INTERNATIONAL CODE COUNCIL
2012 CODE DEVELOPMENT CYCLE

2012 FINAL ACTION AGENDA FOR THE PROPOSED CHANGES TO THE 2012 EDITIONS OF THE

INTERNATIONAL BUILDING CODE®

-FIRE SAFETY

-GENERAL

-MEANS OF EGRESS

-STRUCTURAL

INTERNATIONAL EXISTING BUILDING CODE®
(Structural portions)

INTERNATIONAL FUEL GAS CODE®

INTERNATIONAL MECHANICAL CODE®

INTERNATIONAL PLUMBING CODE®

INTERNATIONAL CODE COUNCIL®

October 22nd, 24th – 28th, 2012

OREGON CONVENTION CENTER

PORTLAND, OR

First Printing

Publication Date: September 2012

PRINTED IN THE U.S.A.

TABLE OF CONTENTS

PAGE

INTRODUCTION

This publication contains the Final Action Agenda for consideration at the Final Action Hearings of the International Code Council on October 22nd, 24th – 28th, 2012 at the Oregon Convention Center in Portland, OR (see page 1). See page xxx for hearing schedule.

This publication contains information necessary for final action consideration of the proposed code changes which have been considered in the ICC Code Development Hearings held on April 29th – May 6th at the Sheraton Dallas Hotel in Dallas, TX. More specifically, this agenda addresses final action consideration for proposed code changes to the *International Building Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Private Sewage Disposal Code,* and *International Existing Building Code (Structural portions),* considered by the respective Code Committee at the Code Development Hearings.

ICC GOVERNMENTAL MEMBER REPRESENTATIVES

Council Policy #28, Code Development (page xiii) requires that applications for Governmental Membership must have been received by April 1st of this year in order for the representatives of the Governmental member to be eligible to vote at this Final Action Hearing. Further, *CP#28* requires that ICC Governmental Member Representatives reflect the eligible voters **30 days prior** to the start of the Final Action Hearings. This includes new, as well as changes, to voting status. Section 7.4 of *CP#28 (page xxiv) reads as follows:*

> **7.4 Eligible voters:** ICC Governmental Member Representatives and Honorary Members in attendance at the Final Action Hearing shall have one vote per eligible attendee on all International Codes. Applications for Governmental Membership must be received by the ICC by April 1st of the applicable year in order for its designated representatives to be eligible to vote at the Final Action Hearing. Applications, whether new or updated, for governmental member voting representative status must be received by the Code Council thirty (30) days prior to the commencement of the first day of the Final Action Hearing in order for any designated representative to be eligible to vote. An individual designated as a Governmental Member Voting Representative shall provide sufficient information to establish eligibility as defined in the ICC Bylaws. The Executive Committee of the ICC Board, in its discretion, shall have the authority to address questions related to eligibility. Decisions of the Executive Committee shall be final and not appealable pursuant to CP 1, other than claims of fraud or misrepresentation, supported by reasonably credible evidence, that were material to the outcome of the Final Action Hearing.

As such, new and updated eligible voter status must be received by ICC's Member Services Department by September 21st, 2012. This must be done via the Electronic Voter Designation System (see p. viii). Access the Electronic Voter Designation System directly by logging on to www.iccsafe.org/EVDS and using the email address and password connected to your Primary Representative account. The online form can also be accessed by logging onto "My ICC" and selecting "Designate Voters" or through the Electronic Voter Designation link in the left hand menu on the ICC home page at www.iccsafe.org. These records will be used to verify eligible voter status for the Final Action Hearing. Voting members are strongly encouraged to review their membership record for accuracy well in advance of the Final Action Hearing so that any necessary changes are made prior to the September 21st deadline. Representatives of any governmental member that has made application for membership after April 1 will not be able to vote.

ICC Policy on Financial Assistance for Governmental Member Voting Representatives

ICC Council Policy #CP-36 defines the circumstances under which it is permissible for Governmental Member Voting Representatives to accept funds to enable a Governmental Member Voting Representative to attend ICC code hearings. The policy seeks to prohibit, or appropriately regulate financial assistance which is designed to increase Participation by a Particular interest group or by those supporting a Particular position on a proposed code change.

Prior to receiving a voting device, each Governmental Member Voting Representative will have to sign a written certification that he/she has complied with ICC policy regarding the receipt of financial assistance in connection with attendance at the hearing. All Governmental Member Voting Representatives will be expected to be familiar with and understand such policy, and to have inquired of ICC well in advance of the hearing regarding any questions or uncertainty about the application of such policy. A Governmental Member Voting Representative who does not sign the compliance certification, or who is determined to ii have accepted financial assistance from a prohibited source, *will NOT be permitted to vote at the hearing.* Improper acceptance of financial assistance, or misrepresentation by a Governmental Member Voting Representative about compliance with CP-36, which are discovered after a code hearing, may result in sanctions regarding voting at future hearings by the Governmental Member Voting Representative or by other Governmental Member Voting Representatives from the same governmental member. CP-36 provides, in pertinent Part:

> **2.0.** **Contributions.** To allow industry and the public to contribute to the goals of the ICC in transparent and accountable processes, organizations and individuals are permitted to contribute financial assistance to Governmental Members to further ICC Code Development Activities provided that:
>
> **2.1** Contributions of financial assistance to Governmental Member Voting Representatives for the purposes of enabling participation in ICC Code Development Activities are prohibited except for reimbursements by the ICC or its subsidiaries, a regional, state, or local chapter of the ICC, or the local, state or federal unit of government such Governmental Member Voting Representative is representing. For the purposes of this policy financial assistance includes the payment of expenses on behalf of the Governmental Member or Governmental Member Voting Representative. Governmental Member Voting Representatives may self-fund for purposes of participating in ICC Activities.
>
> **2.2** A Governmental Member accepting contributions of financial assistance from industry or other economic interests shall do so by action of its elected governing body or chief administrative authority. A Governmental Member Voting Representative may not directly accept financial assistance from industry or other economic interests.
>
> **2.3** Any contributions to a Governmental Member of the ICC shall comply with applicable law, including but not limited to a Governmental Member's ethics, conflict of interest or other similar rules and regulations.

For further information about CP-36, please visit:
http://www.iccsafe.org/MEMBERSHIP/Pages/2010FinancialAssistance.aspx
To view ICC Policy CP-36 please go to the following link:
http://www.iccsafe.org/AboutICC/Documents/CP36-09.pdf

ADVANCE REGISTRATION

The Final Action Hearings are only one component of the 2012 Annual Conference and Hearings. The information required for the Education Program is listed on page vii. **All attendees to the Final Action Hearings are required to register. Registration (see page vi) for the Final Action Hearings is FREE, and is necessary to verify voting status (see above). You are encouraged to register prior to the Final Action Hearings.**

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

AGENDA FORMAT

This Final Action Agenda includes the Consent Agenda and the Individual Consideration Agenda for the code provisions that comprise the 2012 Code Development Cycle. This will complete the Final Action Hearings for the 2012 Code Development Cycle.

The Consent Agenda is comprised of proposed changes to the *International Building Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Private Sewage Disposal Code* (and Structural portions the *International Exiting Building Code*) which did not receive a successful assembly action or public comment, and therefore are not listed on the Individual Consideration Agenda.

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

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

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

MODIFICATIONS & PUBLIC COMMENTS

In addition to modifications made by a committee at the Code Development hearings, *CP#28 Code Development* allows modifications to be made by the assembly at the Code Development Hearings. In addition modifications can be proposed in form of a Public Comment following the Code Development Hearings. The Public Comment deadline was August 1, 2012 and all Public Comments received have been incorporated into this document. <u>Further modifications are not permitted beyond those published in this agenda.</u>

Proposed changes on the Individual Consideration Agenda at the Final Action Hearings may have up to six possible motions - Approval as Submitted, Approval as Modified by the Code Committee, Approval as Modified by a successful Assembly Action, Approval as Modified by a Public Comment, or Disapproval. A Final Action Discussion Guide will be posted and copies available at the hearing which includes a list of allowable motions.

CONSENT AGENDA

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

INDIVIDUAL CONSIDERATION AGENDA

The Final Action Individual Consideration Agenda is comprised of proposals which have an assembly action or public comment. Some code change proposals have multiple Parts (i.e. M38-12, Parts I and II). Where a public comment was submitted to more than one Part of these multiple Part code change proposal, each Part of the code change is heard with the code in which the proposal was originally published, but each Part is published separately (M38-12, Part I and M38-12, Part II) and considered separately. All proposed changes on the Individual Consideration Agenda shall be placed before the assembly for individual consideration of each item. The hearing order is found on page xxxi and the agenda starts on page 1.

ICC FINAL ACTION HEARING PROCESS

The hearing process will follow CP #28. The process is summarized as follows (CP #28 sections noted):

1. At the start of each portion of the hearings (i.e. Fuel Gas, Mechanical, etc.):
   - Requests to withdraw code changes
   - Requests to withdraw public comments
   - Requests to revise the hearing order
   - Consent Agenda voted (Section 7.3.4)

2. The first code change on the Individual Consideration Agenda is brought to the floor with a standing motion to sustain the Committee

3. If the Committee Action is not Disapproval, a motion to approve a modification by a public comment may be presented (Section 7.3.8.3).

4. Public testimony on either the Committee Action (if Disapproval) or the public comment (Section 5.5.1)

5. ICC Governmental Member Representatives and Honorary Members (“eligible voters’) in attendance vote on the motion under consideration. (Section 7.5 for voting majorities)

6. Depending on the motion and action determined by the vote, subsequent allowable motions in accordance with Sections 7.3.8.3 can be considered or voting on the main motion in accordance with 7.3.8.4 is taken. (A Final Action Discussion Guide will be posted and copies available at the hearing which includes a listing of allowable motions.)

7. The final action on the code change determined by a vote of the eligible voters is announced. In accordance with Section 7.3.6, reconsideration is not permitted.

8. Repeat 2 – 7 for subsequent code changes

FINAL ACTION ON CODE CHANGE PROPOSALS RELATIVE TO IBC CHAPTER 34 AND THE IEBC

Code change proposals G201, G202 and G205, considered by the IBC-General Committee, address the scope and application of the *International Building Code,* Chapter 34, and the *International Existing Building Code.* As reported at the Code Development Hearing, the action taken by the IBC-General Committee on these proposals coupled with the final action taken at the 2012 Final Action Hearings will be limited to an advisory recommendation to the ICC Board of Directors who will determine the final disposition on these proposed changes in accordance with Section 1.3 of CP 28, which stipulates that the Board determines the scope of the I-Codes.

ICC WEBSITE - WWW.ICCSAFE.ORG

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

ELECTRONIC VOTING

Electronic voting by the ICC Governmental Member Representative in attendance at the Final Action Hearings, will continue to be used. Eligible voters will be issued a handheld device to be used to cast their vote. Please see "ICC Policy on Financial Assistance for Governmental Member Voting Representatives" on page i.

VIEW THE FINAL ACTION HEARINGS ON YOUR PC

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

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

Registration
Delegate

INTERNATIONAL CODE COUNCIL

2012 Annual Conference and Final Action Hearings
Conference and Hearings October 21 – 28
Oregon Convention Center, Portland

FIRST NAME AND M.I. | LAST NAME/SURNAME

Please select the job title that best fits your current position.

JOB TITLE | OTHER

JURISDICTION/ORGANIZATION

MAILING ADDRESS

CITY | STATE/PROVINCE | ZIP/POSTAL CODE

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

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

Are you an ICC Member? ☐ NO ☐ YES, my ICC Membership Number is: ______________ ☐ Check here if this is your first ICC Conference.

Type of Registration	ICC Member BEFORE SEPTEMBER 1	Nonmember BEFORE SEPTEMBER 1	ICC Member AFTER SEPTEMBER 1	Nonmember AFTER SEPTEMBER 1
☐ Full Conference Registration (includes all business, education and social functions)	$550*	$675*	$610*	$735*
☐ Final Action Hearings only (Registration is required to verify voting status)	FREE Registration		FREE Registration	
☐ One-Day Education ☐ Tuesday, October 23 ☐ Wednesday, October 24	$150	$185	$185	$220

REGISTER BY SEPTEMBER 1 AND SAVE!

All fees are in U.S. dollars.

TOTAL $______________

Payment Options: ☐ BILL ME (ICC MEMBERS ONLY) ☐ CHECK (PAYABLE TO ICC)
☐ VISA ☐ MASTERCARD ☐ AMERICAN EXPRESS

SIGNATURE

CREDIT CARD NUMBER | EXP. DATE | SECURITY CODE†

CARD HOLDERS NAME

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

Cancellation Policy: *All cancellation requests must be received in writing. Cancellations received prior to September 1 will receive a full refund. Requests received between September 2–October 5 will be refunded, less a $50 administrative charge. Cancellations received after October 5 will not be eligible for a refund.*

**Take $10 off when you register online.*

***Payment is required with registration.*

†A three-digit or four-digit number printed on the front or back of the credit card for security purposes.

TO ATTEND EDUCATION SESSIONS, PLEASE COMPLETE THE EDUCATION PROGRAM FORM ON REVERSE.

Save $10 When You Register Online

Register online: www.iccsafe.org/conference

Fax to: (708) 799-2307

Mail to: 2012 ICC Annual Conference
International Code Council
4051 W. Flossmoor Road
Country Club Hills, IL 60478

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

Lodging information available online.

If you have any questions, please call 1-888-ICC-SAFE, x4328 or x4226.

>>>**NOTICE:** ICC requires that facilities are in compliance with the Americans with Disabilities Act regulations. ICC will provide auxillary aids and special services upon request. Please contact Jackie Claus at jclaus@iccsafe.org of your needs.

12-06238

REQUIRED INFORMATION FOR EDUCATION PROGRAM

Last Name ______________________ First Name ______________________

SESSION SELECTION

If you are registering for the full conference, please enter a session name for each time slot. For a list of Education Sessions, please refer to website.
If you are registering for one day of education only, please check the day you will be attending and enter your session name.

☐ **Tuesday, October 23**
1 – 4:15 pm
Session name: ______________________

☐ **Wednesday, October 24**
8 – 11:15 am
Session name: ______________________

EARN CEUs

Earn continuing education recognition for attending sessions at the Conference. Indicate your choice(s) and provide your license or credential number (ID number) for each:

ALABAMA
☐ Board of Heating & Air Conditioning Contractors
ID Number ______________________

CALIFORNIA
☐ Council for Interior Design Certification/CCIDC
ID Number ______________________

CONNECTICUT
☐ Department of Public Safety, Office of Education & Data Management
ID Number ______________________

FLORIDA
☐ Building Code Administrators & Inspectors Board
ID Number ______________________

☐ Florida Professional Engineers Board
ID Number ______________________

GEORGIA
☐ Fire Fighter Standards and Training Council
ID Number ______________________

KANSAS
☐ Johnson County Contractor Licensing
ID Number ______________________

KENTUCKY
☐ Division of Building Code Enforcement, Department of Housing, Buildings, & Construction
ID Number ______________________

MAINE
☐ State Planning Office
ID Number ______________________

MASSACHUSETTS
☐ Board of Building Regulations and Standards
ID Number ______________________

MARYLAND
☐ Hartford County Department of Inspections, License & Permits, Building Services
ID Number ______________________

MICHIGAN
☐ Office of Fire Safety
ID Number ______________________

☐ Bureau of Construction Codes
ID Number ______________________

MISSOURI
☐ Board of Professional Registration – APELSLA
ID Number ______________________

NEW JERSEY
☐ Department of Community Affairs, Division of Codes and Standards
ID Number ______________________

☐ Department of Community Affairs, Division of Fire Safety
ID Number ______________________

NEW YORK
☐ Department of State, Codes Division
Requires Social Security # ______________________
ID Number ______________________

☐ Department of State, Office of Fire Prevention
Requires Social Security # ______________________
FDID #/City Code ______________________
County Code ______________________
ID Number ______________________

NORTH CAROLINA
☐ Code Officials Qualification Board
Requires Driver's License # ______________________
ID Number ______________________

OHIO
☐ Ohio Department of Commerce, Board of Building Standards
ID Number ______________________

☐ Ohio Department of Commerce, Division of Industrial Compliance, Plumbing Section
ID Number ______________________

OKLAHOMA
☐ Construction Industries Board, Inspector Examining Committee
ID Number ______________________

PENNSYLVANIA
☐ Department of Labor and Industry
ID Number ______________________

RHODE ISLAND
☐ State Building Code Commission
ID Number ______________________

SOUTH CAROLINA
☐ Department of Labor, Licensing and Regulation Board of Building Codes Council
ID Number ______________________

TENNESSEE
☐ Commerce and Insurance, Fire Prevention Division (aka State Fire Marshal's Office)
ID Number ______________________

TEXAS
☐ Department of Licensing and Regulation, Electrical Safety and Licensing Advisory Board
ID Number ______________________

UTAH
☐ Division of Occupational and Professional Licensing, Contractor Licensing
ID Number ______________________

WISCONSIN
☐ Safety and Buildings Division
ID Number ______________________

☐ **AMERICAN INSTITUTE OF ARCHITECTS**
ID Number ______________________

☐ **AMERICAN SOCIETY OF HOME INSPECTORS**
ID Number ______________________

☐ **INTERNATIONAL CODE COUNCIL**
ID Number ______________________

☐ **OTHER**
ID Number ______________________

Many professional organizations, boards, and state agencies recognize ICC educational offerings. If you do not find your professional organization or agency listed above, you may still be able to earn continuing education credit by attending these educational sessions. To find out if a specific ICC offering has been recognized by a specific board/agency for continuing education credit, contact the applicable agency/board. ICC cannot guarantee that a specific professional board, organization, or agency will recognize an ICC educational offering.

ICC INTERNATIONAL CODE COUNCIL®

People Helping People Build a Safer World™

Need more information? See the frequently asked questions on the other side of this flyer.

MAKE YOUR VOICE HEARD AND YOUR VOTE COUNT

Designate your voters via the new Electronic Voter Designation System online - by Sept. 21, 2012.

ICC Primary Representatives may have from 4 to 12 Governmental Member Voting Representatives (GMVRs) depending on your population. Make sure you get the full benefits of your ICC Governmental Membership by designating all voters you are eligible for.

Now, designating your GMVRs is easier than ever with the new online Electronic Voter Designation System. Since this is the first year of the Electronic Voting Designation System, ALL Primary Representatives must follow the Quickstart instructions below to add any and all eligible GMVRs, including themselves if they intend to vote.

Quickstart instructions for the Electronic Voter Designation System:

- **Access the Electronic Voter Designation area** directly by logging on to **www.iccsafe.org/EVDS** and using the email address and password connected to your Primary Representative account. You can also access the form if you either log on to "My ICC" and select "Designate Voters" or through the Electronic Voter Designation link in the left hand menu on the ICC home page at **www.iccsafe.org**.
- **Click on "Add Candidate"** to designate GMVRs.
- You will be prompted to complete a questionnaire about each individual you designate. After the questionnaire is completed, the individual's name will be added to the pending GMVR's area. ICC will review each candidate and either approve the candidate as a GMVR or contact you for further information.

HURRY! Every ICC Primary Representative who intends to have GMVRs validated in time to vote at this year's Annual Business Meeting or Final Action Hearings MUST use this online tool before Sept. 21, 2012 to designate their voting representatives, even those GMVRs who have voted in the past.

ICC's Member Services team is available to assist you.

1-888-422-7233 x33804 | members@iccsafe.org | www.iccsafe.org/EVDS

INTERNATIONAL CODE COUNCIL

People Helping People Build a Safer World™

Follow the Quickstart instructions on the other side of this flyer.

Frequently Asked Questions

Why do we have an updated voter designation process?

- The Board of Directors instituted the new Electronic Voter Designation System to further enhance the code development process.
- This online tool documents additional information about Governmental Member Voting Representatives (GMVRs) in order to address concerns that have been raised about eligibility at recent hearings.
- Collecting more information about GMVRs enhances public confidence that only eligible voters are voting, expedites the voter validation process and enables ICC to more readily resolve eligibility questions that are raised by stakeholders.

Who needs to use the new Electronic Voter Designation System?

- Every Primary Representative who intends to have GMVRs validated in time to vote at this year's Annual Business Meeting or Final Action Hearings must use this online tool to designate the Member's voting representatives, *even those GMVRs who have voted in the past*.

When does the Primary Representative need to validate the Member's Voting Representatives?

- The online questionnaire must be completed by the Primary Representative at least 30 days prior to the Annual Business Meeting. This year that means that they need to be filled out by Sept. 21, 2012.

How many GMVRs does my Jurisdiction have?

POPULATION	VOTING REPRESENTATIVES
0 to 50,000	4
50,001 to 150,000	8
Over 150,000	12

Who has access to the new system?

- Only Primary Representatives have access to the new system in order to ensure that the Primary Representative has the sole responsibility for the information provided.

Does a Primary Representative need to revalidate GMVRs every year?

- Yes.
- The process is simple: If there are no changes to a GMVR's status, the Primary Representative may simply confirm all information remains the same and recertify that individual. If changes to a GMVR, or to an existing GMVR's job title or job description, the Primary Representative must edit the information previously submitted, in which case ICC will review the information and either validate the individual to vote or contact the Primary Representative for further information.

Whom may I contact if I have questions?

- ICC's Member Services team is available to help every step of the way via email or telephone.

ICC's Member Services team is available to assist you.

1-888-422-7233 x33804 | members@iccsafe.org | www.iccsafe.org/EVDS

12-05886

2012/2013/2014 ICC CODE DEVELOPMENT SCHEDULE

(Updated May 18, 2012)

THIS UPDATE REMOVES THE IgCC FROM GROUP B TO A NEW GROUP C IN 2014

STEP IN CODE DEVELOPMENT CYCLE	**DATE**		
	2012 – Group A Codes IBC, IFGC, IMC, IPC, IPSDC	**2013 – Group B Codes Admin, ICCPC, IEBC, IECC, IFC, IPMC, ISPSC, IRC, IWUIC, IZC**	**2014 – Group C Code IgCC (See notes for date information)**
2012 EDITION OF I-CODES PUBLISHED	April 30, 2011		March 31, 2012
DEADLINE FOR RECEIPT OF APPLICATIONS FOR ALL CODE COMMITTEES	June 1, 2011 (updated to July 1 for IECC and IRC – Energy; August 1 for IgCC and ISPSC)		
DEADLINE FOR RECEIPT OF CODE CHANGE PROPOSALS	January 3, 2012	January 3, 2013	January 6, 2014
WEB POSTING OF "PROPOSED CHANGES TO THE I-CODES"	March 12, 2012	March 11, 2013	March TBD
DISTRIBUTION DATE OF "PROPOSED CHANGES TO THE I-CODES" (CD only)	April 2, 2012	April 1, 2013	April TBD
CODE DEVELOPMENT HEARING (CDH)	April 29 – May 6, 2012 Sheraton Dallas Hotel Dallas, TX	April 21 – 28, 2013 Sheraton Dallas Hotel Dallas, TX	April/May TBD (Date/location pending)
WEB POSTING OF "REPORT OF THE PUBLIC HEARING"	June 8, 2012	May 31, 2013	June TBD
DISTRIBUTION DATE OF "REPORT OF THE PUBLIC HEARING" (CD only)	June 29, 2012	June 21, 2013	June/July TBD
DEADLINE FOR RECEIPT OF PUBLIC COMMENTS	August 1, 2012	July 15, 2013	July/August TBD
WEB POSTING OF PUBLIC COMMENTS "FINAL ACTION AGENDA"	September 10, 2012	August 28, 2013	August/September TBD
DISTRIBUTION DATE OF PUBLIC COMMENTS "FINAL ACTION AGENDA" (CD only)	October 1, 2012	September 16, 2013	September/October TBD
FINAL ACTION HEARING (FAH)	October 24 – 28, 2012 Oregon Convention Center Portland, OR	October 2 – 9, 2013 Atlantic City Convention Center Atlantic City, NJ	October/November TBD (Date/location pending)
ANNUAL CONFERENCES	October 21 – 24, 2012 Oregon Convention Center Portland, OR	September 29 – October 2, 2013 Atlantic City Convention Center Atlantic City, NJ	October/November TBD (Date/location pending)

Notes:

- New Group C in 2014: The deadline for receipt of code change proposals to the 2012 IgCC is January 6, 2014. All other Group C dates are pending confirmation of the dates of the CDH and FAH. As soon as the CDH and FAH dates are determined, an updated schedule will be posted.

- Be sure to review the "Group A and Group B Code Development Committee Responsibilities" posted at www.iccsafe.org/responsibilities which identifies committee responsibilities which are different than Group A and Group B codes which may impact the applicable code change cycle and resulting code change deadline.

- The International Green Construction Code (IgCC) and International Swimming Pool and Spa Code (ISPSC) were subjected to a full cycle of code development in 2011 resulting in 2012 editions published in March/2012

- Group B "Admin" includes code change proposals submitted to Chapter 1 of all the I-Codes except the ICCPC, IECC, IgCC, IRC and ISPSC. Group B "Admin" also includes administrative update of referenced standards in all I-Codes, including IgCC.

- A comprehensive review of the 2012 – 2014 code groupings will be performed upon receipt of IgCC code change proposals in January/2014 with the potential for 2015 – 2017 code groupings to change. Any changes will be posted at that time. The 2015 – 2017 Cycle will begin with Group A code change proposals due January 5, 2015.

2012/2013/2014 STAFF SECRETARIES

GROUP A (2012)

IBC-Fire Safety Chapters 7, 8, 9, 14, 26	IBC-General Chapters 1-6, 12, 13, 27-34	IBC-Means of Egress Chapters 10, 11	IBC-Structural Chapters 15-25
Ed Wirtschoreck ICC Chicago District Office 1-888-ICC-SAFE, ext 4317 FAX: 708/799-0320 ewirtschoreck@iccsafe.org	Beth Tubbs ICC Northbridge Field Office 1-888-ICC-SAFE, ext 7708 FAX: 419/ 730-6531 btubbs@iccsafe.org	Kim Paarlberg ICC Indianapolis Field Office 1-888-ICC-SAFE, ext 4306 FAX: 708/799-0320 kpearlberg@iccsafe.org	Alan Carr ICC NW Resource Center 1-888-ICC-SAFE, ext 7601 FAX: 425/637-8939 acarr@iccsafe.org
IFGC	**IMC**	**IPC/IPSDC**	
Gregg Gress ICC Chicago District Office 1-888-ICC-SAFE, ext 4343 FAX: 708/799-0320 ggress@iccsafe.org	Gregg Gress ICC Chicago District Office 1-888-ICC-SAFE, ext 4343 FAX: 708/799-0320 ggress@iccsafe.org	Fred Grable ICC Chicago District Office 1-888-ICC-SAFE, ext 4359 FAX: 708/799-0320 fgrable@iccsafe.org	

GROUP B (2013)

ADMINISTRATIVE Chapter 1 All Codes Except IRC	IEBC	IECC-Commercial	IECC-Residential
Kim Paarlberg ICC Indianapolis Field Office 1-888-ICC-SAFE, ext 4306 FAX: 708/799-0320 kpearlberg@iccsafe.org	Beth Tubbs ICC Northbridge Field Office 1-888-ICC-SAFE, ext 7708 FAX: 419/ 730-6531 btubbs@iccsafe.org	Kermit Robinson ICC Chicago District Office 1-888-ICC-SAFE, ext 3317 FAX: : 562/ 699-4522 krobinson@iccsafe.org	Elaine Deak ICC Chicago District Office 1-888-ICC-SAFE, ext 4422 FAX: 708/799-0320 edeak@iccsafe.org
IFC	**ICC PC**	**IPMC**	**IRC-Building**
Bill Rehr/ Beth Tubbs ICC Chicago District Office 1-888-ICC-SAFE, ext 4342 FAX: 708/799-0320 brehr@iccsafe.org btubbs@iccsafe.org	Beth Tubbs ICC Northbridge Field Office 1-888-ICC-SAFE, ext 7708 FAX: 419/ 730-6531 btubbs@iccsafe.org	Ed Wirtschoreck ICC Chicago District Office 1-888-ICC-SAFE, ext 4317 FAX: 708/799-0320 ewirtschoreck@iccsafe.org	Larry Franks/ Allan Bilka ICC Birmingham District Office 1-888-ICC-SAFE, ext 5279 FAX: 205/592-7001 lfranks@iccsafe.org abilka@iccsafe.org
IRC Mechanical	**IRC Plumbing**	**ISPSC**	**IWUIC**
Gregg Gress ICC Chicago District Office 1-888-ICC-SAFE, ext 4343 FAX: 708/799-0320 ggress@iccsafe.org	Fred Grable ICC Chicago District Office 1-888-ICC-SAFE, ext 4359 FAX: 708/799-0320 fgrable@iccsafe.org	Fred Grable ICC Chicago District Office 1-888-ICC-SAFE, ext 4359 FAX: 708/799-0320 fgrable@iccsafe.org	Bill Rehr ICC Chicago District Office 1-888-ICC-SAFE, ext 4342 FAX: 708/799-0320 brehr@iccsafe.org
IZC			
Ed Wirtschoreck ICC Chicago District Office 1-888-ICC-SAFE, ext 4317 FAX: 708/799-0320 ewirtschoreck@iccsafe.org			

GROUP C (2014)

IgCC-General (Chapters: 1-5, 9-12, and Appendices)	IgCC-Energy/Water (Chapters: 6 and 7)	IgCC Indoor Environmental Quality (Chapter 8)
Allan Bilka ICC Chicago District Office 1-888-ICC-SAFE, ext 4326 FAX: 708/799-0320 abilka@iccsafe.org	Fred Grable ICC Chicago District Office 1-888-ICC-SAFE, ext 4359 FAX: 708/799-0320 fgrable@iccsafe.org	Gregg Gress ICC Chicago District Office 1-888-ICC-SAFE, ext 4343 FAX: 708/799-0320 ggress@iccsafe.org

CP# 28-05 CODE DEVELOPMENT

Approved: **9/24/05**
Revised: **10/29/11**

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

1.0 Introduction

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

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

1.2.1 The timely evaluation and recognition of technological developments pertaining to construction regulations.
1.2.2 The open discussion of proposals by all Parties desiring to Participate.
1.2.3 The final determination of Code text by public officials actively engaged in the administration, formulation or enforcement of laws, ordinances, rules or regulations relating to the public health, safety and welfare and by honorary members.

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

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

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

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

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

2.0 Code Development Cycle

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

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

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

2.4 **Emergency Procedures:**

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

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

2.4.3 **Board and Member Action:** In the event that the ICC Board determines that an emergency amendment to any Code is warranted, the same may be adopted by the ICC Board. Such action shall require an affirmative vote of at least two-thirds of the ICC Board.

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

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

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

3.0 **Submittal of Code Change Proposals**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.3.4.5 The proposed text shall be in mandatory terms.

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

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

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

3.3.5.3 **Substantiation:** The proponent shall substantiate the proposed code change based on technical information and substantiation. Substantiation provided which is reviewed in accordance with Section 4.2 and determined as not germane to the technical issues addressed in the proposed code change may be identified as such. The proponent shall be notified that the proposal is considered an incomplete proposal in accordance with Section 4.3 and the proposal shall be held until the deficiencies are corrected. The proponent shall have the right to appeal this action in accordance with the policy of the ICC Board. The burden of providing substantiating material lies with the proponent of the code change proposal. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

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

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

3.3.5.6 **Cost Impact:** The proponent shall indicate one of the following regarding the cost impact of the code change proposal: 1) the code change proposal will increase the cost of construction; or 2) the code change proposal will not increase the cost of construction. The proponent should submit information that supports their claim. Any information submitted will be considered by the code development committee. This information will be included in the bibliography of the published code change proposal.

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

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

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

3.6.1 **Code References:**

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

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

3.6.2 **Standard Content:**

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

3.6.2.2 The standard shall be appropriate for the subject covered.

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

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

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

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

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

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

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

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

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

3.6.3 Standard Promulgation:

3.6.3.1 Code change proposals with corresponding changes to the code text which include a reference to a proposed new standard or a proposed update of an existing referenced shall comply with this section. The standard shall be completed and readily available prior to Final Action Consideration based on the cycle of code development which includes the proposed code change proposal. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If a new standard is not submitted in at least draft form, the code change shall be considered incomplete and shall not be processed. Updating of standards without corresponding code text changes shall be accomplished administratively in accordance with Section 4.5.

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

4.0 Processing of Proposals

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

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

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

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

4.5 Updating Standards:

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

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

4.7 Publication: All code change proposals shall be posted on the ICC website at least 30 days prior to the public hearing on those proposals and shall constitute the agenda for the public hearing.

Code change proposals which have not been published shall not be considered.

5.0 Public Hearing

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

5.2 Committee: The Code Development Committees shall be appointed by the Board of Directors.

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

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

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

5.2.4 Committee Composition: The committee may consist of representation from multiple interests.

A minimum of thirty-three and onEthird percent (33.3%) of the committee members shall be regulators.

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

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

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

5.4.2 Open Meetings: Public hearings of the Code Development Committees are open meetings. Any interested person may attend and Participate in the Floor Discussion and Assembly Consideration portions of the hearing. Only eligible voters (see Section 5.7.4) are permitted to vote on Assembly Considerations. Only Code Development Committee members may Participate in the Committee Action portion of the hearings (see Section 5.6). Participants shall not advocate a position on specific code changes with Committee Members other than through the methods provided in this policy.

5.4.3 Presentation of Material at the Public Hearing: Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 5.5.2. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 3.3.4.4 and other material submitted in response to a code change proposal shall be located in a designated area in the hearing room and shall not be distributed to the code development committee at the public hearing.

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

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

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

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

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

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

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

5.5.1 Discussion Order:

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

.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

5.7.3 **Assembly Action:** A successful assembly action shall be a majority vote of the votes cast by eligible voters (See 5.7.4).

5.7.4 **Eligible Voters:** All members of ICC in attendance at the public hearing shall be eligible to vote on floor motions. Each member is entitled to one vote, except that each Governmental Member Voting Representative in attendance may vote on behalf of its Governmental Member. Code Development Committee members shall be eligible to vote on floor motions. Application, whether new or updated, for ICC membership must be received by the Code Council ten days prior to the commencement of the first day of the public hearing.

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

6.0 Public Comments

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

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

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

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

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

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

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

6.4.3 **Multiple public comments to a code change proposal.** A proponent shall not submit multiple public comments to the same code change proposal. When a proponent submits multiple public comments to the same code change proposal, the public comments shall be considered as incomplete public comments and processed in accordance with Section

6.5.1. This restriction shall not apply to public comments that attempt to address differing subject matter within a code section.

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

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

6.4.5 Supporting Information: The public comment shall include in a statement containing a reason and justification for the desired final action on the code change proposal. Reasons and justification which are reviewed in accordance with Section 6.4 and determined as not germane to the technical issues addressed in the code change proposal or committee action may be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 6.5.1 and the public comment shall be held until the deficiencies are corrected. The public commenter shall have the right to appeal this action in accordance with the policy of the ICC Board. A bibliography of any substantiating material submitted with a public comment shall be published with the public comment and the substantiating material shall be made available at the Final Action Hearing. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

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

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

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

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

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

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

7.0 Final Action Consideration

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

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

Sections 5.7 and 6.0).

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

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

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

7.3.3 Presentation of Material at the Public Hearing: Information to be provided at the hearing shall be limited to verbal presentations. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 6.4.4 and other material submitted in response to a code change proposal or public comment shall be located in a designated area in the hearing room.

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

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

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

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

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

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

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

7.3.8.2 Initial Motion: The Code Development Committee action shall be the initial motion considered.

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

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

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

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

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

7.4 **Eligible voters:** ICC Governmental Member Representatives and Honorary Members in attendance at the Final Action Hearing shall have one vote per eligible attendee on all International Codes. Applications for Governmental Membership must be received by the ICC by April 1st of the applicable year in order for its designated representatives to be eligible to vote at the Final Action Hearing. Applications, whether new or updated, for governmental member voting representative status must be received by the Code Council thirty (30) days prior to the commencement of the first day of the Final Action Hearing in order for any designated representative to be eligible to vote. An individual designated as a Governmental Member Voting Representative shall provide sufficient information to establish eligibility as defined in the ICC Bylaws. The Executive Committee of the ICC Board, in its discretion, shall have the authority to address questions related to eligibility. Decisions of the Executive Committee shall be final and not appealable pursuant to CP 1, other than claims of fraud or misrepresentation, supported by reasonably credible evidence, that were material to the outcome of the Final Action Hearing.

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

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

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

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

8.0 Appeals

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

2012 ICC CODE DEVELOPMENT CYCLE
ERRATA TO THE 2012
REPORT OF THE PUBLIC HEARING

NOTE: Changes/Corrections are highlighted.

IBC – FIRE SAFETY

FS94-12

Committee Action: Approved as Modified

Modify proposal as follows:

716.5.8 Glazing material. Fire-protection-rated glazing and fire-resistance-rated glazing conforming to the opening protective requirements in Section 716.5 shall be permitted in *fire door* assemblies.

(Portions of the proposal not shown remain unchanged).

Committee Reason: The committee agreed that the proposal clarified the differences between fire-resistance-rated glazing and fire-protection-rated glazing regarding code application. The modification simply extends this differentiation to Section 716.5.8.

Assembly Action: None

IBC – MEANS OF EGRESS

E70-12

Committee Action: Approved as Modified

Modify proposal as follows:

1008.1.9.7 (IFC [B] 1008.1.9.7) Delayed egress. Delayed egress locking systems, shall be permitted to be installed on doors serving any occupancy except Group A, E, and H occupancies in buildings that are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved* automatic smoke or heat detection system installed in accordance with Section 907. The locking system shall ~~allow immediate free egress and shall~~ be installed and operated in accordance with Items 1 through 7 below. A building occupant shall not be required to pass through more than one door equipped with a delayed egress ~~lock~~ locking system before entering an *exit.*

1. The delay electronics of the delayed egress locking system shall deactivate upon actuation of the *automatic sprinkler system* or automatic fire detection system, allowing immediate, free egress.
2. The delay electronics of the delayed egress locking system shall deactivate upon loss of power controlling the lock or lock mechanism, allowing immediate free egress.
3. The ~~delay electronics~~ delayed egress locking system shall have the capability of being deactivated at the fire command center and other approved locations.
4. An attempt to egress shall initiate an irreversible process which shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for *not more than 3 seconds*. ~~The effort to open the door shall not require a force greater than 30 pounds (133N).~~ Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only.

   Exception: Where approved, a delay of not more than 30 seconds is permitted on a delayed egress door.

5. A sign shall be provided on the door located above and within 12 inches (305mm) of the door exit hardware reading: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 (30) SECONDS. The sign shall comply with the visual character requirements in ICC A117.1.
6. Emergency lighting shall be provided on the egress side of the door.
7. ~~All components of~~ The ~~door~~ delayed egress locking system units shall be listed in accordance with UL 294.

Committee Reason: The modification coordinates with the terminology used in the referenced standard, UL 294 and recognizes that locks are Part of a system. The modification also coordinates with the suggested language clarifications brought up in E71. Deletion of “immediate free egress” is consistent with the idea of delayed egress locking systems. The updated language will improve consistency between the code and the industry. The reference to UL294 would provide consistency between the different types of access control systems.

Assembly Action: **None**

IBC – MEANS OF EGRESS

S114-12

Committee Action: **Approved as Modified**

Modify proposal as follows:

1703.1 Approved agency. An *approved agency* shall provide all information as necessary for the *building official* to determine that the agency meets the applicable requirements specified in Sections 1703.1.1 through ~~1703.1.4~~ 1703.1.3.

(Portions of proposal not shown are unchanged)

Committee Reason: The committee supports clarifying to whom an approved agency must disclose conflicts of interest and including the registered design professional in addition to the building official in a good idea. The floor modification corrects a section reference.

Assembly Action: **None**

S276-12

Committee Action: **Disapproved**

Committee Reason: This code change potentially extends the application of the conventional construction provisions to buildings not originally intended.

Assembly Action: **None**

S319-12

Committee Action: **Approved as Submitted**

Committee Reason: This code change aligns the IBC appendix with FEMA requirements and ASCE 24. It also clarifies the appendix by coordinating the wording of Section G102.1 with the remainder of the appendix.

Assembly Action: **None**

PLUMBING

P19-12

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent’s written reason statement.

Assembly Action: **None**

P20-12

This code change was heard by the IBC Structural code development committee.

Committee Action: **Approved as Submitted**

Committee Reason: The changes are basically editorial in nature and will improve clarity of this section.

Assembly Action: **None**

P80-12

Committee Action: **Approved as Modified**

Modify the proposal as follows:

504.6 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

(Items 1-9 remain unchanged)

10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or flood level rim of a waste receptor ~~flood level rim~~.

Committee Reason: The committee modified the proposal to read more clearly. The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

P116-12

Committee Action: **Approved as Modified**

Modify the proposal as follows:

TABLE 605.7
VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASTM F1970, CSA B125.3
Copper or copper alloy	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASME B16.34, CSA B125.3, MSS SP-67, MSS SP-80, MSS SP110
Gray and ductile Iron	~~ASTM A126,~~ AWWA C500, AWWA C504, AWWA C507, MSS SP-67, MSS SP-70, MSS SP-71, MSS SP-72, MSS SP-78~~, MSS SP110,~~
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, CSA B125.3, NSF 359
Polypropylene (PP) plastic	ASTM F2389, ASME A112.4.14
Polyvinyl chloride (PVC) plastic	ASME A112.4.14, ASTM F1970

Committee Reason: The committee modified the proposal because one standard was placed in the wrong row and another standard was left out of another row. The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

P142-12

Committee Action: Approved as Modified

Modify the proposal as follows:

608.13.10 Dual check ~~valve~~ backflow preventer. Dual check ~~valve~~ backflow preventers shall conform to ASSE 1024 or CSA B64.6.

Committee Reason: The modification was made to correct the name of the device to be inline with the title of the standard. The committee agreed with the proponent's written reason statement.

Assembly Action: None

2012 FINAL ACTION HEARING SCHEDULE
October 22 – 28, 2012
Oregon Convention Center, Portland, OR

On Monday, October 22nd following the Foundation Luncheon, there will be a cdp ACCESS Update in the hearing room starting at 1:15 pm. The update is scheduled to be completed by 2:45 pm. The hearings will start with the IFGC following the conclusion of the cdp ACCESS Update, but no earlier than 2:30 pm in the event that the update finishes early. The IFGC is scheduled to finish on Monday. The IPC, IMC and IBC hearings will not start until 1:00 pm on Wednesday, following the Awards Luncheon.

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

The schedule anticipates that the hearings will be completed no later than 8 pm on Sunday, October 28th. This may require adjustments to the daily start/end times based on hearing progress. Be sure to review the published hearing order for code changes that are heard with a code other than that indicated by the code change prefix (see note 6).

Monday **October 22**	**Tuesday** **October 23**	**Wednesday** **October 24**	**Thursday** **October 25**	**Friday** **October 26**	**Saturday** **October 27**	**Sunday** **October 28**
Start 2:30 pm **IFGC** **End 5 pm**	**NO HEARINGS**	**Start 1 pm** **IPC** **IMC** **End 5 pm**	**Start 8 am** **IMC** **IBC - FS** (start no earlier than 8 am) **IBC - G** **End 9 pm**	**Start 8 am** **IBC – G** **IBC - E** **End 9 pm**	**Start 8 am** **IBC – E** **IEBC – S** (start no earlier than 1 pm) **IBC - S** **End 9 pm**	**Start 8 am** **IBC - S** **End 8 pm**

Notes:

1. The IFGC hearings will start on Monday, October 22nd following the cdp ACCESS update but no earlier than 2:30 pm.
2. The IEBC – S hearing will consider the proposed changes to the structural provisions of the IEBC which were acted on by the IBC – S Code Committee at the 2012 Code Development Hearings.
3. Daily start and end hearing times are subject to change based on progress.
4. Mid-morning, lunch, mid-afternoon and dinner breaks to be announced.
5. Due to the uncertainties in the hearing process, start times indicated as "Start no earlier than x am/pm" are conservatively estimated and are not intended to be scheduled targets.
6. Consult the hearing order for code changes to be heard with a code other than the code under which the code change is designated.

TENTATIVE HEARING ORDER
FOR EACH INDIVIDUAL CONSIDERATION AGENDA

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

IFGC
(See page 1)
FG2-12
FG3-12, Part I
FG3-12, Part II
FG5-12
FG8-12
FG11-12
FG13-12
FG15-12
FG16-12
FG17-12
FG21-12
FG22-12
FG24-12
FG29-12
FG31-12
FG32-12
FG34-12
FG35-12
FG36-12
FG40-12

IPC
(See page 42)
P11-12
    P223-12
    P225-12
P12-12
P14-12
P15-12
P16-12
P18-12
P21-12
P26-12
P28-12
P29-12
P35-12
P36-12
P42-12
P45-12
P53-12
P54-12
P58-12
P62-12
P64-12
P71-12
P72-12
P82-12
P89-12
P90-12
P91-12
P92-12
P101-12
P103-12
    P165-12
    P229-12
P107-12
P108-12
P117-12
P123-12
P126-12
P128-12
P129-12
P130-12
P131-12
P135-12
P139-12
P142-12
P145-12
P147-12
P152-12
P155-12
P156-12
P159-12
P164-12
P166-12
P167-12
P168-12
P170-12
P173-12
P177-12
P181-12
P182-12
P189-12
P195-12
P196-12
P198-12
P205-12
P206-12
P209-12
P211-12
P218-12
P219-12
P221-12
P222-12
P231-12

IMC
(See page 213)
M3-12
M16-12
M23-12
M26-12
M29-12
M32-12
M38-12, Part I
M38-12, Part II
M39-12, Part I
M39-12, Part II
M40-12
M42-12
M50-12
M52-12
M56-12
M58-12
M66-12
M73-12
M74-12
M76-12
M79-12
M80-12
M84-12
M89-12
M95-12
M99-12
M105-12
M111-12
M112-12
M123-12
M126-12
M129-12
M130-12
M131-12
M133-12
M134-12
M136-12
M137-12
M138-12
M139-12
M140-12
M143-12
M149-12
M151-12
M154-12
M155-12
M158-12
M161-12
M165-12
M175-12
M181-12
M188-12
M192-12
M199-12
M209-12
M214-12
M215-12

IBC Fire Safety
(See page 360)
FS3-12
FS5-12
FS6-12
FS8-12
FS15-12
FS16-12
FS17-12
FS20-12
FS22-12
FS24-12
FS26-12
FS27-12
FS31-12
FS32-12
FS37-12

IBC-General
(See page 626)

IBC-Means of Egress
(See page 1037)

E126-12
E127-12
E132-12
E135-12
E137-12
E141-12
    E85-12
E144-12
E154-12
E155-12
E160-12
E169-12
E174-12
E176-12
E183-12
E186-12
E191-12
E192-12
E200-12
E203-12
E206-12
E215-12
E216-12
    E225-12
E224-12
    G234-12
    G236-12
    G237-12
    G240-12

IEBC
(Structural portions)
(See page 1257)

EB23-12
EB26-12
EB36-12
EB37-12
EB38-12
EB39-12
EB42-12
    G213-12, Part II
EB1-12
EB2-12
EB3-12
EB12-12
EB14-12
    G211-12
    G212-12
EB6-12 Part I
EB6-12, Part II
EB7-12
    G222-12
    G224-12, Part I

IBC-Structural
(See page 1300)
S4-12
    G20-12
S9-12
S11-12
S13-12
S14-12
S15-12
S18-12
S25-12
S29-12
S31-12
    S37-12
S33-12
S34-12
S35-12
    S28-12
S53-12
S60-12
S61-12
S62-12
S64-12
S69-12
S71-12
S72-12
S75-12
S77-12
S79-12
S81-12
S86-12
S87-12
S94-12
S97-12
S98-12
S102-12
    S319-12
    S323-12
    S336-12
    S337-12
S107-12
S109-12
S110-12
S111-12
    S335-12
S114-12
S118-12
S121-12
S123-12
S128-12
S133-12
S134-12
S135-12
S136-12
S137-12
S145-12
S146-12
S150-12
S156-12
S159-12
S163-12
S171-12
S172-12
S175-12
S181-12
S184-12
S190-12
S199-12
S202-12
S203-12
S213-12
S235-12
S240-12
S244-12
    G26-12
S253-12
S254-12
S256-12
S257-12
S260-12
S265-12
S268-12
    G16-12
S273-12
S276-12
S280-12
S281-12
S283-12
S287-12
S288-12
S291-12
S292-12
S298-12
S299-12
S300-12
S305-12
    S258-12
S308-12
S310-12
S311-12
    FS168-12
    FS192-12
    FS194-12
    FS195-12
S315-12, Part I
S315-12, Part II

2012 ICC CODE DEVELOPMENT CYCLE
CROSS INDEX OF PROPOSED CODE CHANGES WITH PUBLIC COMMENTS

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

Listed in this index are proposed code changes that include sections or codes other than those listed on page xxix. For example, International Building Code Section 505.2.3 is proposed for revision in code change E7-12. The International Building Code Chapter 5 is the responsibility of the IBC General Code Committee as listed in the table of Staff Secretaries. It is therefore identified in this index. Another example is Section 617 of the International Fuel Gas Code. The IFGC is maintained by the IFGC code committee, and the proposed revision to Section 617 was considered for revision in code change G193-12, Part III. In some instances, there are other subsections that are revised by an identified code change that are not included in the list. For example, numerous sections in Chapter 10 of the International Fire Code would be revised by the proposed changes to Chapter 10 of the IBC. This was done to keep the list brief enough for easy reference.

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

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

PREFIX	PROPOSED CHANGE GROUP (see Table of Contents on page xxxiii for location)
FS	International Building Code - Fire Safety
G	International Building Code - General
E	International Building Code - Means of Egress
S	International Building Code - Structural
EB	International Existing Building Code
FG	International Fuel Gas Code
M	International Mechanical Code
P	International Plumbing Code

International Building Code		Table 2902.1	P28, P29
		2902.3	P35
101.4	G201	3008.9	FS138
101.4.7 (New)	G201	3111.1	S3
104.11.3 (New)	FS73	3306.8	S90
107.2.6	G198	3311.1	E2 Part III
116.5	G201	**International Existing Building Code**	
202	P29		
403.5	E7	402	G205
404.6	FS41, FS99	403	G205
405.7.1	E3	403.1	G212
410.6.1	E3	403.4	G211
411.7	E3	404	G205
414.7.2	E3	405	G205
505.2.3	E7	406	G205
Table 705.8	G59	406.1	G225
706.1	G103	410	G205
707.3.	E7	410.6	G236, G237
707.5.1	E7	410.7	G237, G240
707.7.1	E7	410.7.1	G240
711.4	E7	410.8 (New)	G237
712.1.8	G54, E7	410.8.1 (New)	G237
712.1.12	E7	410.8.9	G236
713.1	E7	907.2	G213 Part II
713.14.1	E110	907.2.1	G213 Part II
715.1	G15	907.2.2	G213 Part II
715.2	G15	1104.5	E2 Part III
716.5.3	E3	1401.2	G244
905.3.3	E2 Part III	1401.6	G244
905.4	E2 Part III	1401.6.2	G244
905.20	G86	1401.6.4	G244
907.2.13.2	E2 Part III	Table 1401.6.4	G244
907.5.2.2	E2 Part III	1401.6.5	G244
909.9	S70	Table 1401.6.5	G244
909.20	G86	1401.6.7	G244
911.1.5	E2 Part III	1401.6.8	G244
Table 1004.1.2	G193 Part I	Table 1401.6.8	G244
1005.7.2	G73	1401.6.8.1	G244
1009.3	FS99, G86	1401.6.9	G244
1103.2.11	G41	Table 1401.6.9	G244
1203.1	M38, M39	1401.6.10	G244
1403.7	S102	Table 1401.6.10	G244
1609.1.2	G199	1401.6.11	G244
1808.7.3	G193	Table 1401.6.11	G244
2103.15(New)	FS177	1401.6.12	G244
2304.11.6	G16	Table 1401.6.21.1 (New)	G244
2405.3	G199	1401.6.21.1.1(New)	G244
2607.4	G199	1401.6.21.2(New)	G244
2609.4	G193, G199	Table 1401.6.21.2(New)	G244
2902.1	P26	1401.6.21.2.1(New)	G244

International Existing Building Code ***(continued)***	
1401.6.21.3(New)	G244
Table 1401.6.21.3	G244
1401.6.21.3.1(New)	G244
Table 1401.7	G244
1401.8	G244
Table 1401.8	G244
International Fire Code	
202	Table 802.8
Definition of Group B	G28, G29, G30
Definition of Group I	G33, G36, G37
Definition of Group R	G36, G40, G41
Definition of Group S	G42
508.1.5	E2 Part III
604.2.16 (New)	G77
905.3.3	E2 Part III
905.4	E2 Part III
907.2.13.2	E2 Part III
907.5.2.2	E2 Part III
Table 1004.1.2	G193
1005.7.2	G73
1104.6.1	E2 Part III
1104.9	E2 Part III
1104.10	E2 Part III
1104.12	E2 Part III
1104.16	E2 Part III
1104.20	E2 Part III
1104.21	E2 Part III
1104.23	E2 Part III
3313.1	E2 Part III
5005.4.4	E3
5704.2.9.4	E2 Part III
5706.5.1.12	E2 Part III
International Fuel Gas Code	
Section 617	G193 Part III
617.1	G193 Part III
International Mechanical Code	
304.11	E108
403.2.1	G193 Part II
Table 403.3	G193 Part II
601.3	E228, E229
901.5	FG3
1401.1	G193 Part II

International Plumbing Code	
202	G193 Part IV, P3
International Private Sewage Disposal Code	
401.3.2	G193 Part IV
505.8.2	P229
Table 604.1(2)	G193 Part IV
Table 802.7.2	G193 Part IV
Table 802.8	G193 Part IV

TABLE OF CONTENTS

CODE **PAGE**

FG2-12
303.3

Proposed Change as Submitted

Proponent: Guy McMann MCP, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Revise as follows:

303.3 Prohibited locations. Appliances shall not be located in sleeping rooms, bathrooms, toilet rooms, storage closets~~ or surgical rooms~~, or in a space that opens only into such rooms or spaces, except where the installation complies with one of the following:

1. The appliance is a direct-vent appliance installed in accordance with the conditions of the listing and the manufacturer's instructions.
2. Vented room heaters, wall furnaces, vented decorative appliances, vented gas fireplaces, vented gas fireplace heaters and decorative appliances for installation in vented solid fuel-burning fireplaces are installed in rooms that meet the required volume criteria of Section 304.5.
3. A single wall-mounted unvented room heater is installed in a bathroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 6,000 Btu/h (1.76 kW). The bathroom shall meet the required volume criteria of Section 304.5.
4. A single wall-mounted unvented room heater is installed in a bedroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 10,000 Btu/h (2.93 kW). The bedroom shall meet the required volume criteria of Section 304.5.
5. The appliance is installed in a room or space that opens only into a bedroom or bathroom, and such room or space is used for no other purpose and is provided with a solid weather-stripped door equipped with an approved self-closing device. ~~All~~ <u>C</u>ombustion air shall be taken directly from the outdoors, ~~in accordance with Section 304.6~~<u> indoors or a combination of both in accordance with Section 304. Combustion air openings in the enclosure shall not communicate with the prohibited locations listed in this section.</u>

Reason: No designer would ever install a fuel burning appliance in a surgical room and there could conceivably be a long list of other locations where fuel burning appliances should not be installed. There is no technical justification to limit combustion air to outdoor air only in this scenario. Indoor air can be effectively utilized when openings are sized per the code and those openings do not connect the enclosure with the various rooms listed. This could save money avoiding cutting holes in exterior walls and searching for a path for ducts to run which could be very difficult to achieve.

Cost Impact: This proposal may decrease the cost of construction**.**

303.3-FG-MCMANN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The code intends to allow only openings to the outdoors because such openings could vent combustion products to the outdoors in the event of appliance vent failure/blockage.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Commenter's Reason: The committee reason for disapproval revolved around a hypothetical concerning a blocked vent. Disapproval based on this line of reasoning doesn't seem to be logical in this particular scenario. A blocked vent could conceivably occur on any vent at any time. If somehow outside air magically took care of the problem then only outside would be mandated. In this case there is no combustion air passing through the bedroom as this text requires openings to communicate to areas other than the bedroom. If the vent did become blocked the sealed door would aid in preventing flue gas from entering the room. Outside air may dilute the products of combustion but so would the balance of the house. There seems to be some alarmism in this line of thought. There is no technical justification to prohibit combustion air from being obtained from other spaces within the building providing the combustion air doesn't pass through the bedroom. Consider a furnace in a hallway just outside the bedroom; combustion air may be taken from the house if there is enough volume. That same furnace with a blocked vent poses a larger concern because it could communicate to the bedroom or any other room in the building. This proposal will *decrease cost* by permitting inside air to be tapped and thereby eliminating the need to cut holes in outside walls and will aid in energy savings as it provides a much needed option for installers.

FG2-12
Final Action: AS AM AMPC____ D

FG3-12, Part I
303.3.1 (New); IMC: 901.5 (New), 901.6 (New)

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care

THIS IS A 2 PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE IFGC COMMITTEE AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THIS COMMITTEE.

PART I – IFGC

Add new text as follows:

303.3.1 Fireplaces and decorative appliances in Group I-2 occupancies. In addition to the requirements of Section 303.3, fuel gas-fired fireplaces and decorative appliances in Group I-2 occupancies shall not be located in sleeping rooms, storage closets, surgical rooms, toilet rooms and bathrooms located in the patient sleeping or dwelling units. Fuel gas-fired fireplaces and decorative appliances are permitted in other areas that open into such rooms or spaces only where the installation complies with all of the following:

1. Combustion air is taken directly from the outdoors,
2. Flue gases are discharged directly to the outdoors.
3. Appliance combustion chambers are separated from the environmental air on the interior of the building.
4. Appliances shall automatically shut down and stop fuel flow upon any of the following events:
   - 4.1 when temperatures exceed the appliance listing,
   - 4.2 when there is failure to ignite
   - 4.3 upon activation of the fire alarm system
5. Appliance controls are located in an approved restricted or locked location.
6. A carbon monoxide detector with a local alarm shall be provided and installed in accordance with Section 908.7 of the IBC.

Reason: This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

The AHC is proposing a revision to address some of the oversights in the I-Codes of long-standing and operational requirements for hospitals and healthcare facilities that has not been specifically addressed. The requirements being proposed in this code change have been long-standing provisions of the construction and operational requirements for healthcare facilities.

Justification: The language proposed in the IFGC prescribes the limitations and conditions to provide the necessary safety and limitations of hazards found within the healthcare environments to the fire and ignition sources inherent to all fireplaces and gas-fired appliances. Combustion air is restricted from being drawn from a healthcare environment for more than the last decade. It is standard practice and operational procedure to control the ignition sources in these occupancies that can contain combustible, flammable (and sometimes even explosive) material. Fire risks need to be limited to the maximum extent feasible and specific requirements for these facilities are not currently or completely addressed in the I-Codes. The physical separation of the combustion chambers of fireplaces and gas-fired equipment is required to separate and provide a barrier between the ignition sources and the environmental air within healthcare occupancies. All combustion air is required to be taken directly from the exterior of the building with one exception that is already provided for in IFGC Section 303.3.

The solid fuel burning fireplaces and appliances (decorative or heating) present open flames that cannot otherwise be controlled or extinguished like similar gas-fired appliances. The attention to and the tending of the open flames from solid fuel burning appliances require the opening any surrounding compartment while the flames and ignition sources are present; thereby, exposing the I-2 environment (within the patient smoke compartment) to the ignition sources. When gas-fired appliances are utilized, the ability to completely control the fuel source and all open flames and ignition sources is possible and does not require exposure to or tending of solid fuel burning materials . The AHC committee is recommending the restriction of solid-fuel burning fireplaces and appliances in the I-2 occupancy.

Future submissions to proposals to the IFC are being drafted to clarify, restrict and limit the ignition source hazards in healthcare occupancies that will reference these requirements being proposed in the IBC, IMC AND IFGC. The code sections that address the installation of fuel gas-fire fireplaces and appliances will also provide alternative means for compliance for existing facilities. Given the hazards present with these appliances in the I-2 Occupancies, the proposed IFC requirements will be 'retro-active' requirements for healthcare occupancies (I-2); please note, these are not new requirements for the I-2 Occupancy facilities but are needed in the I-Codes for coordination of the long-standing provision of the construction and operational requirements for healthcare facilities.

Cost Impact: No increase to the cost of construction for these facilities is associated with these code changes. This change is consistent with existing federal certification requirements.

303.3.1-FG-Williams-Adhoc

Public Hearing Results

PART I – IFGC
Committee Action: Disapproved

Committee Reason: The proposed text refers to section 303 which would allow unvented heaters to be installed in such occupancies. Unvented heaters do not belong in such spaces.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care, requests Approval as Submitted.

Commenter's Reason; The addition of these code requirements into the I-Code are critical to limit fuel gas burning and restrict solid fuel gas burning decorative fire places and equipment in I-2 institutional occupancies. These code change proposals are being put forward by the Adhoc healthcare committee and have been coordinated with the ICC CTC-Care committee; industry representatives on our ahc spoke unanimously that the safety and fire hazards associated with these devices in a healthcare occupancy are a serious hazard and request that the code officials vote to overturn the committee decision.

The committee discussions during the initial action hearings and the report of hearings indicates that the reasons that the committee denied this proposals are the reasons that we are requesting approval as submitted. Unfortunately, our committee members were not in the room to speak to the committee and to clarify that we are requesting limitations and restrictions, not the allowance for these elements in the I-2 occupancy healthcare environments.

Please overturn the committee decision and support approval as submitted for these necessary code requirements and provisions.

The language proposed in the IFGC prescribes the limitations and conditions to provide the necessary safety and limitations of hazards found within the healthcare environments to the fire and ignition sources inherent to all fireplaces and gas-fired appliances. Combustion air is restricted from being drawn from a healthcare environment for more than the last decade. It is standard practice and operational procedure to control the ignition sources in these occupancies that can contain combustible, flammable (and sometimes even explosive) material. Fire risks need to be limited to the maximum extent feasible and specific requirements for these facilities are not currently or completely addressed in the I-Codes. The physical separation of the combustion chambers of fireplaces and gas-fired equipment is required to separate and provide a barrier between the ignition sources and the environmental air within healthcare occupancies. All combustion air is required to be taken directly from the exterior of the building with one exception that is already provided for in IFGC Section 303.3.

The solid fuel burning fireplaces and appliances (decorative or heating) present open flames that cannot otherwise be controlled or extinguished like similar gas-fired appliances. The attention to and the tending of the open flames from solid fuel burning appliances require the opening any surrounding compartment while the flames and ignition sources are present; thereby, exposing the I-2 environment (within the patient smoke compartment) to the ignition sources. When gas-fired appliances are utilized, the ability to completely control the fuel source and all open flames and ignition sources is possible and does not require exposure to or tending of solid fuel burning materials . The AHC committee is recommending the restriction of solid-fuel burning fireplaces and appliances in the I-2 occupancy.

Future submissions to proposals to the IFC are being drafted to clarify, restrict and limit the ignition source hazards in healthcare occupancies that will reference these requirements being proposed in the IBC, IMC AND IFGC. The code sections that address the installation of fuel gas-fire fireplaces and appliances will also provide alternative means for compliance for existing facilities. Given the hazards present with these appliances in the I-2 Occupancies, the proposed IFC requirements will be 'retro-active' requirements for healthcare occupancies (I-2); please note, these are not new requirements for the I-2 Occupancy facilities but are needed in the I-Codes for coordination of the long-standing provision of the construction and operational requirements for healthcare facilities.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

The AHC is proposing a revision to address some of the oversights in the I-Codes of long-standing and operational requirements for hospitals and healthcare facilities that has not been specifically addressed. The requirements being proposed in this code change have been long-standing provisions of the construction and operational requirements for healthcare facilities.

Cost Impact: No increase to the cost of construction for these facilities is associated with these code changes. This change is consistent with existing federal certification requirements.

Public Comment 2:

Wade Rudolph, CBET, CHFM, Sacred Heart Hospital, representing Wisconsin Healthcare Engineers Association Codes & Standards Committee, requests Approval as Submitted.

Commenter's Reason: The proposal as submitted by John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare should be accepted.

The ICC IFGC committee logic is invalid as the proposal specifically limits all fireplaces to be vented to the outdoors so an unvented system would not be allowed. The IMC committee did not provide a valid reason for rejection other than refer to the IFGC committee which had flawed conclusions as a basis for rejection.

This proposal does have merit in providing great guideance for facilities that would like to make our healthcare institutions not look and feel so "industrial".

I am submitting this request on behalf of the Wisconsin Healthcare Engineers Association Codes & Standards committee representing over 700 members in the State of Wisconsin.

Thank you for your time and consideration of my comments.

FG3-12, Part I

Final Action: AS AM AMPC____ D

FG3-12, Part II
303.3.1 (New); IMC: 901.5 (New), 901.6 (New)

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care

THIS IS A 2 PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE IFGC COMMITTEE AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THIS COMMITTEE.

PART II – IMC

Add new text as follows:

901.5 Fuel gas-fired Fireplaces and appliances in Group I-2. Fuel gas-fired fireplaces and decorative appliances located within smoke compartments containing patient sleeping rooms and surgical rooms in Group I-2 occupancies shall be installed in accordance with Section 303.3.1 of the IFGC.

901.6 Solid fuel-burning fire places and appliances in Group I-2. Solid fuel-burning fireplaces and appliances shall not be located in Group I-2 occupancies.

> **Exception:** Solid fuel-burning fireplaces and appliances shall not be prohibited in Group I-2 nursing homes provided that they are not located in smoke compartments that contain patient sleeping rooms.

Reason: This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

The AHC is proposing a revision to address some of the oversights in the I-Codes of long-standing and operational requirements for hospitals and healthcare facilities that has not been specifically addressed. The requirements being proposed in this code change have been long-standing provisions of the construction and operational requirements for healthcare facilities.

Justification: The language proposed in the IFGC prescribes the limitations and conditions to provide the necessary safety and limitations of hazards found within the healthcare environments to the fire and ignition sources inherent to all fireplaces and gas-fired appliances. Combustion air is restricted from being drawn from a healthcare environment for more than the last decade. It is standard practice and operational procedure to control the ignition sources in these occupancies that can contain combustible, flammable (and sometimes even explosive) material. Fire risks need to be limited to the maximum extent feasible and specific requirements for these facilities are not currently or completely addressed in the I-Codes. The physical separation of the combustion chambers of fireplaces and gas-fired equipment is required to separate and provide a barrier between the ignition sources and the environmental air within healthcare occupancies. All combustion air is required to be taken directly from the exterior of the building with one exception that is already provided for in IFGC Section 303.3.

The solid fuel burning fireplaces and appliances (decorative or heating) present open flames that cannot otherwise be controlled or extinguished like similar gas-fired appliances. The attention to and the tending of the open flames from solid fuel burning appliances require the opening any surrounding compartment while the flames and ignition sources are present; thereby, exposing the I-2 environment (within the patient smoke compartment) to the ignition sources. When gas-fired appliances are utilized, the ability to completely control the fuel source and all open flames and ignition sources is possible and does not require exposure to or tending of solid fuel burning materials . The AHC committee is recommending the restriction of solid-fuel burning fireplaces and appliances in the I-2 occupancy.

Future submissions to proposals to the IFC are being drafted to clarify, restrict and limit the ignition source hazards in healthcare occupancies that will reference these requirements being proposed in the IBC, IMC AND IFGC. The code sections that address the installation of fuel gas-fire fireplaces and appliances will also provide alternative means for compliance for existing facilities. Given the hazards present with these appliances in the I-2 Occupancies, the proposed IFC requirements will be 'retro-active' requirements for healthcare occupancies (I-2); please note, these are not new requirements for the I-2 Occupancy facilities but are needed in the I-Codes for coordination of the long-standing provision of the construction and operational requirements for healthcare facilities.

Cost Impact: No increase to the cost of construction for these facilities is associated with these code changes. This change is consistent with existing federal certification requirements.

303.3.1-FG-Williams-Adhoc

Public Hearing Results

PART II – IMC
Committee Action: Disapproved

Committee Reason: Disapproval is consistent with the action taken on Part I. The referenced Section 303.3.1 would not exist

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care, requests Approval as Submitted.

Commenter's Reason: The addition of these code requirements into the I-Code are critical to limit fuel gas burning and restrict solid fuel gas burning decorative fire places and equipment in I-2 institutional occupancies. These code change proposals are being put forward by the Adhoc healthcare committee and have been coordinated with the ICC CTC-Care committee; industry representatives on our ahc spoke unanimously that the safety and fire hazards associated with these devices in a healthcare occupancy are a serious hazard and request that the code officials vote to overturn the committee decision.

The committee discussions during the initial action hearings and the report of hearings indicates that the reasons that the committee denied this proposals are the reasons that we are requesting approval as submitted. Unfortunately, our committee members were not in the room to speak to the committee and to clarify that we are requesting limitations and restrictions, not the allowance for these elements in the I-2 occupancy healthcare environments.

Please overturn the committee decision and support approval as submitted for these necessary code requirements and provisions.

The language proposed in the IFGC prescribes the limitations and conditions to provide the necessary safety and limitations of hazards found within the healthcare environments to the fire and ignition sources inherent to all fireplaces and gas-fired appliances. Combustion air is restricted from being drawn from a healthcare environment for more than the last decade. It is standard practice and operational procedure to control the ignition sources in these occupancies that can contain combustible, flammable (and sometimes even explosive) material. Fire risks need to be limited to the maximum extent feasible and specific requirements for these facilities are not currently or completely addressed in the I-Codes. The physical separation of the combustion chambers of fireplaces and gas-fired equipment is required to separate and provide a barrier between the ignition sources and the environmental air within healthcare occupancies. All combustion air is required to be taken directly from the exterior of the building with one exception that is already provided for in IFGC Section 303.3.

The solid fuel burning fireplaces and appliances (decorative or heating) present open flames that cannot otherwise be controlled or extinguished like similar gas-fired appliances. The attention to and the tending of the open flames from solid fuel burning appliances require the opening any surrounding compartment while the flames and ignition sources are present; thereby, exposing the I-2 environment (within the patient smoke compartment) to the ignition sources. When gas-fired appliances are utilized, the ability to completely control the fuel source and all open flames and ignition sources is possible and does not require exposure to or tending of solid fuel burning materials . The AHC committee is recommending the restriction of solid-fuel burning fireplaces and appliances in the I-2 occupancy.

Future submissions to proposals to the IFC are being drafted to clarify, restrict and limit the ignition source hazards in healthcare occupancies that will reference these requirements being proposed in the IBC, IMC AND IFGC. The code sections that address the installation of fuel gas-fire fireplaces and appliances will also provide alternative means for compliance for existing facilities. Given the hazards present with these appliances in the I-2 Occupancies, the proposed IFC requirements will be 'retro-active' requirements for healthcare occupancies (I-2); please note, these are not new requirements for the I-2 Occupancy facilities but are needed in the I-Codes for coordination of the long-standing provision of the construction and operational requirements for healthcare facilities.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

The AHC is proposing a revision to address some of the oversights in the I-Codes of long-standing and operational requirements for hospitals and healthcare facilities that has not been specifically addressed. The requirements being proposed in this code change have been long-standing provisions of the construction and operational requirements for healthcare facilities.

Cost Impact: No increase to the cost of construction for these facilities is associated with these code changes. This change is consistent with existing federal certification requirements.

Public Comment 2:

Wade Rudolph, CBET, CHFM, Sacred Heart Hospital, representing Wisconsin Healthcare Engineers Association Codes & Standards Committee, requests Approval as Submitted.

Commenter's Reason: The proposal as submitted by John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare should be accepted.

The ICC IFGC committee logic is invalid as the proposal specifically limits all fireplaces to be vented to the outdoors so an unvented system would not be allowed. The IMC committee did not provide a valid reason for rejection other than refer to the IFGC committee which had flawed conclusions as a basis for rejection.

This proposal does have merit in providing great guideance for facilities that would like to make our healthcare institutions not look and feel so "industrial".

I am submitting this request on behalf of the Wisconsin Healthcare Engineers Association Codes & Standards committee representing over 700 members in the State of Wisconsin.

Thank you for your time and consideration of my comments.

FG3-12, Part II
Final Action: AS AM AMPC____ D

FG5–12
307.6

Proposed Change as Submitted

Proponent: Guy McMann MCP, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Add new text as follows:

307.6 Condensate pumps. Condensate pumps located in uninhabitable spaces, such as attics and crawl spaces, shall be connected to the appliance or equipment served such that when the pump fails, the appliance or equipment will be prevented from operating. Pumps shall be installed in accordance with the manufacturers' installation instructions.

Reason: Pumps that are not connected in this fashion will permit the appliances to keep operating, spilling waste water where ever the appliance is located. When this condition continues over time, it could result in damage to building components or other property. This overflow condition may result in mold issues among other things. Most pump manufacturers already have this feature incorporated into the pump but the code does not require it to be connected. Damage as a result of not connecting this feature could prove to be very costly. This is not as much of a concern when appliances are readily accessible to occupants where leakage may be noticed in a timely manner.

Cost Impact: None

307.6 (NEW)-FG-MCMANN

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

307.6 Condensate pumps. ~~Condensate pumps located in uninhabitable spaces, such as attics and crawl spaces, shall be connected to the appliance or equipment served such that when the pump fails, the appliance or equipment will be prevented from operating~~. Pumps shall be installed in accordance with the manufacturers' installation instructions.

Committee Reason: The code does not address condensate pumps and needs the coverage. The modification makes the text apply to all locations and allows the manufacturer's instructions to address the proper appliance and equipment connections.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Approved as Submitted.

FG5-12
Final Action: AS AM AMPC____ D

FG8–12
401.9

Proposed Change as Submitted

Proponent: James Ranfone, American Gas Association (jranfon@aga.org)

Revise as follows:

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

> **Exception:** The manufacturer identification for fittings and pipe nipples shall be on each piece or shall be printed on the fitting or nipple packaging or provided documentation.

Reason: The exception would allow identification of fittings to be provided on or with the packaging. Some piping fittings, short nipples for example, do not have the physical room for a manufacturers mark.

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

401.9-FG-RANFONE

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Not all fittings can be marked at the factory and this text offers an alternative. Pipe nipples cut in the field could be prohibited without the proposed exception. Pipe nipples are cut from code complying pipe.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Disapproved.

FG8-12
Final Action: AS AM AMPC____ D

FG11-12
403.10.1, 403.10.2, 403.10.3

Proposed Change as Submitted

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting, representing Copper Development Association (penniefeehan@me.com)

Revise as follows:

~~**403.10.1 Pipe joints.** Pipe joints shall be threaded, flanged, brazed or welded. Where nonferrous pipe is brazed, the brazing materials shall have a melting point in excess of 1,000°F (538°C). Brazing alloys shall not contain more than 0.05-percent phosphorus.~~

403.10.1 Pipe and tubing joints. Joints shall be threaded, flanged, brazed or welded. Brazed joints between copper pipe or tubing and fittings shall be made with brazing alloys having a liquid temperature above 1,000°F (538°C). All joints surfaces to be brazed shall be cleaned. An *approved* brazing flux shall be applied to the joint surfaces where required by manufacturer's recommendation. The joints shall be brazed with a brazing filler metal conforming to AWS A5.8. Brazing filler metal and shall be applied at the point where the pipe or tubing enters the socket of the fitting.

403.10.2 Pressed ~~Tubing~~ joints. ~~Tubing joints shall be made with *approved* gas tubing fittings, brazed with a material having a melting point in excess of 1,000°F (538°C) or made with~~ P~~p~~ress-connect fittings shall comply with ANSI LC-4. The joint shall be pressed using the tool recommended by the fitting manufacturer. ~~Brazing alloys shall not contain more than 0.05-percent phosphorus.~~

403.10.3 Flared joints. Flared joints shall be used only in systems constructed from nonferrous pipe and tubing where experience or tests have demonstrated that the joint is suitable for the conditions and where provisions are made in the design to prevent separation of the joints. Flared joints shall be made by a tool designed for that operation.

Reason: The above proposal combined two similar code sections and provides important language from the standards to aid the end user.

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

403.10.1-FG-FEEHAN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The condensing of the text has changed the intent. Brazing of copper is no longer mandated by the revised text. Tubing is included, but cannot be threaded. The installation details are not enforceable.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Pennie L. Feehan, Pennie L. Feehan Consulting, representing CDA – Copper Development Association, requests Approval as Modified by this Public Comment.

Replace original proposal as follows:

403.10.1 Pipe joints. Pipe joints shall be threaded, flanged, brazed or welded. Where ~~nonferrous~~ copper pipe is brazed, the ~~brazing materials~~ filler metals shall have a melting point range between ~~in excess of~~ 1,1~~0~~00°F (593~~38~~°C) and 1500°F (815°C). Brazing alloys shall not contain more than 0.05-percent phosphorus.

403.10.2 Tubing joints. Tubing joints shall be made with approved gas tube~~ing~~ fittings~~,~~. Where copper tube is brazed, ~~with a material~~ the filler metals shall have~~ing~~ a melting point range between ~~in excess of~~ 1,1~~0~~00°F (593~~38~~°C) and 1500°F (815°C). ~~or made with press-connect fittings complying with ANSI LC-4.~~ Brazing alloys shall not contain more than 0.05-percent phosphorus. Press-connect fittings shall comply with ANSI LC-4.

Commenter's Reason: This proposal removes obsolete terms, adds press-connect fittings that are approved for fuel gas systems, and provides uniformity with the IPC & IMC.

FG11-12

Final Action: AS AM AMPC____ D

FG13 – 12
404.6

Proposed Change as Submitted

Proponent: James Ranfone, American Gas Association (jranfon@aga.org)

Revise as follows:

404.6 ~~Underground penetrations prohibited.~~ Piping through Foundation Wall. ~~Gas piping shall not penetrate building foundation walls at any point below grade. Gas piping shall enter and exit a building at a point above grade and the annular space between the pipe and the wall shall be sealed.~~ Underground piping installed through the outer foundation or basement wall of a building, shall be encased in a protective sleeve or protected by an approved device or method. The space between the gas piping and the sleeve and between the sleeve and the wall shall be sealed to prevent entry of gas and water.

Reason: A change adopted into the 2012 edition would prohibit gas piping from penetrating a foundation wall below grade. This change was adopted without evidence that such penetrations have resulted in a safety concern. Below grade penetrations have long been permitted and have proven to be safe installation method. The revised language would reinstate this allowance.

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

404.6-FG-RANFONE

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposed text gives designers the option to enter/exit above or below ground. For existing homes, it is burdensome to require gas piping to enter the building above ground first before entering the basement.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Disapproved and a public comment was submitted.

Public Comment:

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

Modify the proposal as follows:

404.6 Piping through Foundation Walls. ~~Underground piping installed through the outer foundation or basement wall of a building, shall be encased in a protective sleeve or protected by an approved device or method. The space between the gas piping and the sleeve and between the sleeve and the wall shall be sealed to prevent entry of gas and water.~~ Gas piping shall not penetrate building foundation walls at any point under ground. Buried gas piping shall enter and exit a building at a point above grade and the annular space between the pipe and the wall shall be sealed.

Commenter's Reason: Comments were brought forth in Dallas asserting that piping in meter vaults must rise to a point "above grade" before penetrating a foundation wall. This is an incorrect interpretation of the intent of the code. This scenario is permitted because the piping in this case is not buried and poses no danger due to the fact the piping can vent to the atmosphere where as buried piping cannot. The public comment clears up this misconception by replacing the words "below grade" with the word "underground".

There have been many cases throughout the country where explosions have occurred as a result of a gas leak that originates underground and made its way into the building. One of the reasons this occurs is because natural gas or propane tends to follow the pipe in its ditch due to less resistance surrounding the pipe. Piping penetrating foundation walls under ground provides a path for gas to follow. The safety of occupants should not be left up to how well a bead of caulking has been applied. Plastic piping is also subject to the same scenario, especially when the 8-inch burial depth is taken into consideration. Plastic will not hold up to common tools such as shovels, spades, picks and roto-tillers. Also consider expansive soils and the potential effect it can have on the piping. The heaving soil will have a devastating effect on a caulked sleeve. It's not uncommon to have a gas line snapped off completely at the foundation wall due to the overwhelming force of expansive soil. Permitting the pipe to enter the building only above ground will eliminate the likelihood that gas would enter the building. Life, limb, property and the potential threat of explosion should not be determined by the integrity of a sealed joint alone. Depending how deep the ditch is, the weight of the back-fill alone could be significant enough to have an impact on a caulked joint. One should also consider that the joint could deteriorate over time.

The membership approved this in the last two editions of the code and we urge the membership to continue to support this life safety effort.

FG13-12

Final Action: AS AM AMPC____ D

FG15-12
404.7, 404.7.1 (New), 404.7.2 (New)

Proposed Change as Submitted

404.7 Protection against physical damage. In concealed locations where *piping*, other than black or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1-1/2 inches (38 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. ~~Protective steel~~ Such shield plates shall have~~ing~~ a ~~minimum~~ thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage). Such plates shall cover the area of the pipe where the member is notched or bored and shall extend not less than 4 inches (102 mm) above sole plates, and below top plates and to each side of a stud, joist, rafter or similar member.

404.7.1 Formed steel framing members. *Piping*, other than black or galvanized steel, shall not be installed within the channel of a formed steel framing member except where the piping is not less than 1-1/2 inches from the backside of any fastening face of the member.

404.7.2 Piping installed parallel to framing members. In concealed locations where *piping*, other than black or galvanized steel, is installed parallel to studs, joists, rafters or similar members less than 1-1/2 inches (38 mm) from the nearest edge of the member, such pipe shall be protected along its length by steel shield plates that comply with the requirements of Section 404.7.

Reason: Like the IPC, Section 404.7 does not address pipe or tubing run down the side of a stud or inside of a “C” channel metal stud or rafter. Such installations are subject to penetrations but the code addresses only holes and notches for pipe and tubing that runs perpendicular to the framing member. The NEC treats wiring that runs parallel to framing members the same as wiring that runs perpendicular. The IMC, IFGC and IPC need to catch up. If the sheeting material fasteners miss a framing member, they can easily penetrate piping which is why the code requires the protection shield to extend 4 inches on both sides. Placing piping parallel to a member, either on the side or within a channel, exposes the piping to penetration, yet current code addresses only perpendicular penetrations.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

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

404.7-FG-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The requirements for formed steel members are overly restrictive. The measuring points are not consistent in Sections 404.7 and 404.7.1.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing the International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Replace the original proposal as follows:

404.7 Protection against physical damage. ~~In concealed locations, where piping other than black or galvanized steel is installed through holes or notches in wood studs, joists, rafters or similar members less than 1 ½ inches (38 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective steel shield plates having a minimum thickness of 0.0575 inch (1.463 mm) (No. 16 gage) shall cover the area of the pipe where the member is notched or bored and shall extend a minimum of 4 inches (102 mm) above sole plates, below top plates and to each side of a stud, joist or rafter.~~ Where piping will be concealed within light-frame construction assemblies, the piping shall be protected against penetration by fasteners in accordance with Sections 404.7.1 through 404.7.3.

Exception: Black steel piping and galvanized steel piping shall not be required to be protected.

404.7.1 Piping through bored holes or notches. Where *piping* is installed through holes or notches in framing members and the piping is located less than 1 ½ inches (38 mm) from the framing member face to which wall, ceiling or floor membranes will be attached, the pipe shall be protected by shield plates that cover the width of the pipe and the framing member and that extend not less than 4 inches (51 mm) to each side of the framing member. Where the framing member that the piping passes through is a bottom plate, bottom track, top plate or top track, the shield plates shall cover the framing member and extend not less than 4 inches (51 mm) above the bottom framing member and not less than 4 inches (51 mm) below the top framing member.

404.7.2 Piping installed in other locations. Where the piping is located within a framing member and is less than 1 ½ inches (38 mm) from the framing member face to which wall, ceiling or floor membranes will be attached, the piping shall be protected by shield plates that cover the width and length of the piping. Where the piping is located outside of a framing member and is located less than 1 ½ inches (38 mm) from the nearest edge of the face of the framing member to which the membrane will be attached, the piping shall be protected by shield plates that cover the width and length of the piping.

404.7.3 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

Commenter's Reason: The committee's arguments for disapproving this code change were that the requirements for formed steel members were overly restrictive and that the measuring points were not consistent with Sections 404.7 and 404.7.1. After multiple communications between members of the PMG Code Action Committee and industry representatives, the concerns that were voiced at the Dallas Code Hearings have been addressed in the language included in this public comment. The language has changed to reflect that the piping installation applies to all light frame assemblies, both wood and cold-formed steel. In addition, the language has been improved to provide consistent measuring points. This is one of two proposed public comments to provide consistent language between the IFGC and IPC for piping protection.

FG15-12

Final Action: AS AM AMPC____ D

FG16-12
404.8.1, 404.8.2, 404.14.1, 404.14.2

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Arlington County, VA, representing PMG CAC

Revise as follows:

~~**404.8.1 Conduit with one end terminating outdoors.** The conduit shall extend into an occupiable portion of the building and, at the point where the conduit terminates in the building, the space between the conduit and the gas *piping* shall be sealed to prevent the possible entrance of any gas leakage. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor. If the end sealing is capable of withstanding the full pressure of the gas pipe, the conduit shall be designed for the same pressure as the pipe. Such conduit shall extend not less than 4 inches (102 mm) outside the building, shall be vented above grade to the outdoors andshall be installed so as prevent the entrance of water and insects.~~

~~**404.8.2 Conduit with both ends terminating indoors.** Where the conduit originates and terminates within the same building, the conduit shall originate and terminate in an accessible portion of the building and shall not be sealed. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor.~~

404.8 Piping in solid floors. Piping in solid floors shall be laid in channels in the floor and covered in a manner that will allow access to the piping with a minimum amount of damage to the building. Where such piping is subject to exposure to excessive moisture or corrosive substances, the piping shall be protected in an approved manner. As an alternative to installation in channels, the piping shall be installed in a conduit of Schedule 40 steel, wrought iron, PVC or ABS pipe in accordance with Section 404.8.1 or 404.8.2. Where the conduit originates and terminates within the same building, the conduit shall originate and terminate in an accessible portion of the building and shall not be sealed. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor.

~~**404.14.1 Conduit with one end terminating outdoors.** The conduit shall extend into an occupiable portion of the building and, at the point where the conduit terminates in the building, the space between the conduit and the gas *piping* shall be sealed to prevent the possible entrance of any gas leakage. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor. Where the end sealing is capable of withstanding the full pressure of the gas pipe, the conduit shall be designed for the same pressure as the pipe. Such conduit shall extend not less than 4 inches (102 mm) outside of the building, shall be vented above grade to the outdoors and shall be installed so as to prevent the entrance of water and insects.~~

~~**404.14.2 Conduit with both ends terminating indoors.** Where the conduit originates and terminates within the same building, the conduit shall originate and terminate in an accessible portion of the building and shall not be sealed. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor.~~

404.14 Piping underground beneath buildings. Piping installed underground beneath buildings is prohibited except where the piping is encased in a conduit of wrought iron, plastic pipe, steel pipe or other approved conduit material designed to withstand the superimposed loads. The conduit shall be protected from corrosion in accordance with Section 404.11 and shall be installed in accordance with Section 404.14.1 or 404.14.2. Where the conduit originates and terminates within the same building, the conduit shall originate and terminate in an accessible portion of the building and shall not be sealed. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor.

Reason: Sections 404.8.1 and 404.14.1 are trumped by Section 404.6 and although they would still apply to a very limited type of installation, they give the appearance of a direct conflict with Section 404.6 and have caused interpretation issues. There is no actual conflict, but the main application of these sections was for bringing gas piping into or out of a building below grade which is now expressly prohibited by Section 404.6. These sections would now only apply to gas piping running from point A to point B within the building. It is extremely unlikely that anyone would use these sections considering that Sections 404.8.2 and 404.14.2 provide a much simpler option that does not require a vent to the outdoors. Sections 404.8.1 and 404.14.1 should be deleted to avoid confusion and because they have almost no practical application value. The utility of these sections has been eliminated by the Section 404.6.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

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

404.8.1-FG-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal creates confusion. Sections 404.6 and 404.8.1 are not in conflict since the provision of Section 404.8.1 is still allowed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Submitted.

Commenter's Reason: The committee disapproved this proposal because they felt that it created confusion and because Section 404.6 is not in conflict with Sections 404.8.1 and 404.14.1. The purpose of the original proposal was to eliminate the confusion that already exists over these sections. Current Sections 404.8.1 and 404.14.1, describe a method for running gas piping into or out of a building below grade or within a slab on grade. These methods confuse code users by describing a practice that is prohibited by Section 404.6. To be clear, the methods in these deleted sections are not prohibited where piping is run between points inside of a building, as correctly stated by the committee. However, these methods where written to accommodate piping run into and out of the building and suggest that this practice is still OK, notwithstanding that Section 404.6 prohibits such runs of piping. If one compares Section 404.14.1 to Section 404.14.2, it is obvious that one method is simple and easy to install and the other method is difficult to install and would never be chosen, so why keep it in the code where it will clash with Section 404.6? This proposal does not cause confusion, it relieves it. Also , the consolidation of Sections 404.8.2 and 404.14.2 with the parent sections simplifies the code.

FG16-12

Final Action: AS AM AMPC____ D

FG17-12
404.14

<u>Proposed Change as Submitted</u>

Proponent: James Ranfone, American Gas Association (jranfon@aga.org)

Revise as follows:

404.14 Piping underground beneath buildings. Piping installed underground beneath buildings is prohibited except where the piping is encased in a conduit of wrought iron, plastic pipe, steel pipe or other approved conduit material designed to withstand the superimposed loads <u>or is encased in a listed encasement system</u>. The conduit shall be protected from corrosion in accordance with Section 404.11 and shall be installed in accordance with Section 404.14.1 or 404.14.2.

Reason: To permit the use of an encasement system that is listed. This change has been adopted into the 2012 National Fuel Gas Code.

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

404.14-FG-RANFONE

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

Richard Grace, Fairfax County, Virginia, representing the Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and the Virginia Building Code and Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: The addition to this code section appears to be somewhat premature. What standard shall an encasement system be listed to? There does not appear to be any specific standard for this system and installation. The current standards referenced in the IFGC do not apply to this system. If the encasement system were to be listed to ASTM A674, this code section would allow its use beneath buildings.

FG17-12
Final Action: AS AM AMPC____ D

FG21-12
409.5

Proposed Change as Submitted

Proponent: Jean Steckler, representing TECO Americas (jeans@aa-fs.com)

Revise as follows:

409.5 Appliance shutoff valve. Each *appliance s*hall be provided with a shutoff valve in accordance with Section 409.5.1, 409.5.2 or 409.5.3. <u>Each gas appliance shall be equipped with a passive thermal shut-off device that will automatically stop the flow of gas to the appliance in the event of a fire. The thermal gas shut-off device shall not be a substitute for the manual shut-off valve required by this section. A combination type valve that serves as both a shutoff valve and a thermal shutoff device satisfies the requirements of this section. The thermal shut-off device shall not require electricity or batteries to stop the flow of gas.</u>

Reason: According to the National Fire Protection Association (NFPA), U.S. fire departments face 2,110 home fires each year where natural gas is the first material ignited, and 1,170 home fires a year where LP-gas is involved with the start of a fire. Most home gas fires originate in the kitchen at the stove or gas range.

Building occupants have a false sense of security regarding gas appliances. Occupants assume they have the protection of automatic thermal gas shut-offs, when in reality the manual valves have to be physically shut off to prevent gas release. An automatic thermal shut-off provides passive gas and fire safety, and does not depend on a facility manager to locate and manipulate a manual valve. Automatic thermal gas shutoffs stop the gas from feeding the fire during the time it takes for first responders to reach the facility.

When manual gas shut-off valves are combined with passive, automatic thermal shut-offs, occupants and first responders greatly reduce risk to their lives. And they are much better protected from personal harm and property damage. Automatic thermal gas shutoffs greatly reduce the amount of gas released to the atmosphere when fire occurs. Uncontrolled gas leaks pose a significant hazard to firefighters, emergency responders, and the public.

According to the National Fire Incident Reporting System (NFIRS) database, a system established by the National Fire Data Center of the United States Fire Administration (USFA) to document and develop uniform data reporting when gathering and analyzing information on fires across the U.S., there have been 36,577 fires in the 49 states and the District of Columbia where gas was the material first ignited resulting in an uncontrolled or self-perpetuating fire in the five year period between 2005-2009. Automatic thermal gas shutoffs mitigate consequences of fires:

- Thermal gas shutoffs stop the flow of gas instantaneously when the fire temperature reaches 212°F
- When the curb valve is too close to a burning building to be safely operated, or it is non-existent or inoperable
- Thermal gas shutoffs are intended to shutoff the flow of gas when fire occurs near the gas line
- Automatic thermal gas shutoffs assist in the prevention of risk to fire personnel and first responders when gas is released and acts as an accelerant

The primary incident consequences that would be reduced are deaths, injuries, and property damage. Additional benefits would be an expected reduction in the severity of fires, explosions, and evacuation occurring at incidents, and the quantity of gas lost during incidents.

Cost Impact: Minimal Cost Impact.

409.5-FG-STECKLER

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There is no standard to which these devices can be listed. The possible implications of requiring these devices are not known.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jean Steckler, representing Teco Americas, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

409.5 Appliance shutoff valve. Each *appliance* shall be provided with a shutoff valve in accordance with Section 409.5.1, 409.5.2 or 409.5.3. ~~Each gas appliance~~ Shutoff valves installed in accordance with Section 409.5.1 and not installed in fireplaces or on manifolds shall be equipped with a passive thermal shut-off device that will automatically stop the flow of gas to the appl8iance in the event of a fire. ~~The thermal gas shut-off device shall not be a substitute for the manual shut-off valve required by the section.~~ A combination type valve that serves as both a shutoff valve and a thermal shutoff device ~~satisfies the requirements of this section.~~ shall comply with Table 409.1.1. The thermal shut-off device shall not require electricity or batteries to stop the flow of gas.

Commenter's Reason: Thermal gas shutoffs are referenced in the ANSI/CSA ANSI Z21.90/CSA 6.24 standard for Gas Convenience Outlets. The following is excerpted from the ANSI Z21.90/CSA 6.24 standard:

1.2.7 A gas convenience outlet shall incorporate a thermal shut-off. The thermal element shall be located on the supply portion of the gas convenience outlet.

2.14 THERMAL SHUT-OFF
Gas outlets shall include means to automatically shutoff the flow of gas within a temperature range of 250°F to 300°F (121 °C to 149°C). The thermal element shall be located on the supply portion of the gas convenience outlet. Three samples of the outlet shall be subjected to this test, all of which shall comply.

U.S. Experience with Thermal Gas Shutoffs
Thermal gas shutoffs have been used successfully in the United States since 1974, when they were required by Massachusetts' General Law (G.L.C. 164, §75A). This law requires automatic thermal shutoffs for gas "when the inlet piping to an exterior meter exceeds 4" in nominal diameter."

How Thermal Shutoffs Work
Thermal activated gas shutoffs do not replace manual gas shutoffs. Rather they are placed in the gas line in addition to the manual gas shutoffs. The thermal gas shutoff provides passive gas safety by shutting off the flow of gas when a fire occurs, so that the gas cannot feed a fire. The thermal shutoffs can be either installed as a single unit with the manual shutoff valve – or separately. These safety devices provide automatic protection so no one needs to look for – or manipulate them when a fire occurs. The thermal shutoffs work in a similar way to how water sprinklers work. When the room temperature reaches 212°F, a fusible link melts, which releases a plug to close the gas line.

Explanation of Change to Code Change Request
In the code change request, the phrase "or on manifolds" has been added to be clear that the passive thermal shut-off is only required when the manual gas shutoff is located within same room.

FG21-12
Final Action: AS AM AMPC____ D

FG22-12
409.5.3

Proposed Change as Submitted

Proponent: Brent Ursenbach, Salt Lake County, representing Utah Chapter ICC (bursenbach@slco.org)

Revise as follows:

409.5.3 Located at manifold. Where the *appliance* shutoff valve is installed at a manifold, such shutoff valve shall be located within 50' (15240mm) of the *appliance* served, shall be located on the same building level as the *appliance* and shall be readily accessible and permanently identified. The *piping* from the manifold to within 6 feet (1829 mm) of the *appliance* shall be designed, sized and installed in accordance with 401 through 408.

Reason: It is common to have a gas manifold located in a basement level furnace room or mechanical room, with gas appliances located on other levels within a building. It is poses a safety hazard to not have a gas shutoff reasonable close to the gas appliance. Installing and servicing technicians performing start-up and testing procedures on gas appliances may need to turn the gas on and off multiple times as they test inlet and outlet (manifold) pressures. It creates a hazardous condition to not have a means to immediately stop the gas flow while performing service on a gas appliance.

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

409.5.3-FG-URSENBACH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The required valve is for servicing the appliance, not for emergency use. The current text is in the NFGC and allows the valves to be placed at a manifold for convenience. There is no evidence that the current allowance is unsafe. If desired, the installer can provide a valve at the appliance.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Brent Ursenbach, Salt Lake County, representing Utah Chapter ICC, requests Approval as Submitted.

Commenter's Reason: The Committee stated the required shut off valve on a gas appliance is for servicing, not for emergency use. The proponent agrees the main purpose is for servicing the appliance. The issue as discussed in the proposal reason statement is locating the service shut off valve in a remote location, possibly 2 or 3 levels from the appliance, creates a significant hazard to the *servicing* technician. The code does not allow the electrical disconnect for an appliance to be located is a remote location, several levels away from the appliance, as this would create a hazardous condition for the servicing technician. This should not be allowed for the gas shut off valve.

Several misunderstood this proposal in the discussion on the floor in Dallas. This proposal does not require installing manifolds on each level. It simply allows shut-off valves at the manifold to be acceptable for any appliance installed on the same building level, with-in 50'. For appliances on other building levels, there is no requirement or need to place a shut-off valve at the manifold, simply locate one near the appliance on the level the appliance is located.

FG22-12
Final Action: AS AM AMPC____ D

FG24-12
411.1, 411.1.1, 411.1.4

Proposed Change as Submitted

Proponent: James Ranfone, American Gas Association (jranfon@aga.org)

Revise as follows:

411.1 Connecting appliances. Except as required by Section 411.1.1, appliances shall be connected to the piping system by one of the following:

1. Rigid metallic pipe and fittings.
2. Corrugated stainless steel tubing (CSST) where installed in accordance with the manufacturer's instructions.
3. Semirigid metallic tubing and metallic fittings. Lengths shall not exceed 6 feet (1829 mm) and shall be located entirely in the same room as the appliance. Semirigid metallic tubing shall not enter a motor-operated appliance through an unprotected knockout opening.
4. Listed and labeled appliance connectors in compliance with ANSI Z21.24 and installed in accordance with the manufacturer's instructions and located entirely in the same room as the appliance.
5. Listed and labeled quick-disconnect devices used in conjunction with listed and labeled appliance connectors.
6. Listed and labeled convenience outlets used in conjunction with listed and labeled appliance connectors.
7. Listed and labeled outdoor appliance connectors in compliance with ANSI Z21.75/CSA 6.27 and installed in accordance with the manufacturer's instructions.
8. Listed outdoor gas hose connectors in compliance with ANSI Z21.54 used to connect portable outdoor appliances. The gas hose connection shall be made only in the outdoor area where the appliance is to be used, and shall be to the gas piping supply at an appliance shutoff valve, a listed quick-disconnect device, or listed gas convenience outlet.

411.1.1 Commercial cooking appliances. Commercial cooking appliances installed on casters and appliances that are moved for cleaning and sanitation purposes shall be connected to the piping system with an appliance connector listed as complying with ANSI Z21.69 ~~or in accordance with Item 1 or 3 of Section 411.1~~. The commercial cooking appliance connector installation shall be configured in accordance with the manufacturer's installation instructions. Movement of appliances with casters shall be limited by a restraining device installed in accordance with the connector and appliance manufacturer's instructions.

~~**411.1.4 Movable appliances.** Where appliances are equipped with casters or are otherwise subject to periodic movement or relocation for purposes such as routine cleaning and maintenance, such appliances shall be connected to the supply system piping by means of an approved flexible connector designed and labeled for the application. Such flexible connectors shall be installed and protected against physical damage in accordance with the manufacturer's installation instructions.~~

Reason: The proposal accomplishes three changes:

1. 411.1 - Add a requirement that a Z21.54 listed connector be used to connect portable outdoor appliances to the house piping system. Z21.54 connectors are designed for such application.
2. 411.1.1 - Requires the use of a Z21.69 listed connector for all commercial cooking appliances on casters and for appliances that are moved for cleaning purposes. This would change eliminate the use of rigid pipe and semirigid metallic tubing. Z21.69 connectors are designed specifically for such application. The change also adds requirements for the proper installation of the connector and requires the installation of a restraining device to project the connector.
3. 411.1.4 – The requirements in this section are covered by the proposed changes to 411.1.1 and the section is no longer needed.

These revisions are consistent with changes adopted into the 2012 National Fuel Gas Code.

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

411.1-FG-RANFONE

Public Hearing Results

Committee Action: **Approved as Submitted**

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

Staff analysis: The standard Z21.54 indicates that it was developed by an ANSI consensus process. In staff's opinion, the standard had no apparent proprietary references and no apparent non-mandatory text.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

411.1.4 Movable appliances. Where appliances are equipped with casters or are otherwise subject to periodic movement or relocation for purposes such as routine cleaning and maintenance, such appliances shall be connected to the supply system piping by means of an appliance connector listed as complying with ANSI Z21.69 or by means of item 1 of Section 411.1. Such flexible connectors shall be installed and protected against physical damage in accordance with the manufacturer's instructions.

(Portions of the proposal not shown are unaffected by this public comment.)

Commenter's Reason: Under the original proposal the entire section 411.1.4 was removed. There are movable appliances that are not commercial cooking appliances that would be subject to periodic moving, yet they would not be covered because only cooking appliances are addressed by FG24 text. Under this new proposal, then these movable appliances would be permitted to be connected with one of any items as described in section 411.1 such as semirigid metallic tubing. Soft copper tubing, for example, would be work-hardened and damaged as the result of repeated movement and bending. Most connector listings will not prohibit the connector from being used with a moveable appliance, therefore, other connectors that are not as robust as a Z21.69 connector could end up being used, even though they may not be suitable for such harsh duty. If an appliance is periodically moved, a special connector or rigid pipe connections should be used.

FG24-12

Final Action: AS AM AMPC____ D

FG29-12
502.7.1 (New)

Proposed Change as Submitted

Proponent: Guy McMann MCP, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Add new text as follows:

502.7.1 Door swing. Appliance and equipment vent terminals shall be located such that doors cannot swing within 12 inches (305 mm) horizontally of the vent terminal. Door stops or closures shall not be installed to obtain this clearance.

Reason: As indicated in the photo, any gas vent can be subject to damage as a result of a door swing even when the vent has been installed in accordance with the manufacturer's instructions. Most manufacturers do not address proximity to doors on a different plane. Even if the door doesn't come in contact with the vent terminal, the door could be too close to the vent when the appliance is operating and possibly overheating the door causing problems.

Cost Impact: None

502.7.1 (NEW)-FG-MCMANN

Public Hearing Results

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Gregg Achman, VP Product Engineering & Standards, representing Hearth & Home Technologies, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

502.7.1 Door swing. Appliance and equipment vent terminals shall not be located inside of the swing radius of a door and shall not be located such that doors can ~~swing within 12 inches (305 mm) horizontally of the vent terminal~~ come in contact with the vent terminal when the door is fully opened. Door stops or closures shall not be ~~installed to obtain this clearance~~ used to keep a door from contacting a vent terminal.

Commenter's Reason: The main issue is potential damage to the vent terminal that may hamper an appliances performance by a door hitting it. There is no need to prescribe a clearance distance for the swing of the door, it just cannot hit the vent termination. The IFGC already has clearance to openings defined in the code for vent terminals, this would only add more dimensional restriction when the issue is a door damaging a vent termination. Manufacturers are required to provide clearance to combustible materials with respect to the vent termination, so adding another dimensional requirement is not necessary.

Any issue with the vent terminal being behind the door if it was propped open for extended periods of time can be addressed with the added language that the "vent termination cannot be inside the swing radius of the door" versus a prescribed distance.

Public Comment 2:

Dan Buuck, Dipl.-Ing, (FH), National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

502.7.1 Door swing. Appliance and equipment vent terminals shall be located such that doors cannot ~~swing within 12 inches (305 mm) horizontally of~~ come in contact with the vent terminal or alternatively, door stops or other door-swing limiting devices shall be installed to prevent a door from coming in contact with the vent terminal. Required clearances to combustibles shall be maintained as required in Section 305.8. ~~Door stops or closures shall not be installed to obtain this clearance.~~

Commenter's Reason: The proposed section 502.7.1 is meant to prevent physical damage to vent terminals from swinging doors. Another section, 305.8, already deals with door swing as pertaining to clearances to combustibles. Therefore, the proposed section does not need to give a set 12-inch clearance, which is not even stated in 305.8. That section references the manufacturer's instructions. A metal and glass storm door, for example, would not be required to meet the clearance to combustibles, so there is no reason to keep it 12 inches away as proposed. It should only be kept from hitting the vent terminal.

Adding an exception for door stops and other door-swing limiting devices makes sense in this section because their purpose will be obvious to the occupant. Some might argue that they can be removed and should not be allowed, but handrails, fall protection, and other code-required safety devices can also be removed by an occupant. That does not mean that we keep them out of the code. This is a minimum code, and we are dealing with a rare situation. The proposal is too restrictive as approved by the committee.

To be clear, if a combustible door swings near a vent terminal, section 305.8 is more restrictive than this modification, and therefore trumps it. But since this section is only meant to address physical damage, it does not need to be as restrictive where non-combustible doors are installed.

FG29-12

Final Action: AS AM AMPC____ D

FG31-12
505.1.1

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Arlington County, VA, representing PMG CAC

Revise as follows:

505.1.1 Commercial cooking appliances vented by exhaust hoods. Where commercial cooking appliances are vented by means of the Type I or II kitchen exhaust hood system that serves such appliances, the exhaust system shall be fan powered and the appliances shall be interlocked with the exhaust hood system to prevent appliance operation when the exhaust hood system is not operating. The method of interlock between the exhaust hood system and the appliances equipped with standing pilot burner ignition systems shall not cause such pilots to be extinguished. Where a solenoid valve is installed in the gas piping as part of an interlock system, gas piping shall not be installed to bypass such valve. Dampers shall not be installed in the exhaust system.

> **Exception:** An interlock between the cooking appliance(s) and the exhaust hood system shall not be required where heat sensors or other approved methods automatically activate the exhaust hood system when cooking ~~operations occur~~ appliances are operating.

Reason: What about when the appliances are firing to be ready to cook, but no cooking is occurring? The hood system is typically the venting means for the products of combustion generated by the gas-fired appliances. The intent of the code is to make certain that the exhaust system is operating any time that the appliances are firing and this is not necessarily related to when actual cooking is taking place.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

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

505.1.1-FG-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed text could be misinterpreted to apply to appliances that are in the standby mode with only an ignition pilot burning.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approved as Modified by this Public Comment.

Modify the proposal as follows:

505.1.1 Commercial cooking appliances vented by exhaust hoods. Where commercial cooking appliances are vented by means of the Type I or II kitchen exhaust hood system that serves such appliances, the exhaust system shall be fan powered and the appliances shall be interlocked with the exhaust hood system to prevent appliance operation when the exhaust hood system is not operating.

The method of interlock between the exhaust hood system and the appliances equipped with standing pilot burner ignition systems shall not cause such pilots to be extinguished. Where a solenoid valve is installed in the gas piping as part of an interlock system, gas piping shall not be installed to bypass such valve. Dampers shall not be installed in the exhaust system.

> **Exception:** An interlock between the cooking appliance(s) and the exhaust hood system shall not be required where heat sensors or other approved methods automatically activate the exhaust hood system when cooking ~~appliances are operating~~ appliances are at normal operation temperature.

Commenter's Reason: The committed felt that appliances that were off with only an ignition pilot burning could trigger the requirement to activate the hood system, as previously worded. With the revision it should be clear that the operation of a standing pilot only will not require the operation of the hood system. The intent is to require hood operation when the appliances are firing, are up to temperature, and are producing combustion by products that need to be vented through the hood system. Whether or not actual cooking of food is occurring is not the issue, rather, the issue is venting of combustion products when the appliances are firing.

FG31-12
Final Action: AS AM AMPC____ D

FG32-12
505.1.1

Proposed Change as Submitted

Proponent: Guy McMann MCP, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Revise as follows:

505.1.1 Commercial cooking appliances vented by exhaust hoods. Where commercial cooking appliances are vented by means of the Type I or II kitchen exhaust hood system that serves such appliances, the exhaust system shall be fan powered and the appliances shall be interlocked with the exhaust hood system to prevent appliance operation when the exhaust hood system is not operating. The method of interlock between the exhaust hood system and the appliances equipped with standing pilot burner ignition systems shall not cause such pilots to be extinguished. Where a solenoid valve is installed in the gas piping as part of an interlock system, gas piping shall not be installed to bypass the solenoid valve and the circuitry for the interlock system shall be arranged to require a manual reset operation so that after power has been interrupted to the valve the valve will not automatically re-open upon restoration of the power supply. ~~Dampers shall not be installed in the exhaust system~~.

> **Exception:** An interlock between the cooking appliance(s) and the exhaust hood system shall not be required where heat sensors or other approved methods automatically activate the exhaust hood system when cooking operations occur

Reason: A realistic scenario exists where in the event of a power failure during normal cooking operations the line stall could walk away from the stove or cook top and not shut off the valves. When the power comes back on gas could flow freely creating a potential disaster. In fact, any time that the hood is powered off for any reason, the kitchen staff could walk away from the appliances without turning off the burners and when the hood is powered again, the appliances could be unattended. Installing a manual reset device will ensure that this could not happen. The last sentence has been stricken as this is an IMC issue and isn't related to the IFGC.

Cost Impact: This may increase cost

505.1.1-FG-MCMANN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: No evidence was provided to show that such hazardous scenarios have occurred. The proponent has described a hypothetical hazard. The cost of the additional circuit component is a concern**.**

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Commenter's Reason: Much of the reason that codes are developed is in anticipation of events that have not occurred yet and to head off disasters before they become reality. The committee didn't think that a problem could result if during a power failure/outage, the kitchen line staff walk away from the cooking appliances without turning off the hood and the appliance burners. If this were to happen, when the power comes back on, gas will flow if burners are left on resulting in a potential disaster. This proposal will require a manual reset of the valve just as is required for Ansul fire suppression systems as indicated in Section 904.11.2 of the Fire Code. After a power failure has occurred and the solenoid gas valve has closed, the valve should be locked out so that it can open only after a deliberate operation of a reset control button.

FG32-12
Final Action: AS AM AMPC____ D

FG34-12
618.4, 618.4 (New)

Proposed Change as Submitted

Proponent: Guy McMann MCP, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Revise as follows:

~~**618.4 Prohibited sources.** Outdoor or return air for forcedair heating and cooling systems shall not be taken from the following locations:~~

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

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

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

   ~~**Exception:** This shall not apply where:~~

   ~~1. The appliance is a direct-vent appliance or an appliance not requiring a vent in accordance with Section 501.8.~~
   ~~2. The room or space complies with the following requirements:~~
      ~~2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6L/W) of combined input rating of all fuel-burning appliances therein.~~
      ~~2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.~~
      ~~2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of a draft hood in the same room or space or the combustion chamber of any atmospheric burner appliance in the same room or space.~~
   ~~3. Rooms or spaces containing solid fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.~~
~~6. A closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.~~

~~**Exceptions:**~~

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

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

618.4 Supply, Return and outdoor air. Supply, return and outdoor air installations shall be installed in accordance with the *International Mechanical Code.*

Reason: The purview of the Fuel Gas Code presides over the gas fired appliance. How the appliance is ducted and all that surrounds it should be up to the other codes. The Fuel Gas code doesn't attempt to tell the user how to electrically wire it, so why should it tell the user how to duct it.

Cost Impact: None

618.5 #2-FG-MCMANN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The text proposed for deletion should stay in the code so as to eliminate the need to refer to the IMC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Commenter's Reason: This was approved as submitted by the Mechanical Code Committee. FG-35 which was approved as submitted, has several problems and this proposal will bring consistency to the two codes.

FG34-12
Final Action: AS AM AMPC____ D

FG35-12
618.4, 618.5 (New), 618.6 (New)

Proposed Change as Submitted

Proponent: James Ranfone, American Gas Association (jranfon@aga.org)

Delete and substitute as follows:

~~**618.4 Prohibited sources.** Outdoor or return air for forcedair heating and cooling systems shall not be taken from the following locations:~~

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

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

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

   ~~**Exception:** This shall not apply where:~~

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

   ~~**Exceptions:**~~

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

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

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

618.5 Outdoor air openings: Outdoor air intake openings for a forced-air heating system shall be located in accordance with all of the following:

1. Outdoor air openings located within 10 feet horizontally of an appliance vent outlet, a plumbing vent outlet, or an exhaust fan discharge outletshall be not less than 3 feet below such outlets.
2. They shall be not less than 10 feet (3048 mm) above the surface of any adjoining sidewalk, street, alley or driveway.
3. They shall be an approved distance from a storage location where the stored materials emit odors, fumes, hazardous or flammable vapors.

618.6 Indoor return air openings: Indoor return air intake openings for a forced-air heating system shall be in accordance with all of the following:

1. Shall be located in rooms or spaces where the supply air rate discharged back into the room or space is equal to or greater than the return air rate taken from the space.
2. Shall be located a minimum of 10 feet (3048 mm) from a cooking appliance or the firebox or draft hood of a natural draft vented fuel-burning appliance.
3. Where located in a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or attic. Return air is permitted to be taken from such spaces where they are served by a dedicated force-air heating system and the supply air rate discharged back into the room or space is equal to or greater than the return air rate taken from the space.
4. Return air intake openings shall not be located in the following locations:
   - 4.1. Where stored materials emit odors, fumes, hazardous or flammable vapors
   - 4.2. A refrigeration machinery room as defined in the *International Mechanical Code*

Reason: The proposal seeks to clarify the provisions as follows:

1. Reorganize code requirements by outdoor and indoor air opening locations.
2. State provisions in a positive manner and minimize the use of exceptions.
3. Eliminate unenforceable language or language open to wide interpretation – for example “insanitary location”, “objectionable odors”
4. Simplify the requirements regarding indoor return air openings
5. Allow return air openings a wider variety of spaces where a dedicated forced-air system is installed. Currently coverage only permits kitchen installations.
6. Eliminate the 25% requirement that has no technical basis. The revised text such spaces to be supplied with an equal or greater rate of supply air. (New 618.6 #1)

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

618.5-FG-RANFONE

Public Hearing Results

This code change was contained in the Updates to the 2012 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/12-13-ProposedChanges-A.aspx

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent’s published reason and also on the action taken on FG33-12 and FG34-12.

This proposal replaces the proposal that was originally published with the IFGC proposals.

~~**618.4 Prohibited sources.**~~ *(All of current section 618.4 is deleted)*

Add new text as follows:

618.5 Outdoor air openings: Outdoor air openings for a forced-air heating system shall be located in accordance with all of the following:

1. Not less than 3 feet below an appliance vent outlet, a plumbing vent outlet, or exhaust fan discharge outlet, located within 10 feet (3048 mm).
2. Not less than 10 feet (3048 mm) above the surface of any adjoining sidewalk, street, alley or driveway.

   Exception. Openings located 25 ft (7620 mm) above such surfaces.

3. An approved distance from a storage location where the stored materials emit odors, fumes, hazardous or flammable vapors.

618.6 Indoor return air openings: Indoor return air openings for a forced-air heating system shall be in accordance with all of the following:

1. Shall be located in rooms or spaces where the supply air rate discharged back into the room or space is equal to or greater than the return air rate taken from the space. Adjoining rooms and spaces connected by a permanent opening having an area sized in accordance with Section 618.2 shall be considered as a single room or space.
2. Shall be located a minimum of 10 feet (3048 mm) from a cooking appliance or the firebox or draft hood of a natural draft vented fuel-burning appliance.
3. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic. Return air is permitted to be taken from such spaces where served by a dedicated forced-air heating system and the supply air rate discharged back into the room or space is equal to or greater than the return air rate taken from the space.
4. Return air intake openings shall not be located in the following locations:
   4.1. Where stored materials emit odors, fumes, hazardous or flammable vapors
   4.2. A refrigeration machinery room as defined in the *International Mechanical Code*

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Richard Grace, Fairfax County, Virginia, representing the Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and the Virginia Building Code and Officials Association (VBCOA) requests Disapproval.

Commenter's Reason: There is one simple flaw to this change, it does not include forced air cooling systems. This section would not apply to a space or spaces provided with a baseboard heating system and a forced air cooling system, nor would it apply to a gas fired forced air system when in the cooling mode. Additionally, with the passage of M167-12, there are now two differing requirements for forced air heating and cooling systems based on their fuel (IMC vs. IFGC) type. It is not clear as to why there should be a difference in the outdoor and return air opening locations based on the fuel type, and the proponent did not provide such clarification.

Public Comment 2:

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

Commenter's Reason: This proposal has several issues that are inconsistent with language that was approved by the Mechanical Code Committee.

- 618.5 # 2 is still inconsistent with similar language in the mechanical code.
- 618.5 # 3 permits return air to be taken from storage areas containing foul or hazardous fumes if the code official "thinks" its ok. This will only cause confusion and inconsistent enforcement as it's too subjective.
- 618.6 item 3 permits return air from bathrooms; closets and toilet rooms provided they have dedicated systems. This isn't ever going to happen. Return air from a toilet room or bathroom is ill-advised under any condition.

- It's not realistic to think that there will be a dedicated system for boiler rooms, furnace rooms and the like although such a scenario does exist for garages.

FG35-12

Final Action: AS AM AMPC____ D

FG36-12
621.2, 621.4

Proposed Change as Submitted

Proponent: Craig Conner, Building Quality, representing self

Revise as follows:

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

621.4 Prohibited locations. Unvented room heaters shall not be installed within occupancies in Groups A, E and I. <u>Unvented room heaters shall not be installed within dwelling units.</u> The location of unvented room heaters shall also comply with Section 303.3.

Reason: Unvented room heaters should not be allowed in the dwelling units of new, tight, energy-efficient buildings. A new study by the Building Research Council at the University of Illinois measured the air quality produced by unvented heaters as used in real residences. The study demonstrated problems with the indoor air quality in residences with unvented heaters. The study also calls into question the extent of the protection provided by one of the industry's key safety devices, the oxygen depletion sensor (ODS).

A study of 30 homes with unvented gas fireplaces was recently published in the Indoor Air journal[1]. The study monitored the combustion products in the residences. Of the greatest concern was the measured nitrogen dioxide levels (NO_2). There are 4 relevant guidelines/standards for NO_2. About 40% of the residences exceeded both the most lenient ANSI Standard Z21.11.2 value of 300 ppb and the Health Canada guideline of 250 ppb. About 80% exceeded both the US National Ambient Air Quality Standards/EPA standard of 100 ppb and the World Health Organization (WHO) guideline of 110 ppb.[2] A whopping 40% were at least triple the US standard. The study concluded

> "*Levels of NO_2 that exceeded health-based guidelines occurred regardless of usage patterns, so should be considered inherent to the fireplace performance."*

Twenty percent of the heaters exceeded the carbon monoxide (CO) safety level, as established by the US National Ambient Air Quality Standards/EPA standard of 100 ppm (8 hour period).

Unvented heater proponents routinely argue that unvented heaters with oxygen depletion sensors (ODS) have never been shown to have significant health or safety issues. The unvented trade association says "*Vent-free appliances feature an automatic safety shut-off device (Oxygen Detection System or ODS). The ODS turns off the gas in case of a malfunction.*" It is perhaps stating the obvious, but an oxygen depletion sensor monitors oxygen, not carbon monoxide or nitrogen dioxide. Clearly the ODS sensor allowed the indoor air quality to exceed safe levels far too often. It is clear that the ODS did not turn of the gas for the 20% of the heaters that exceeded the carbon monoxide (CO) safety level. Worse yet an outright majority of the unvented heaters exceeded the safety levels for NO^2. (http://www.ventfree.org/images/stories/files/VentFree_SafeEfficient_V06.pdf)

The study monitored the combustion products in the residences for only 3 to 4 days in each of the 30 homes. It only took 3 or 4 days to find the air quality problems reported. Longer monitoring would likely have reported problems with additional residences. Does the industry still conclude there is no evidence of problems?

The 2012 IECC requires residences in most of the US (climates zone 3 to 8) to be tested to show an air leakage of 3 ACH50 or less (IECC R402.4.1.2). The residences in this study were also tested for air tightness, with the tightest being almost twice as leaky as allowed by the new IECC and the average (median) being almost 4 times as leaky as allowed by the new energy code. New commercial buildings also have substantially more stringent air tightness requirements ((IECC C402.4). If anything, the study of the 30 residences underestimates the air quality problems in new dwelling units.

As if to echo these concerns with health and safety here, it is significant that a number of the producers of vented heater products refuse to produce unvented products due to their concerns with health and safety issues (Hearth & Home Technologies, Jotul, Kozy Heat Fireplaces, Mendota Fireplaces, Renni, Travis Industries), including the largest maker of fireplaces and hearth products.

Unvented gas room heaters do not belong in dwelling units.

1. "Measured concentrations of combustion gases from the use of unvented gas fireplaces". Francisco, P. W., Gordon, J. R. and Rose, B. (2010), Indoor Air, volume 20: pages 370–379.
2. NO_2 measurements are average over one hour.
3. http://www.ventfree.org/images/stories/files/VentFree_SafeEfficient_V06.pdf

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

621.2-FG-CONNER

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal would prohibit unvented heaters in older homes that have greater air infiltration. The nitrogen dioxide levels discussed are more stringent than recommended by the CPSC. No substantiation was given to demonstrate that the current restrictions for these appliances are inadequate.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

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

Commenter's Reason: Pollutants released into an airtight home by an unvented heater are a health issue. The solution is simple-don't put the problem into the home. Use a vent.

The committee reason states "no substantiation was given to demonstrate the current restrictions for these appliances are inadequate". However, the reason statement for the original proposal cited a recent study of 30 homes with unvented heaters. After measuring air quality in these homes for only 3 or 4 days tests showed nitrogen dioxide and/or carbon monoxide levels exceeding safe levels in over half of the homes, clearly demonstrating a health problem.

The committee reason states that the CPSC (Consumer Product Safety Commission) nitrogen dioxide limit is less restrictive than the limits cited in the study. True, the US, Canadian and European nitrogen dioxide limits are between 110 and 250 ppb. The CPSC limit is 300 ppb. However, even using the less restrictive CPSC limit, 12 of the 30 homes studied exceeded the CPSC nitrogen dioxide limit. Clearly nitrogen dioxide is a problem with unvented heaters, which is why the study concluded

> "*Levels of NO_2 that exceeded health-based guidelines occurred regardless of usage patterns, so should be considered inherent to the fireplace performance."*

The precedent for restricting the use of unvented heaters is easy to find. The existing IFGC sentence immediately prior to the proposed new sentence says "Unvented room heaters shall not be installed within occupancies in Groups A, E and I."

Residences continue to get tighter and more susceptible to air quality problems originating inside the home. Venting the combustion products at the source (the unvented room heater) makes much more sense than venting a whole house on the prospect that an unvented heater might be in the space. Excessive ventilation wastes energy, undermining the value of new energy-efficient homes. The solution is simple; require vented heaters and eliminate unvented heaters.

Public Comment 2:

Gregg Achman, representing VP Product Engineering & Standards, Hearth & Home Technologies, Inc requests Approval as Submitted.

Commenter's Reason: Hearth and Home Technologies (HHT) is the world's largest manufacturer of hearth products under the brands Heatilator®, Heat & Glo™, Quadra-Fire® and Harman. Annually, we manufacture hundreds of thousands of gas, wood, pellet and electric hearth systems. We are the recognized technology leader in the hearth industry and have more design patents than any other company including a patent for unvented gas fireplaces that dates back to 2000. We have the ability to make and sell unvented gas hearth products; but in the best interest of the homeowner/consumer choose not to make or sell unvented gas hearth products.

Additionally, we own the largest hearth installation and distribution company in the US, acquired in 2000. When acquired the distribution business was selling a large amount of unvented products. We exited the unvented category at significant financial risk to our revenue and profitability, unless we could convert the new company's builders and consumers to a vented product. We did this because we believed so strongly that the unvented gas category is not right for the homeowner/consumer. As we have acquired more companies through the years, the same decision has been made each and every time.

Our vision is to be profitable, to be responsible corporate citizens and to create long term value for our stakeholders while conducting our business in a way that sustains the well-being of society, our environment and the economy in which we live and work. Quite simply, we consider selling unvented gas heater products irresponsible. We have always held that the unvented gas heater category was not in the best interest of the homeowner/consumer and therefore should not be manufactured by the industry. It is our opinion unvented gas heaters are not appropriate for today's homes for the reasons listed below. Our position has gotten stronger through the years, as proof of our concerns has grown with the increased use of the unvented category since the mid 1990's.

Expanding consensus to exclude unvented gas appliances.

- Virtually all of the largest national homebuilders have ceased using unvented gas hearth products because of inherent liability.
- Many jurisdictions ban or severely limit the application of unvented gas heaters. With housing being built tighter and more efficient every year, we believe this ban should be consistent in all jurisdictions.
- National organizations have introduced green building programs which exclude unvented gas appliances as a prerequisite to certification. Those include US Green Building Council's LEED® for Homes, American Lung Association's Health House® and Environmental Protection Agency's Energy Star® with Indoor Air Package. The National Association of Home Builders' National Green Building Standard (ICC-700) requires the use of direct vent systems and prohibits unvented devices.
- The 2012 IGCC, Section 804.1, states that unvented room heaters and unvented decorative appliances, including alcohol burning, shall be prohibited.

Reduced indoor air quality (IAQ).

1. Water vapor from the gas combustion process exhausts at approximately 1 quart/hour. Tightly built homes can't adequately process this additional moisture, so mold growth can result as condensation accumulates on cooler surfaces in the home.
2. Unhealthy indoor air quality can result from the byproducts of unvented gas combustion, specifically: carbon monoxide, nitrogen dioxide and ultrafine particle matter which has been linked to health effects such as oxidative damage to DNA and mortality.
3. Improper usage and installation by homeowner/consumers can put them in an unsafe position in violation of manufacturer's instructions.
    - Manufacturer's claim that unvented gas appliances are "99% efficient" leading consumers to believe these appliances can be used as primary heat sources. In reality, the 99% efficiency claim is attainable only if all the water vapor condenses completely within the home.
    - Public statements show many "do-it-yourself" homeowners lack the knowledge to properly install and maintain unvented gas heaters.

Better alternatives, in line with consumer preferences, comprise the majority of what is sold and in use today. The vented products are cost competitive.

- Unvented gas appliances have represented a declining share of hearth market since 1997.
- Manufacturers provide comparable vented gas appliances at a comparable consumer cost.
- The consumer advantage with unvented gas appliances being cheaper to install does not justify the risks.
- Many other manufacturers of hearth products choose not to manufacture unvented gas hearth products. The vast majority of manufacturers of unvented gas appliances also manufacture vented gas appliances, so they could also change to vented products.

Not one person on our management team would use unvented gas hearth products in their home. We believe that homeowner/consumers are people just like us and would want the same thing we do. The best overall value product should safely meet their needs and the unvented category does not, so why would we manufacture and sell them? The potential liability is a financial risk; but, more than money is at issue here. Behaving responsibly means having a positive impact on the environment of people's homes where our product is used. We must strive to move beyond what we have the right to sell our customers —but to focus on what is the right thing to sell our customers.

FG36-12

Final Action: AS AM AMPC____ D

FG40-12
407.2

Proposed Change as Submitted

Proponent: Dan Buuck, representing National Association of Home Builders (NAHB) (dbuuck@nahb.org)

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

Reason: This change from the 2006 International Fuel Gas Code (IFGC) is clearly proprietary in nature. To disallow any other material that is proven to meet the requirements for support is contrary to the spirit of the ICC family of codes (I-Codes). Section 105.2 specifically states that the code should be inclusive in nature as long as products and materials meet the qualities necessary to meet their intended purpose. Favoring one material over another without reason is unacceptable. The change to the 2009 IFGC is too restrictive and eliminates other support materials that have been used successfully for years.

The 2012 change will have a significant impact on several manufacturers that have established alternate materials for piping supports. If the structural properties of a material is tested and proven to meet the structural specifications for supporting the piping it should be accepted for use. Even the referenced standard, MSS SP-58, allows other materials to be used provided they comply with the allowable stress requirements in the standard—taking into consideration the effects of temperature on the strength of the material.

If the material requirements for this section are not removed, it allows this code to become exclusionary. In the past the I-Codes have railed from the exclusivity of other codes that limit the type of materials. Materials that have proven themselves acceptable over the years should not be eliminated to prosper one type of material.

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

407.2-FG-BUUCK

Public Hearing Results

This code change was contained in the Updates to the 2012 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/12-13-ProposedChanges-A.aspx

Committee Action: **Disapproved**

Committee Reason: Current text is consistent with ANSI Z223.1 and NFPA 54. In the event of fire, plastic hangers would be less safe than metal hangers. As proposed, the text would allow any material without restriction. Pipe manufacturers do not recommend plastic hangers for their pipe. The load rating for nonmetallic hangers is unknown.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dan Buuck, Dipl.-Ing, representing (FH), National Association of Home Builders (NAHB) requests Approval as Submitted.

Commenter's Reason: The committee's reason for disapproving this proposal is flawed. It states that this proposal will allow any material without restriction. That is not correct, because the section, as written, references MSS SP-58 which specifies allowable stresses, load ratings and temperatures. The code traditionally leaves material requirements up to the standards it references. It does not need to go beyond the standard this time and be more restrictive.

Additionally, calling out a specific material without giving guidance as to what would constitute an acceptable alternative conflicts directly with Section 105.2 which states "The provisions of this code are not intended to prevent the installation of any material ... not specifically prescribed by this code."

FG40-12
Final Action: AS AM AMPC____ D

P11 – 12
202, 301.3, Chapter 13, Chapter 13 (New), Chapter 14 (New)

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Add new definitions as follows:

STORAGE TANK. A fixed container for holding water at atmospheric pressure for subsequent reuse as part of a plumbing or irrigation system.

RECLAIMED WATER. *Non-potable water* that has been derived from the treatment of wastewater by a facility or system licensed or permitted to produce water meeting the jurisdiction's water requirements for its intended uses. Also known as "Recycled Water."

ONSITE NON-POTABLE WATER REUSE SYSTEMS. Water systems for the collection, treatment, storage, distribution, and reuse of non-potable water generated onsite, including but not limited to graywater systems. This definition does not include rainwater harvesting systems.

DISTRIBUTION PIPE. Pressurized or non-pressure piping used within the plumbing system of a building to deliver rainwater or graywater from the *storage tank* or pump to the point of use.

COLLECTION PIPE. Unpressurized pipe used within the collection system that drains onsite non-potable water or rainwater to a storage tank by gravity.

ALTERNATE ON–SITE NON-POTABLE WATER. Non-potable water from other than public utilities, onsite surface sources and subsurface natural freshwater sources. Examples of such water are graywater, on-site reclaimed water, collected rainwater, captured condensate, and rejected water from reverse osmosis systems.

METER. A measuring device used to collect data and indicate water usage.

RAINWATER. Water from natural precipitation.

Revise as follows:

301.3 Connections to drainage system. Plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be directly connected to the sanitary drainage system of the building or premises, in accordance with the requirements of this code. This section shall not be construed to prevent indirect waste systems required by Chapter 8.

> **Exception:** Bathtubs, showers, lavatories, clothes washers and laundry trays shall not be required to discharge to the sanitary drainage system where such fixtures discharge to an approved ~~gray water~~ system in accordance with Chapter 13 and 14 ~~for flushing of water closets and urinals or for subsurface landscape irrigation~~.

Delete existing Chapter 13 and substitute as follows:

~~CHAPTER 13~~
~~GRAY WATER RECYCLING SYSTEMS~~

CHAPTER 13
NON-POTABLE WATER SYSTEMS

SECTION 1301
GENERAL

1301.1 Scope. The provisions of Chapter 13 shall govern the materials, design, construction and installation of systems for the collection, storage, treatment, and distribution of non-potable water. The use and application of non-potable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

1301.2 Water quality. Non-potable water for each end use application shall meet the minimum water quality requirements as established for the intended application by the laws, rules and ordinances applicable in the jurisdiction. Where *non-potable* water from different sources is combined in a system, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

1301.2.1 Residual disinfectants. Where chlorine is used for disinfection, the *non-potable* water shall contain not more than 4 mg/L of chloramines or free chlorine when tested in accordance with ASTM D1253. Where ozone is used for disinfection, the *non-potable* water shall not contain gas bubbles having elevated levels of ozone at the point of use.

1301.2.2 Filtration required. *Non-potable* water utilized for water closet and urinal flushing applications shall be filtered by a 100 micron or finer filter.

> **Exception:** Reclaimed water sources shall not be required to comply with the requirements of 1301.2.1 and 1301.2.2.

1301.3 Signage required. All non-potable water outlets such as hose connections, open ended pipes, and faucets shall be identified at the point of use for each outlet with signage that reads as follows: "Non-potable water is utilized for [application name]. Caution: non-potable water. DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inches in height and in colors in contrast to the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure 1301.3 shall appear on the signage required by this section.

Figure 1301.3 – Pictograph DO NOT DRINK

1301.4 Permits. *Permits* shall be required for the construction, installation, *alteration*, and *repair* of non-potable water systems. *Construction documents*, engineering calculations, diagrams, and other such data pertaining to the non-potable water system shall be submitted with each application for *permit*.

1301.5 Potable water connections. Where a *potable* system is connected to a non-potable water system, the *potable* water supply shall be protected against backflow in accordance with Section 608.

1301.6 Approved components and materials. Piping, plumbing components, and materials used in the collection and conveyance systems shall be manufactured of material *approved* for the intended application and compatible with any disinfection and treatment systems used.

1301.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into *storage tanks* and piping systems. Any screen materials shall be compatible with contacting system components and shall not accelerate corrosion of system components.

1301.8 Freeze protection. Where sustained freezing temperatures occur, provisions shall be made to keep *storage tanks* and the related piping from freezing.

1301.9 Non-potable water storage tanks. Where used, non-potable water *storage tanks* shall comply with Sections 1301.9.1 through 1301.9.11.

1301.9.1 Sizing. The holding capacity of the *storage tank* shall be sized in accordance with the anticipated demand.

1301.9.2 Location. *Storage tanks* shall be installed above or below grade. Above grade *storage tanks* shall be protected from direct sunlight and shall be constructed using opaque, UV resistant, materials such as, but not limited to, heavily tinted plastic, fiberglass, lined metal, concrete, wood, or painted to prevent algae growth, or shall have specially constructed sun barriers including but not limited to installation in garages, crawlspaces, or sheds. *Storage tanks* and their manholes shall not be located directly under any soil or waste piping or any source of contamination.

1301.9.3 Materials. Where collected onsite, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The *storage tank* shall be constructed of materials compatible with any disinfection systems used to treat water upstream of the tank and with any systems used to maintain water quality within the tank. Wooden *storage tanks* that are not equipped with a makeup water source shall be provided with a flexible liner.

1301.9.4 Foundation and supports. *Storage tanks* shall be supported on a firm base capable of withstanding the *storage tank's* weight when filled to capacity. *Storage tanks* shall be supported in accordance with the *International Building Code*.

1301.9.4.1 Ballast. Where the soil can become saturated, an underground *storage tank* shall be ballasted, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down ballast shall meet or exceed the buoyancy force of the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to support the *storage tank* weight when full, consistent with the bearing capability of adjacent soil.

1301.9.4.2 Structural support. Where installed below grade, *storage tank* installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when filled with water or empty.

1301.9.5 Makeup water. Where an uninterrupted supply is required for the intended application, *potable* or reclaimed water shall be provided as a source of makeup water for the *storage tank*. The makeup water supply shall be protected against backflow in accordance with Section 608. A full-open valve located on the makeup water supply line to the *storage tank* shall be provided. Inlets to *storage tank* shall be controlled by fill valves or other automatic supply valves installed so as to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. Where makeup water is provided, the water level shall not be permitted to drop below the source water inlet or the intake of any attached pump.

1301.9.6 Overflow. The *storage tank* shall be equipped with an overflow pipe having a diameter not less than that shown in Table 606.5.4 The overflow pipe shall be protected from insects or vermin and shall be discharged in a manner consistent with storm water runoff requirements of the jurisdiction. The overlow piope shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directed so as not to freeze on roof walks. The overflow drain shall not be equipped with a shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section 708.

1301.9.7 Access. A minimum of one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below grade *storage tanks*, located outside of the *building*, shall be provided with either a manhole not less than 24 inches (610 mm) square or a manhole with an inside diameter not less than 24 inches (610 mm) . Manholes shall extend not less than 4 inches above ground or shall be designed to as to prevent water infiltration. Finished grade shall be sloped away from the manhole to divert surface water from the manhole. Each manhole cover shall be secured to prevent unauthorized access. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be a minimum of 4 inches (102 mm) above the finished grade level. The service port be secured to prevent unauthorized access.

> **Exception:** *Storage tanks* under 800 gallons in volume installed below grade shall not be required to be equipped with a manhole, but shall have a service port not less than 8 inches (203 mm) in diameter.

1301.9.8 Venting. *Storage tanks* shall be provided with a vent sized in accordance with Chapter 9 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of a U-bend installed with the opening directed downward or an *approved* cap. Vent outlets shall extend a minimum of 4” above grade, or as necessary to prevent surface water from entering the *storage tank*. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section 1307.1.

1301.9.9 Draining of tanks. Where tanks require draining for service or cleaning, tanks shall be drained by using a pump or by a drain located at the lowest point in the tank The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table 606.5.7. A minimum of one cleanout shall be provided on each drain pipe in accordance with Section 708.

1301.9.10 Marking and signage. Each non-potable water *storage tank* shall be *labeled* with its rated capacity. The contents of *storage tanks* shall be identified with the words “CAUTION: NON-POTABLE WATER – DO NOT DRINK.” Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, “DANGER – CONFINED SPACE.” Markings shall be indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material mounted on the tank or shall be indelibly printed on the tank. The letters of the words shall be not less than 0.5 inches in height and shall be of a color in contrast with the background on which they are applied.

1301.9.11 Storage tank tests. *Storage tanks* shall be tested in accordance with the following:

Storage tanks shall be filled with water to the overflow line prior to and during inspection. All seams and joints shall be left exposed and the tank shall remain water tight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and verify that there are no leaks.

2. The tank drain shall be observed for proper operation.
3. The makeup water system shall be observed for proper operation and successful automatic shutoff of the system at the refill threshold shall be verified.

1301.10 System abandonment. If the owner of an onsite non-potable water reuse system or *rainwater collection and conveyance system* elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with the following:

1. All system piping connecting to a utility-provided water system shall be removed or disabled.
2. The *distribution piping* system shall be replaced with an *approved potable* water supply piping system. Where an existing *potable* pipe system is already in place, the fixtures shall be connected to the existing system.
3. The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

1301.11 Trenching requirements for non-potable water piping. Non-potable water collection and distribution piping and reclaimed water piping shall be separated from the *building* sewer and *potable* water piping underground by 5 feet (1524 m) of undisturbed or compacted earth. Non-potable water collection and distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried non-potable water piping shall comply with the requirements of Section 306.

Exceptions:

1. The required separation distance shall not apply where the bottom of the non-potable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials conforms to Table 702.3.
2. The required separation distance shall not apply where the bottom of the *potable* water service pipe within 5 feet (1524 mm) of the non-potable water pipe is a minimum of 12 inches (305 mm) above the top of the highest point of the non-potable water pipe and the pipe materials comply with the requirements of Table 605.4
3. Non-potable water pipe is permitted to be located in the same trench with a building sewer, provided that such sewer is constructed of materials that comply with the requirements of Table 702.2.
4. The required separation distance shall not apply where a non-potable water pipe crosses a sewer pipe provided that the pipe is sleeved to at least 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing with pipe materials that comply with Table 702.2.
5. The required separation distance shall not apply where a *potable* water service pipe crosses a non-potable water pipe provided that the *potable* water service pipe is sleeved for a distance of at least 5 feet (1524 mm) horizontally from the centerline of the non-potable pipe on both sides of such crossing with pipe materials that comply with Table 702.2.
6. Irrigation piping located outside of a *building* and downstream of the backflow preventer is not required to meet the trenching requirements where non-potable water is used for outdoor applications.

1301.12 Outdoor outlet access. Sillcocks, hose bibs, wall hydrants, yard hydrants, and other outdoor outlets supplied by *non-potable* water shall be located in a locked vault or shall be operable only by means of a removable key.

SECTION 1302
ONSITE NON-POTABLE WATER REUSE SYSTEMS

1302.1 General. The provisions of Section 1302 shall govern the construction, installation, *alteration,* and *repair* of *onsite non-potable water reuse systems* for the collection, storage, treatment and distribution of on-site sources of non-potable water as permitted by the jurisdiction.

1302.2 Sources. Onsite non-potable water reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers, and laundry trays. Water from other approved non-potable sources including swimming pool backwash operations, air conditioner condensate, rainwater, cooling tower blow-down water, foundation drain water, steam system condensate, fluid cooler discharge water, food steamer discharge water, combination oven discharge water, industrial process water, and fire pump test water shall also be permitted to be collected for reuse by onsite non-potable water reuse systems, as approved by the code official and as appropriate for the intended application.

1302.2.1 Prohibited sources. Wastewater containing urine or fecal matter shall not be diverted to onsite non-potable water reuse systems and shall discharge to the sanitary drainage system of the building or premises in accordance with Chapter 7. Water from reverse osmosis system reject water, water softener discharge water, kitchen sink wastewater, dishwasher wastewater, and wastewater discharged from wet-hood scrubbers shall not be collected for reuse within a to onsite non-potable water reuse systems.

1302.3 Traps. Traps serving fixtures and devices discharging wastewater to to onsite non-potable water reuse systems shall comply with the Section 1002.4.

1302.4 Collection pipe. Onsite non-potable water reuse systems shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey untreated water for reuse. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the graywater system. Collection and vent piping materials shall comply with Section 702.

1302.3.1 Installation. Collection piping conveying untreated water for reuse shall be installed in accordance with Section 704.

1302.3.2 Joints. Collection piping conveying untreated water for reuse shall utilize joints *approved* for use with the *distribution piping* and appropriate for the intended applications as specified in Section 705.

1302.3.3 Size. Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section 710.

1302.3.4 Labeling and marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by the Chapter 7.

1302.5 Filtration. Untreated water collected for reuse shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gage or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

1302.6 Disinfection. Where the intended application for non-potable water collected onsite for reuse requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use. Non-potable water collected onsite containing untreated *graywater* shall be retained in collection reservoirs for a maximum of 24 hours.

1302.7 Storage tanks. *Storage tanks* utilized in onsite non-potable water reuse systems shall comply with Section 1301.9.

1302.7.1 Location. *Storage tanks* shall be located with a minimum horizontal distance between various elements as indicated in Table 1302.7.1.

TABLE 1302.7.1
LOCATION OF NON-POTABLE WATER REUSE STORAGE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (FEET)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5
Water wells	50
Streams and lakes	50
Water service	5
Public water main	10

1302.7.3 Outlets. Outlets shall be located at least 4 inches (102 mm) above the bottom of the *storage tank*, and shall not skim water from the surface.

1302.8 Valves. Valves shall be supplied on onsite non-potable water reuse systems in accordance with Sections 1302.8.1 and 1302.8.2.

1302.8.1 Bypass valve. One three-way diverter valve listed and labeled to NSF 50 or other *approved* device shall be installed on collection piping upstream of each *storage tank*, or drainfield, as applicable, to divert untreated onsite reuse sources to the sanitary sewer to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections Bypass valves shall be *marked* to indicate the direction of flow, connection and *storage tank* or drainfield connection. Bypass valves shall be installed in accessible locations. Two shutoff valves shall not be installed to serve as a bypass valve.

1302.8.2 Backwater valve. One or more *backwater valves* shall be installed on each overflow and tank drain pipe. *Backwater valves* shall be in accordance with Section 715.

1302.9 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform *repair*, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall appropriate for the application and in accordance with Section 604.

1302.10 Water-pressure reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the nonnpotable water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8.

1302.11 Distribution pipe. *Distribution piping* utilized in onsite non-potable water reuse systems shall comply with Sections 1302.11.1 through 1302.11.4.

Exception: Irrigation piping located outside of the *building* and downstream of a backflow preventer.

1302.11.1 Materials, joints and connections. *Distribution piping* shall conform to the standards and requirements specified in Section 605.

1302.11.2 Design. Onsite non-potable water reuse distribution piping systems shall be designed and sized in accordance with Section 604 for the intended application.

1302.11.3 Marking. Onsite non-potable water distribution piping labeling and marking shall comply with Section 608.8.

1302.12 Tests and inspections. Tests and inspections shall be performed in accordance with Sections 1302.12.1 through 1302.12.6.

1302.12.1 Collection pipe and vent test. Drain, waste and vent piping used for onsite water reuse systems shall be tested in accordance with Section 312.

1302.12.2 Storage tank test. *Storage tanks* shall be tested in accordance with the Section 1301.9.11.

1302.12.3 Water supply system test. The testing of makeup water supply piping and *distribution piping* shall be conducted in accordance with Section 312.5.

1302.12.4 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and *backwater valves* shall be conducted in accordance with Section 312.10.

1302.12.5 Inspection vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the *storage tank* and piping systems in accordance with Section 1301.7.

1302.12.6 Water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.

1302.13 Operation and maintenance manuals. Operations and maintenance materials shall be supplied with non-potable onsite water reuse systems in accordance with Sections 1302.13.1 through 1302.13.4.

1302.13.1 Manual. A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

1302.13.2 Schematics. The manual shall include a detailed system schematic, locations of all system components, and a list of all system components including manufacturer and model number.

1302.13.3 Maintenance procedures. The manual shall provide a maintenance schedule and procedures for all system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.

1302.13.4 Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

SECTION 1303
NON-POTABLE RAINWATER COLLECTION AND DISTRIBUTION SYSTEMS

1303.1 General. The provisions of Section 1303 shall govern the construction, installation, *alteration,* and *repair* of *rainwater collection and conveyance systems* for the collection, storage, treatment and distribution of rainwater for non-potable applications, as permitted by the jurisdiction.

1303.2 Collection surface. *Rainwater* shall be collected only from above-ground impervious roofing surfaces constructed from *approved* materials. Collection of water from vehicular parking or pedestrian surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted appliances including but not limited to evaporative coolers, water heaters, and solar water heaters shall not discharge onto *rainwater* collection surfaces.

1303.3 Debris excluders. Downspouts and leaders shall be connected to a *roof washer* and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected *rainwater* with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.

1303.4 Roof washer. A sufficient amount of *rainwater* shall be diverted at the beginning of each rain event, and not allowed to enter the *storage tank*, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize *storage tank* water contamination. The *roof washer* shall not rely on *manually* operated valves or devices, and shall operate automatically. Diverted *rainwater* shall not be drained to the roof surface, and shall be discharged in a manner consistent with the storm water runoff requirements of the *jurisdiction*. *Roof washers* shall be accessible for maintenance and service.

1303.5 Roof gutters and downspouts. Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the *rainwater* quality for the desired end use. Joints shall be made water-tight.

1303.5.1 Slope. Roof gutters, leaders, and *rainwater* collection piping shall slope continuously toward collection inlets. Gutters and downspouts shall have a slope of not less than 1/8 inch per foot along their entire length, and shall not permit the collection or pooling of water at any point.

> **Exception:** Siphonic drainage systems installed in accordance with the manufacturer's installation instructions shall not be required to have slope.

1303.5.2 Size. Gutters and downspouts shall be installed and sized in accordance with Section 1106.6 and local rainfall rates.

1303.5.3 Cleanouts. Cleanouts shall be provided in the water conveyance system so as to allow access to all filters, flushes, pipes and downspouts.

1303.6 Drainage. Water drained from the *roof washer* or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the *storage tank* and discharge in a location that will not cause erosion or damage to property in accordance with the *International Building Code*. *Roof washers* and debris excluders shall be provided with an automatic means of self draining between rain events, and shall not drain onto roof surfaces.

1303.7 Collection pipe. Rainwater collection and conveyance systems shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section 702.

1303.7.1 Installation. Collection piping conveying captured rainwater shall be installed in accordance with Section 704.

1303.7.2 Joints. Collection piping conveying captured rainwater shall utilize joints *approved* for use with the *distribution piping* and appropriate for the intended applications as specified in Section 705.

1303.7.3 Size. Collection piping conveying captured rainwater shall be sized in accordance with drainage sizing requirements specified in Section 710.

1303.7.4 Labeling and marking. Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by the Chapter 7.

1303.8 Filtration. Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gage or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

1303.9 Disinfection. Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use. Where chlorine is used for disinfection or treatment, water shall be tested for residual chlorine in accordance with ASTM D1253. The levels of residual chlorine shall not exceed the levels allowed for the intended use in accordance with the requirements of the *jurisdiction*.

1303.10 Storage tanks. *Storage tanks* utilized in non-potable rainwater collection and conveyance systems shall comply with Section 1301.9 and 1303.10.1 through 1303.10.3.

1303.10.1 Location. *Storage tanks* shall be located with a minimum horizontal distance between various elements as indicated in Table 1303.10.1.

TABLE 1303.10.1
LOCATION OF RAINWATER STORAGE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (FEET)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

1303.10.2 Inlets. *Storage tank* inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the *storage tank*.

1303.10.3 Outlets. Outlets shall be located at least 4 inches (102 mm) above the bottom of the *storage tank*, and shall not skim water from the surface.

1303.11 Valves. Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections 1303.11.1 and 1303.11.2.

1303.10.2 Backwater valve. *Backwater valves* shall be installed on each overflow and tank drain pipe. *Backwater valves* shall be in accordance with Section 715.

1303.12 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform *repair*, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall appropriate for the application and in accordance with Section 604.

1303.13 Water-pressure reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8.

1303.14 Distribution pipe. *Distribution piping* utilized in rainwater collection and conveyance systems shall comply with Sections 1303.14.1 through 1303.14.3.

Exception: Irrigation piping located outside of the *building* and downstream of a backflow preventer.

1303.14.1 Materials, joints and connections. *Distribution piping* shall conform to the standards and requirements specified in Section 605 for non-potable water.

1303.14.2 Design. Distribution piping systems shall be designed and sized in accordance with the Section 604 for the intended application.

1303.14.3 Marking. Non-potable rainwater distribution piping labeling and marking shall comply with Section 608.8.

1303.15 Tests and inspections. Tests and inspections shall be performed in accordance with Sections 1303.15.1 through 1303.15.8.

1303.15.1 Roof gutter inspection and test. Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section 1303.5.1. Gutters shall be tested by pouring a minimum of one gallon of water into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.

1303.15.2 Roofwasher test. Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section 1303.4 shall be verified.

1303.15.3 Collection pipe and vent test. Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section 312.

1303.15.4 Storage tank test. *Storage tanks* shall be tested in accordance with the Section 1301.9.11.

1303.15.5 Water supply system test. The testing of makeup water supply piping and *distribution piping* shall be conducted in accordance with Section 312.5.

1303.15.6 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and *backwater valves* shall be conducted in accordance with Section 312.10.

1303.15.7 Inspection vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the *storage tank* and piping systems in accordance with Section 1301.7.

1303.15.8 Water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*. Except where site conditions as specified in ASTM E2727 affect the rainwater, collected rainwater shall be considered to have the parameters indicated in Table 1303.15.8.

TABLE 1303.15.8
RAINWATER QUALITY

PARAMETER	**VALUE**
pH	6.0-7.0
BOD	Not greater than 10 mg/L
NTU	Not greater than 2
Fecal Coliform	No detectable fecal coli in 100 mL
Sodium	No detectable sodium in 100 mL
Chlorine	No detectable chlorine in 100 mL
Enteroviruses	No detectable enteroviruses in 100 mL

1303.16 Operation and maintenance manuals. Operations and maintenance materials shall be supplied with rainwater collection and conveyance systems in accordance with Sections 1303.16.1 through 1303.16.4.

1303.16.1 Manual. A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

1303.16.2 Schematics. The manual shall include a detailed system schematic, locations of all system components, and a list of all system components including manufacturer and model number.

1303.16.3 Maintenance procedures. The manual shall provide a maintenance schedule and procedures for all system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.

1303.16.4 Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

SECTION 1304
RECLAIMED WATER SYSTEMS

1304.1 General. The provisions of this section shall govern the construction, installation, *alteration*, and *repair* of systems supplying *non-potable reclaimed water*.

1304.2 Water-pressure reducing valve or regulator. Where the *reclaimed water* pressure supplied to the *building* exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the *reclaimed water* distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8 of the *International Plumbing Code*.

1304.3 Reclaimed water systems. The design of the *reclaimed water* systems shall conform to ASTM E 2635 and *accepted engineering practice.*

1304.3.1 Distribution pipe. *Distribution piping* shall comply with Sections 1304.3.1.1 through 1304.3.1.3.

> **Exception:** Irrigation piping located outside of the *building* and downstream of a backflow preventer.

1304.3.1.1 Materials, joints and connections. *Distribution piping* conveying reclaimed water shall conform to standards and requirements specified in Section 605 for non-potable water.

1304.3.1.2 Design. Distribution piping systems shall be designed and sized in accordance with the Section 604 for the intended application.

1304.3.1.3 Labeling and marking. Non-potable rainwater distribution piping labeling and marking shall comply with Section 608.8.

1304.4 Tests and inspections. Tests and inspections shall be performed in accordance with Sections 1304.4.1 and 1304.4.2.

1304.4.1 Water supply system test. The testing of makeup water supply piping and *reclaimed water distribution piping* shall be conducted in accordance with Section 312.5.

1304.4.2 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers shall be conducted in accordance with Section 312.10.

Add new Chapter and next text as follows:

CHAPTER 14
SUBSURFACE LANDSCAPE IRRIGATION SYSTEMS

SECTION 1401
GENERAL

1401.1 Scope. The provisions of Chapter 14 shall govern the materials, design, construction and installation of subsurface landscape irrigation systems connected to non-potable water from onsite water reuse systems.

1401.2 Materials. Above-ground drain, waste and vent piping for subsurface landscape irrigation systems shall conform to one of the standards listed in Table 702.1. Subsurface landscape irrigation underground building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.

1401.3 Tests. Drain, waste and vent piping for subsurface landscape irrigation systems shall be tested in accordance with Section 312.

1401.4 Inspections. Subsurface landscape irrigation systems shall be inspected in accordance with Section 107.

1401.5 Disinfection. Disinfection shall not be required for onsite non-potable reuse water used for subsurface landscape irrigation systems.

1401.6 Coloring. Onsite non-potable reuse water used for subsurface landscape irrigation systems shall not be required to be dyed.

SECTION 1402
SYSTEM DESIGN AND SIZING

1402.1 Sizing. The system shall be sized in accordance with the sum of the output of all water sources connected to the subsurface irrigation system. Where gray water collection piping is connected to subsurface landscape irrigation systems, gray water output shall be calculated according to the gallons-per-day-per-occupant number based on the type of fixtures connected. The gray water discharge shall be calculated by the following equation:

C = A x B **(Equation 14-1)**

where:

A = Number of occupants:

Residential–Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.
Commercial–Number of occupants shall be determined by the *International Building Code.*

B = Estimated flow demands for each occupant:

Residential–25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.

Commercial–Based on type of fixture or water use records minus the discharge of fixtures other than those discharging gray water.

C = Estimated gray water discharge based on the total number of occupants.

1402.2 Percolation tests. The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.

1402.2.1 Percolation tests and procedures. At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.

1402.2.1.1 Percolation test hole. The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.

1402.2.1.2 Test procedure, sandy soils. The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour. Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section 1303.7.1.3.

1402.2.1.3 Test procedure, other soils. The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows: any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than 1/16 inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

1402.2.1.4 Mechanical test equipment. Mechanical percolation test equipment shall be of an approved type.

1402.2.2 Permeability evaluation. Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section 1402.2.1.1 for evaluating the soil.

1402.3 Subsurface landscape irrigation site location. The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining lot. Where this is not possible, the site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table 1402.3. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.

TABLE 1402.3
LOCATION OF SUBSURFACE IRRIGATION SYSTEM

ELEMENT	MINIMUM HORIZONTAL DISTANCE	
	STORAGE TANK (feet)	IRRIGATION DISPOSAL FIELD (feet)
Buildings	5	2
Lot line adjoining private property	5	5
Water wells	50	100
Streams and lakes	50	50
Seepage pits	5	5
Septic tanks	0	5
Water service	5	5
Public water main	10	10

For SI: 1 foot = 304.8 mm.

SECTION 1403
INSTALLATION

1403.1 Installation. Absorption systems shall be installed in accordance with Sections 1403.1.1 through 1403.2.1 to provide landscape irrigation without surfacing of water.

1403.1.1 Absorption area. The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table 1403.1.1.

TABLE 1403.1.1
DESIGN LOADING RATE

PERCOLATION RATE (minutes per inch)	DESIGN LOADING FACTOR (gallons per square foot per day)
0 to less than 10	1.2
10 to less than 30	0.8
30 to less than 45	0.72
45 to 60	0.4

For SI: 1 minute per inch = min/25.4 mm,
1 gallon per square foot = 40.7 L/m2.

1403.1.2 Seepage trench excavations. Seepage trench excavations shall be not less than 1 foot (304 mm) in width and not greater than 5 feet (1524 mm) in width. Trench excavations shall be spaced not less than 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be not greater than100 feet (30 480 mm) in developed length.

1403.1.3 Seepage bed excavations. Seepage bed excavations shall be not less than 5 feet (1524 mm) in width and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced not greater than 5 feet (1524 mm) and not less than 3 feet (914 mm) apart, and greater than 3 feet (914 mm) and not less than 1 foot (305 mm) from the sidewall or headwall.

1403.1.4 Excavation and construction. The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.

1403.1.5 Aggregate and backfill. Not less than 6 inches in depth of aggregate ranging in size from 1/2 to 21/2 inches (12.7 mm to 64 mm) shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed not less than 2 inches (51 mm) in depth over the top of the distribution pipe. The aggregate shall be covered with approved synthetic materials or 9 inches (229 mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. Not less than 9 inches (229 mm) of soil backfill shall be provided above the covering.

1403.2 Distribution piping. Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table 1303.10. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (102 mm) per 100 feet (30 480 mm).

TABLE 1403.2
DISTRIBUTION PIPE

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F 405
Polyvinyl chloride (PVC) plastic pipe	ASTM D 2729
Polyvinyl chloride (PVC) plastic pipe with a 3.5 inch O.D. and solid cellular core or composite wall.	ASTM F 1488

1403.2.1 Joints. Joints in distribution pipe shall be made in accordance with Section 705 of this code.

Reason: The sections shown to be added to the code are from the IgCC. These sections really need to be in the IPC as these subjects are more applicable to the IPC scope. Currently, the IPC does not address different types of nonpotable water (other than gray water) and therefore provides no guidance as to how nonpotable waters are to be collected, stored and distributed. The current Chapter 13 only deals with the use/reuse of gray water for the flushing of water closets and urinals and subsurface irrigation. It is clarified that gray water and rain water recycling systems must be separate systems and may not be interconnected.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This language is already in the IgCC and doesn't need to be repeated in the IPC. Because testimony indicated that" although this language might need more work, it should still be put in the code" is a concern. The language needs further work for example; The language mandates a roof washer for rainwater collection – there are other ways to accomplish the same function without the expense involved with a pressurized roof washer system. Also, Table 1303.15.8 gives a pH range outside the normal range of reuse water and requires control of enteroviruses which would require adding considerable cost to a rainwater system. This proposal is a lot of language that seems to need more work before it can be added to the code.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Approved as Submitted and public comments were submitted.

Public Comment 1:

Shawn Strausbaugh, Arlington County, VA, International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**STORAGE TANK.** A fixed container for holding water at atmospheric pressure for subsequent reuse as part of a plumbing or irrigation system.~~

~~**DISTRIBUTION PIPE.** Pressurized or non-pressure piping used within the plumbing system of a building to deliver rainwater or graywater from the *storage tank* or pump to the point of use.~~

Remainder of proposal is unchanged

Commenter's Reason: The proposal was approved as submitted by the assembly action. The one point raised in regard to the roof washer was rebutted under testimony and made clear to the committee member that "pressurized" roof washer system was not the only means of satisfying this requirement. The deletion of the above two definitions are due to a conflict with other terms contained within the plumbing code as these definitions would be added to chapter 2 not just chapter 13 and 14 which is the specific chapters where these definitions where intended to be used.

Public Comment 2:

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

Modify the proposal as follows:

STORAGE TANK. A fixed container for holding water ~~at atmospheric pressure~~ for subsequent reuse as part of a plumbing or irrigation system.

Remainder of proposal is unchanged

Commenter's Reason: A storage tank may be either pressurized or non-pressurized, and are used in several different applications. For example, a storage tank water heater is operated under pressure. IPC section 501.7 specifically covers pressurized storage tanks.

Public Comment 3:

Guy Tomberlin, Fairfax County, Virginia, representing Fairfax County VA, VA Plumbing and Mechanical Inspectors Association, VA Building and Code Officials, ICC Region IIV and Colorado Association of Plumbing and Mechanical Officials requests Approved as Submitted.

Commenter's Reason: The drought conditions of this summer are a painful reminder that, for many jurisdictions, there is not adequate raw water sources (reservoirs, aquifers) and adequate public infrastructures (water treatment plant capacity) to keep up with the demand for potable water. The demand for potable water needs to be reduced so that potable water is available for those uses where potable water must be used (drinking, bathing, food preparation). Even though the codes have reduced allowable flow rates for plumbing fixtures and required other methods to limit potable water waste, the biggest impact to be made towards reducing the demand for potable water is to stop using potable water for end uses that do not require potable water. In other words, need to be able to use nonpotable water in ways that do not impact the health and safety of humans and the environment.

Where do we get nonpotable water to use for applications that don't require potable water? Some jurisdictions have public water utilities that provide "reclaimed water" through a water supply distribution system that parallels the potable water supply distribution system. However, most jurisdictions do not have municipal reclaimed water distribution systems. It then falls upon the building designer to develop onsite treatment systems for raw nonpotable water that can be collected onsite. A building generates many sources of raw nonpotable water (other than sewage) such as graywater, condensate and cooling tower blow down. Rainwater that falls on building roofs is also a source.

The IPC currently has very limited provisions on how to process and use graywater for water closet flushing, urinal flushing and subsurface irrigation. (Note that the IPC does not mandate the use of graywater for those purposes-it only tells you how to use graywater if you should decide to use it). It does not currently address rainwater or reclaimed water. Many code officials are already being pressed to approve graywater reuse, rainwater reuse and reclaimed water systems. Some jurisdictions require use rainwater reuse systems as part of the federally-mandated management of storm water. Unfortunately, the current IPC does not provide adequate support to the code official to make approvals for rainwater reuse systems or reclaimed water systems.

We cannot wait another code change cycle to get the IPC up to speed with what is already happening in the plumbing industry. As stated during testimony by Julius Ballanco, "This new Chapter 13 is ten times better than the current Chapter 13." This proposal is a significant improvement to the code that is sorely needed. No proposed code language is ever "perfect" as evidenced by the dozens of "tweaks" to almost every code section of the many I-codes over many code change cycles. Please keep in mind that most of this proposal's language is directly from the IgCC which was developed through two draft public versions plus a full code change cycle of public hearing and final action hearing. This language isn't just being seen for the first time – it has been vetted better than most new code text that is proposed (and accepted) to the codes. The PMG Code Action Committee worked hard in order to submit this proposal. The Committee vote on this proposal was very close, 6 in favor to 7 against. There was a successful Floor Action for As Submitted. We need this language in the IPC to begin using it so we can fully understand how to improve on anything that it might currently lack.

Responses to Testifier and Committee comments made during the public hearing:

1. Why does this language have to be in the IPC? It's already in the IgCC.

   Reply: The main purpose of the IgCC is to allow jurisdictions to require buildings to exceed the requirements of the other I-codes to promote more sustainable construction. With respect to water use, the IgCC allows jurisdictions to require reduced use of potable water through reductions in flow rates, reductions in potable water waste and the use of nonpotable water instead of potable water. Those requirements are necessarily tied to "how to execute" requirements. The "how to execute" requirements could not be put in the 2012 IPC because the code change cycle for the IPC had already started long before the IgCC requirements were in final form. The intent was always to move the "how to execute" requirements over to the plumbing code as the work described in the requirements is plumbing work. If this proposal is successful, then a proposal will be made to the IgCC (in 2014) to remove the "how to execute" requirements from the IgCC so that the IPC will control the "how to execute" requirements and the IgCC will control the "when to execute" requirements. Note that this proposal's language does not require or mandate the use of nonpotable water for any application. The language only has requirements on "how to execute" should a decision be made to use nonpotable water.

2. The rainwater section requires a roof washer. I understand a roofwasher to be a pressurized water spray system to clean the roof of debris before rainfall is collected. This would be very expensive to execute and might make a rainwater reuse system cost prohibitive.

Reply: The proposed language does not require a pressurized roof washer system. A roof washer could simply be a device that diverts the initial rainfall flow (which washes the roof) from the storage tank. It is up to the designer on how “roof washing” is accomplished.

3. Section 1303.15.8 seems to require that rainwater have the parameter values indicated in Table 1303.15.8. Making rainwater comply with those parameter values could be very costly and might make a rainwater reuse system cost prohibitive.

   Reply: Section 1303.15.8 does not require collected rainwater to have the parameter values shown in Table 1303.8. The parameter values in Table 1303.8 are the values that the rainwater is considered to possess unless affected by site conditions specified by ASTM E2727. The information is provided for use by the designer of the rainwater reuse system. The quality of the rainwater required for the end use is up to the requirements of the jurisdiction.

4. The proposed language adds a definition for the term “meter” which is different than the definition for the same term in the IgCC. Won’t this be confusing?

   Reply: No. The term “meter” as used in the IPC is only related to water measuring, not measurement of electrical use. Different codes can use the same term but their definitions can be different.

Public Comment 4:

Craig Conner, Building Quality, representing self, requests Disapproval.

Commenter’s Reason: P11 intends to add parts of the IGCC into the IPC. Unfortunately P11 creates inconsistences between the existing IGCC and the proposed IPC, as well as other problems.

Examples of P11 problems:

- The proposed “*meter*” definition applies only to water, whereas the existing IECC and IGCC also use the word “*meter*” for energy. The proposed IPC “*meter*” definition is different from the existing IGCC definition of “*meter*”.
- The proposed IPC “*distribution pipe*” definition applies only to rainwater and gray water. However the main IPC use of the term “*distribution pipe*” is for potable water; for example, in the existing IPC Section 605.4.
- Useful parts of the IPC are deleted without replacement. For example, the existing figures showing common parts of a gray water system for landscape irrigation (existing IPC 1301.1(1)), and common parts of a gray water system for water closets and urinals (existing IPC 1301.1(2)) are deleted by P11.
- Some optional items in the existing IGCC are made mandatory in the proposed IPC change. For example, installing locks on the outdoor access for non-potable water is optional in the existing IGCC (IGCC A107.3), but is made a new requirement in the proposed IPC (IPC 1301.12).
- Names for the different categories of water are used inconsistently. For example, P11 would effectively change the existing IPC’s “gray water recycling system” (IPC 1301.7) to “onsite non-potable water reuse systems” (proposed IPC 1302.2.1) even though the existing IGCC calls them “gray water systems” (IGCC 708.12.1.1).

These examples include less than half the inconsistencies introduced by P11. The best option is to disapprove P11.

P11-12
Final Action: AS AM AMPC____ D

P12-12
301.4

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Arlington County VA representing the Virginia Plumbing and Mechanical Inspectors Association and The Virginia Building Code Officials Association and ICC Region 7 (Sstrausbaugh@arlingtonva.us)

Revise as follows:

301.4 Connections to water supply. ~~Every~~ Plumbing fixtures, devices or appliances requiring or using water ~~for its proper operation~~ shall be directly or indirectly connected to the water supply system in accordance with the provisions of this code. Faucets provided with a connection for cold water shall be connected to the cold water distribution system.

Reason: The current code does not require a fixture to be supplied with cold water even if the handles or trim plate indicate cold water will be supplied when it is turned to the "on" position.. If a faucet has the "indication" that cold water can be obtained (e.g. single handle cold water position or a two handle faucet), the code should require that cold water actually be connected and provided to the faucet.

Cost Impact: none

301.4-P-STRAUSBAUGH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal is a common sense issue that doesn't need to be in the code. There is no safety issue being addressed. The proposal would force designers to not use 2 handle faucets where tempered water must be supplied at the faucet.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing the VA Plumbing and Mechanical Inspectors Assoc. (VPMIA), VA Building Code Officials Association (VBCOA), and ICC Region VII, requests Approval as Submitted.

Commenter's Reason: Contrary to the committee's reason statement this change would not disallow the use of two handle faucets and would only require cold water to be supplied to the applicably marked cold side and the required hot water or tempered water for public hand washing facilities, as mentioned by the committee, would be on the applicably marked left hand side of the fixture fitting.

P12-12
Final Action: AS AM AMPC____ D

P14-12
303.3, 611.3

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self. (JBEngineer@aol.com)

Delete without substitution:

~~**303.3 Plastic pipe, fittings and components.** All plastic pipe, fittings and components shall be third-party certified as conforming to NSF 14.~~

Revise as follows:

611.3 Connection tubing. The tubing to and from drinking water treatment units shall be of a size and material as recommended by the manufacturer. The tubing shall comply with ~~NSF 14,~~ NSF 42, NSF 44, NSF 53, NSF 58 or NSF 61.

Reason: With the addition of Section 303.4 to the 2012 edition, there is no need to have a separate reference to NSF 14. All plumbing material must be listed by a third party certifier.

NSF 14 was originally inserted into the code as a quality control standard. In the latest edition of NSF 14, material requirements were added. It is completely inappropriate for a quality control standard to have material requirements. The material requirements belong in the material standards that are listed in the code (and referenced in NSF 14), not a quality control standard. With the change to NSF 14, it is no longer a viable quality control standard. It has crossed over to being a quazi-material standard. All material standards should be complete material standards regulating the full requirements of the material. NSF 14 does not do this.

For these reasons, NSF 14 should no longer be referenced in the International Plumbing Code.

Cost Impact: This may reduce the cost of certain plumbing products.

303.3-P-BALLANCO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee heard a significant amount of testimony against approval of this proposal and made a remark that they were confused by some of the testimony.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

303.3 Plastic pipe, fittings and components. All plastic pipe, fittings and components shall be third-party certified as conforming to <u>the health effects requirements of</u> NSF 14.

Commenter's Reason: I would encourage the membership to vote against the motion to deny and vote to approve this change, with modifications. The proposed text is similar to the requirement that appears in the ASTM standards regulating plastic pipe. The key requirements to NSF 14 is the health effects requirements for listing.

The reason this is important is because of the recent changes to NSF 14, adding testing requirements for dezincification. This is a major error made by the NSF 14 Committee, adding a dezincification test requirement to the standard. I have petitioned the NSF 14 Committee to remove this test from the standard. There is more technical support for the removal of this test requirement than there is to support such a test.

When the dezincification test was first proposed to NSF 14, the claim was that there needs to be some test since there are all these lawsuits regarding the matter. A lawsuit is not technical justification for adding a test requirement. Most claims made by the plaintiffs' attorney are wrong. We should not be adding requirement to the Plumbing Code to keep attorneys at bay.

NSF 14 should never have material requirements for copper alloys in the standard. The standard is a plastic standard. Yes, there are copper alloy components to plastic piping systems. However, the material requirements for copper alloys should be left to the committees responsible for that particular material. For many of the plastic products, that would be the ASTM standards. This is where a test requirement for copper alloy belongs, not NSF 14.

When dealing with metal components, it is a recognized fact that all metals in plumbing systems corrode. To think otherwise is foolishness. Copper alloys corrode, so does copper tube, so does galvanized steel, so does cast iron. In other words, corrosion is a part of life in the plumbing industry. What we attempt to do is reduce the rate of corrosion to extend the life of a product.

With metallic components, there are many ways to extend the life of the material. It often involves more than simply changing the formulation of the material. Heat treatment and cooling play an important role in developing a material that reduces the rate of corrosion. We have been using copper alloys, also known as yellow brasses, for more than 80 years in the plumbing industry. I might add - with much success. So, the question you needs to ask is,"Why do we, all of the sudden, need a test on dezincification?"

ISO 6509 was developed after testing was conducted in Göteborg, Sweden. Water was circulated for 3-1/2 years at a temperature of 140 degrees F. The water used in the testing was Göteborg water. After the conclusion of this test, the researchers attempted to duplicate the same impact on brass in a 24 hour time period. In doing so, they did not develop any end point criteria. The researchers, however, suggested an end point criteria that, in their opinion, equated to 60 years of life. It should also be noted that the fittings being tested were already in service for a period of 4 years.

There are many problems with this research. There is no water in the United States or Canada that is of the same poor quality as that of Göteborg, Sweden in the 1970's when the research was conducted. Even today, Göteborg, Sweden has a poorer quality water than the water in the United States. So why should we use a test based on water that is not used in the United States?

The other problem with the requirement is the end point criteria. The engineering community in the United States has always used a time period of 30 years for longevity testing of construction products. Europe has used values of 50 years, 60 years, and 70 years. There is no engineering accuracy to these values. To choose a length of time of 60 years using Swedish water running continuously at 140 degrees F is ridiculous. Again, there is no technical basis for such a test requirement.

The researchers also assume a straight line rate of corrosion over the years. Research done by metallurgists over the last three years has proven this to be inaccurate. The rate of corrosion begins at one rate, than reduces. The corrosion rate occurs in a curve, not a straight line. Hence, the assumptions are again wrong by these researchers. Using their analysis, you would have a life of probably 250 years. That proves even more how ridiculous the end point criteria is that was chosen by the NSF 14 Committee.

ISO 6509 is only good for verifying that yellow brass corrodes by dezincification, which is technically de-alloying. That is somewhat of a "duh" statement. We already know the corrosion process. We don't have to prove it by a useless test.

Unfortunately, no one can equate ISO 6509 to performance in a plumbing system installed in the United States or Canada. That is because this has not been studied. All that has been done is analysis of what one "thinks" it equates to. That is not good enough to change a standard so significantly.

Another way to view this test requirement is to consider an equivalent test for galvanized steel products. Galvanized steel has a corrosion rate higher than copper alloy. If we had a galvanized steel equivalent corrosion test, there would be no galvanized steel permitted to be installed in plumbing systems. That does not make any sense. Similarly, the dezincification test does not make any sense.

Substantiation supporting the inclusion of a dezincification test should never be based on, "I think it is a good idea," or "The attorneys think we should add this." There should be proper technical justification. There is none for the inclusion of ISO 6509 to NSF 14. If you review the ASME and ASTM standards on copper alloy, you will not find any requirement for a dezincification test using ISO 6509.

It was apparent that no testing was done on manufacturers' products prior to the inclusion of the dezincification test. Some recent tests proved how ineffective ISO 6509 is. To date, six manufacturers' PEX fittings were put through the ISO 6509 test for longer than 24 hours (the time required on the test). The dezincification ranged from 50 percent to 100 percent in the fittings. Yet the fittings passed the ASTM F877 test requirements. When brought to failure, the PEX tube failed, not the fittings.

Interestingly, NSF 14 assumes these fittings are not acceptable since they could not pass the dezincification test. How can we exclude perfectly acceptable fittings because of some made up testing of a certain grade of brass? This establishes a very poor precedence.

Before adding this test requirement to NSF 14, the Committee did not do any failure analysis of copper alloy in the United States and Canada. This is dangerous and often results in invalid tests being added to standards. There are billions of yellow brass fittings, faucets, valves, fixture fittings, and backflow preventers installed throughout the country. If yellow brass was such a problem, we would see millions of failures, not a handful, by comparison.

Unfortunately, the Plumbing Code Committee and the ICC membership has not been able to evaluate the alleged dezincification failures. I have for many projects. The vast majority of the failures were related to improper installation. This cannot be corrected by adding a dezincification test to the standard. It would appear that the NSF 14 Committee was completely unaware of this.

One manufacturer of yellow brass components for a particular adapter fitting could not pass the dezincification test. They conducted a survey of failures of that fitting. I should mention that they have manufactured thousands of those fittings over the last 35 years. They could not find one failure. Not one fitting was returned, not one fitting was identified as failing in the field. How can we make a perfectly good fitting unacceptable? What changed to make this fitting no longer permissible to install?

If there really was a problem, perhaps adding a test would be acceptable. But, again, that test should be to the ASTM standards, not NSF 14. The dezincification test was added because of assumed problems with PEX fittings. However, it applies to any plastic piping component. The failure rate of PEX fittings manufactured by US manufacturers is insignificant. The failure rate of non-PEX products is nonexistent.

P14-12

Final Action: AS AM AMPC____ D

P15-12
305.1

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Arlington County VA representing the Virginia Plumbing and Mechanical Inspectors Association and The Virginia Building Code Officials Association and ICC Region 7 (Sstrausbaugh@arlingtonva.us)

Delete and substitute as follows:

~~**305.1 Corrosion.** Pipes passing through concrete or cinder walls and floors or other corrosive material shall be protected against external corrosion by a protective sheathing or wrapping or other means that will withstand any reaction from the lime and acid of concrete, cinder or other corrosive material. Sheathing or wrapping shall allow for movement including expansion and contraction of piping. The wall thickness of the material shall be not less than 0.025 inch (0.64 mm).~~

305.1 Corrosion. Metallic piping shall not be installed in direct contact with concrete, masonry or corrosive soil. Where plastic sheathing is used to prevent direct contact, the wall thickness of the sheathing shall be not less than 0.006 inches (6 mil) (0.152 mm) thick .

Reason: The intent of the code is to protect piping from direct contact with concrete, masonry and corrosive soils, this proposal is a cleanup action to clarify that intent. The commonly used plastic sheathing for pipe protection has a wall thickness of only 0.004 inches or 0.006 inches thick. The 0.025 inch thick material is really unnecessary and beyond the minimum standard practice used to protect the piping system. The thinner material has been used for years with satisfactory results.

Cost Impact: none

305.1-P-STRAUSBAUGH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There was a concern that if the thickness of the sleeving material is reduced, there might not be enough clearance left to accommodate piping movement caused by expansion and contraction. The current text allows other means to protect piping against the lime and acid in concrete; the new text doesn't mention anything about protection against corrosion of piping caused by concrete.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Shawn Strausbaugh, Arlington County, VA , VA Plumbing and Mechanical Inspectors Assoc. (VPMIA), VA Building Code Officials Association (VBCOA), and ICC Region VII requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

305.1 Corrosion. Metallic piping, other than cast iron and ductile iron, shall not be installed in direct contact with concrete~~,~~ or masonry ~~or corrosive soil~~. Metallic piping shall not be installed in direct contact with corrosive soil. Where plastic sheathing is used to prevent direct contact, the wall thickness of the sheathing shall be not less than 0.006 inches (6 mil) (0.152 mm) thick.

Commenter's Reason: The modified language as shown above was submitted as a floor modification to the committee. The committee approved the modified language but the modified proposal failed to be approved by the committee. This public comment reintroduces the same language that was presented in the floor modification. This new language is clear and answers the committee's reason for rejection. The committee reason stating the reduction in the thickness of the plastic sheathing material might not allow for expansion and contraction of piping has no merit. The thickness of plastic sheathing has nothing to do with piping movement. Besides, existing code sections 305.2 and 305.3 already require that piping movements be accounted for. The proposed language allows other means of protection and only states that where plastic sheathing is used to prevent direct contact, the thickness of that material must be not less than 0.006 inches. The new language still recognizes that concrete will affect metallic piping, other than cast iron and ductile iron, and further limits the contact of metallic piping from corrosive soils.

Public Comment 2:

Michael Cudahy, representing Plastic Pipe and Fittings Association (PPFA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

305.1 Corrosion. Sheathing or other means shall be used to prevent the direct contact of metallic piping ~~shall not be installed in direct contact~~ with concrete, masonry, cinder, corrosive material or corrosive soil. Where plastic sheathing is used to prevent direct contact, the wall thickness of the sheathing shall be not less than ~~0.006 inches (6 mil) (0.152 mm) thick .~~ 0.025 inch (0.64 mm). Sheathing shall allow for movement including expansion and contraction of piping.

Commenter's Reason: The current code text for the corrosion section does not indicate "metallic", but rather, implies that all piping requires corrosion protection. Obviously, not all piping materials are subject to corrosion. This modification restores the language the committee felt should have remained, "other means" and expansion and contraction language back to the section. It also retains the original thickness of sheathing required.

P15-12

Final Action: AS AM AMPC____ D

P16-12

305.6, 305.6.1 (New), 305.6.2 (New)

<u>Proposed Change as Submitted</u>

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

305.6 Protection against physical damage. In concealed locations where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1-1/2 inches (38 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage). Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates<u>,</u> ~~and~~ below top plates <u>and to each side of a stud, joist, rafter or similar member.</u>

<u>**305.6.1 Formed steel framing members.** *Piping*, other than cast-iron or galvanized steel, shall not be installed within the channel of a formed steel framing member except where the piping is not less than 1-1/2 inches from the backside of any fastening face of the member.</u>

<u>**305.6.2 Piping installed parallel to framing members**. In concealed locations where *piping*, other than cast-iron or galvanized steel, is installed parallel to studs, joists, rafters or similar members less than 1-1/2 inches (38 mm) from the nearest edge of the member, such pipe shall be protected along its length by steel shield plates that comply with the requirements of Section 305.6.</u>

Reason: Like the IPC, Section 404.7 does not address pipe or tubing run down the side of a stud or inside of a "C" channel metal stud or rafter. Such installations are subject to penetrations but the code addresses only holes and notches for pipe and tubing that runs perpendicular to the framing member. The NEC treats wiring that runs parallel to framing members the same as wiring that runs perpendicular. The IMC, IFGC and IPC need to catch up. If the sheeting material fasteners miss a framing member, they can easily penetrate piping which is why the code requires the protection shield to extend 2 inches above and below wall plates. Placing piping parallel to a member, either on the side or within a channel, exposes the piping to penetration, yet current code addresses only perpendicular penetrations.Given the speed at which drywall installers put up and fasten drywall to studs and rafters, there is a great potential for drywall screws or nails to miss the intended stud and hit a pipe or tube. The code already requires that shield plates on sole plates and top plates extend 2 inches above and below the edges of those framing members. Why should not piping to the sides of framing members be protected to the same degree?

Section 305.6.1 is being added to prohibit piping from being installed within 1-1/2 inches of the backside of the fastening flange of a formed steel member. Piping located in this area is likely to be penetrated by drywall fasteners. An all too common practice is to install piping "inside" of formed steel members such that the piping is within 1-1/2" of the fastening face of the member. It is unrealistic to protect the piping with steel shield plates as installing the shield plates requires the installation fasteners. Piping just should not be placed in this location.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

305.6-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal limits the size of piping that can be used in the walls of standard construction and this would be a major hindrance to the building industry. The committee would like the proponent to come back with a public comment that would address the specific means for protecting the pipe from the front of the studs.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

305.6 Protection against physical damage. ~~In concealed locations where *piping*, other than cast iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1-1/2 inches (38 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage). Such plates shall cover the area of the pipe where the member is notched or bored and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.~~ Where piping will be concealed within light-frame construction assemblies, the piping shall be protected against penetration by fasteners in accordance with Sections 305.6.1 through 305.6.3.

Exception: Cast iron piping and galvanized steel piping shall not be required to be protected.

305.6.1 Piping through bored holes or notches. Where *piping* is installed through holes or notches in framing members and the piping is located less than 1 ½ inches (38 mm) from the framing member face to which wall, ceiling or floor membranes will be attached, the pipe shall be protected by shield plates that cover the width of the pipe and the framing member and that extend 2 inches (51 mm) to each side of the framing member. Where the framing member that the piping passes through is a bottom plate, bottom track, top plate or top track, the shield plates shall cover the framing member and extend 2 inches (51 mm) above the bottom framing member and 2 inches (51 mm) below the top framing member.

305.6.2 Piping in other locations. Where the piping is located within a framing member and is less than 1 ½ inches (38 mm) from the framing member face to which wall, ceiling or floor membranes will be attached, the piping shall be protected by shield plates that cover the width and length of the piping. Where the piping is located outside of a framing member and is located less than 1 ½ inches (38 mm) from the nearest edge of the face of the framing member to which the membrane will be attached, the piping shall be protected by shield plates that cover the width and length of the piping.

305.6.3 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

Commenter's Reason: The committee thought that the originally proposed Section 305.6.1 was too restrictive because it prohibited piping from being located within the channel of a light frame, cold formed steel framing member unless the pipe was at least 1 ½ inches from the face of the member. The committee wanted a public comment that addressed protection of piping (within the channel of the member) that was closer than 1 ½ inches to the face of the member so that any size of pipe could be located in that area.

This public comment completely replaces the original proposal in order to provide clear requirements of where shield plates are needed. Section 305.6 uses the term "light frame construction assemblies" to describe wall, floor and roof assembles that can be made up from either wood members or light frame, cold formed steel members.

Section 305.6.1 covers applications where piping runs perpendicular to a framing member and passes through a bored hole or notch in the framing member. If the piping is within 1 ½ inches of the face of the member where wall ceiling or floor membranes will be attached, then the piping is required to be protected by a shield pate that covers the width of the piping by the width of the framing member plus 2 inches on either side of the framing member. Protection of the piping on either side of the framing member is needed because it is too easy for a membrane/fastener installer to miss the framing member's fastening face or penetrate the member at an angle and hit the piping that is just outside of the framing member. Section 305.6.1 also covers the application where piping runs perpendicular to and penetrates top and bottom plates, or top and bottom tracks. Protection of the piping above the bottom framing member (or below the top framing member) is needed because it is too easy for a membrane/fastener installer to miss the framing member's fastening face or penetrate the member at an angle and hit the piping just outside of the framing member.

Section 305.6.2 covers applications where the piping runs alongside of a framing member or in the case of a light frame, cold formed steel framing member, piping that runs parallel to the length of and within the framing member (in other words, within the channel section). If the piping is within 1 ½ inches of the face of the member where wall, ceiling or floor membranes will be attached, then the piping is required to be protected by a shield pate that covers the width of the piping by the length of piping that is within the 1 ½ inch proximity of the framing member's fastening face. Piping that is located behind the fastening face of the member and within 1 ½ inches of the fastening face of the member obviously needs protection from fastener penetration. Piping that is located adjacent to and within 1 ½ inches of the fastening face of the member needs protection because it is too easy for a membrane/fastener installer to miss the framing member's fastening face or penetrate the member at an angle and hit the piping that is just outside of the framing member.

P16-12

Final Action: AS AM AMPC____ D

P18 – 12
308.5

Proposed Change as Submitted

Proponent: James Paschal, Paschal Engineering representing himself (Jim@PaschalEngineering.com)

Revise as follows:

308.5 Interval of support. Pipe shall be supported in accordance with Table 308.5.

> **Exception:** The interval of support for piping systems designed to provide for expansion/contraction shall conform to the engineered design in accordance with Section 316.1. <u>The interval of support for fiberglass or metal reinforced plastic piping shall be in accordance with the manufacturer's specifications and shall conform to the engineered design in accordance with Section 316.1.</u>

Reason: There are a variety of plastic piping systems available which utilize metal or fiberglass reinforcement to add rigidity and strength to the piping, and as a result, may require different support spacing than the traditional materials shown in Table 308.5. In addition to the existing requirement that the spacing be per the engineered design and approved by the code official, the proposed wording here also requires that the spacing be per the manufacturer's specifications. This will ensure that the spacing is consistent between the design professional, code official, and manufacturer.

Cost Impact: None

308.5-P-PASCHAL

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal adds guidance for supporting these new pipe materials that are being used.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Disapproved.

P18-12

Final Action: AS AM AMPC____ D

P21-12
311.1

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

311.1 General. Toilet facilities shall be provided for construction workers and such facilities shall be maintained in a sanitary condition. Construction worker toilet facilities of the nonsewer type shall conform to ANSI Z4.3. <u>Not less than one portable toilet facility for every 50 workers or fraction thereof shall be provided.</u>

Reason: The code currently provides no guidance as to how many portable toilet facilities are needed for construction sites. To save money, a contractor could provide just one toilet facility for hundreds of workers. The ratio of 1 per fifty workers is reasonable.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

311.1-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Portable toilets are not connected to the plumbing system and really should not be part of a plumbing code. The proposed language would be very hard to enforce and may be in conflict with OSHA regulations, state laws and union requirements.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

311.1 General. Toilet facilities shall be provided for construction workers and such facilities shall be maintained in a sanitary condition. Construction worker toilet facilities of the nonsewer type <u>shall be provided in the quantity specified in </u>~~shall conform t~~o ANSI Z4.3 <u>and shall conform the requirements of such standard</u>. ~~Not less than one portable toilet facility for every 50 workers or fraction thereof shall be provided.~~

Commenter's Reason: The committee's argument for disapproving this code change was that portable toilets were not connected to the plumbing system and therefore should not be part of the code. The requirement for portable toilet facilities for construction workers are already in the IPC and have been since the first edition in 1995. Because the current code language provides no guidance as to how many portable toilet facilities are needed for construction sites, the intent of the proposed code change was to provide that guidance. The original proposed code change was to require 1 portable toilet for every 50 workers or fraction thereof. Due to the concern expressed by the committee that the 1:50 ratio could be in conflict with OSHA requirements for toilets for workers, additional research was done which concluded that the ANSI Z4.3 standard contains two elements, the construction of the nonsewer type toilet facility and the minimum number required for construction workers. This leaves one to wonder, has the code referenced only part of a standard? This change will clarify that the standard addresses not only the construction of, but also the minimum number of portable toilet facilities required for construction workers.

P21-12
Final Action: AS AM AMPC____ D

P26-12
403.1 (IBC [P] 2902.1)

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self. (JBEngineer@aol.com)

Revise as follows:

403.1 (IBC [P] 2902.1) Minimum number of fixtures. Plumbing fixtures shall be provided ~~for the type of occupancy and~~ in the minimum number as shown in Table 403.1 based upon the actual use of the building or space. ~~Types of occupancies~~ Uses not shown in Table 403.1 shall be considered individually by the code official. The number of occupants shall be determined by the International Building Code. ~~Occupancy classification shall be determined in accordance with the International Building Code.~~

Reason: The purpose of the table is to provide fixtures based on the use of the building space, not based on the use group classification. By referencing the use group in accordance with the Building Code, an incorrect number of fixtures may be established for a building. A typical example is a mixed use building. Each use must be considered separately as to the fixture demands. Another example would be a high school that has a cafeteria, an auditorium for productions, and a stadium for sporting events. Each space would have different requirements. The listing of the use group in the table was done merely for convenience. The fixture demands have always been based on the use of the space.

Cost Impact: There is no impact to the cost of a building.

403.1-P-BALLANCO

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal recognizes that a building can have different actual uses with respect to plumbing fixture needs than what the occupancy classification is for the building.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Roger Harper, Jr, Louisa County, VA, representing Virginia Plumbing & Mechanical Inspectors Association (VPMIA) & Virginia Building Code Officials Association (VBCOA) requests Disapproval.

Commenter's Reason: IPC Table 403.1 is correct and the current language in 403.1 is very clear showing the occupant loads and plumbing fixture requirements. When a mixed use building is reviewed EACH USE is reviewed separately and fixtures are required per each use. Calculating such fixtures is outlined in 403.1.1. The proponent's example of a high school is a somewhat inaccurate as the 2012 IBC section 303.1.3 clearly tells one that a school is reviewed in its entirety as Group E.

P26-12

Final Action: AS AM AMPC____ D

P28-12
Table 403.1 (IBC Table [P]2902.1)

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

TABLE 403.1
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a]
(See Sections 403.2 and 403.3)

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN[e, f] (SEE SECTION 410.1)	OTHER
				MALE	FEMALE	MALE	FEMALE			
2	Business	B	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses.[j]	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100	1 service sink[g]

j. Exam and procedure rooms in doctor, dentist and veterinarian offices shall be provided with a hand washing sink.

(Portions of table and footnotes not shown remain unchanged)

Reason: The code is silent about requiring hand washing sinks in doctor, dentist and veterinarian exam and procedures rooms. Sanitation is vitally important to prevent the spread of disease causing organisms. Hand washing is critical in preventing this spreading. The code needs to require hand washing sinks in these areas to allow for proper sanitation.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

T403.1-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This is an issue that needs to be controlled by the health services industry, not the plumbing code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Submitted.

Commenter's Reason: Of those who spoke in opposition to this proposed change at the Dallas hearings, it was suggested that the use of a hand sanitizer would address the concern about the spread of disease. Aside from being an enforcement nightmare to allow the use of hand sanitizers, hand sanitizers do not kill all germs. They strip away the outer lay of oil on the skin, which usually prevents bacteria which are present in the body from coming to the surface. However, the bacteria normally present in the human body are different than those that will make us sick. Using soap and water is the most effective method of handwashing. A hand sanitizer should not take the place of proper cleansing using soap and water.

Another issue by those speaking in opposition was that the code is a minimum standard. Handwashing is the single most important and easiest way of preventing the spread of disease according to the Center for Disease Control. Changing the IPC to require a handwashing sink in areas prone in the spread of disease can only benefit everyone. Another opposing issue was that veterinarian offices were too specific. There are diseases that are easily transferred from animals to humans, called zoonotic diseases. The American Veterinary Medical Association recognizes that the number one preventer in spreading these diseases is through handwashing.

P28-12
Final Action: AS AM AMPC____ D

P29-12
202 (IBC 202), Table 403.1 (IBC Table [P]2902.1)

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Add new definitions as follows:
(Definitions to also be added to the IBC)

GRANDSTAND. Tiered seating that is supported on a dedicated structural system, that is two or more rows high and that is not a *building element*. See “Bleachers”.

BLEACHERS. Tiered seating that is supported on a dedicated structural system, that is two or more rows high and that is not a *building element*. See “Grandstand”.

BUILDING ELEMENT. A functional component of building construction that is listed in Table 601 of the IBC. Such components are constructed of materials consistent with the construction type of the building and can be fire-resistance-rated.

Revise table as follows:

TABLE 403.1 (IBC Table [P]2902.1)
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a]
(See Sections 403.2 and 403.3)

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN[e, f] (SEE SECTION 410.1)	OTHER
				MALE	FEMALE	MALE	FEMALE			
1	Assembly	A-5	Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[h]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000[i]	1 service sink[i]

(Portions of table and footnotes not shown are unchanged)

h. Where the total *bleacher* or *grandstand* seating capacity is less than 150 persons and permanent toilet facilities are not provided, portable toilets facilities that conform to ANSI 4.3 shall be provided.

i. Where the total *bleacher* or *grandstand* seating capacity is less than 150 persons, drinking fountains and service sinks shall not be required.

Reason: Consider a small city park with a ball field having a several bleacher units. The code currently requires that any venue with bleachers and grandstands have permanent toilet facilities and a drinking fountain and a service sink. This seems to be an unreasonable requirement where the ball field is used only seasonally, the anticipated attendance is very low and the provision of utilities (water, sewer) might be difficult. However, it is recognized that the presence of even a small number of people at an event does create the need for basic toilet facilities. Therefore, if permanent toilet facilities are not required, then portable toilet facilities need to be required.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

T403.1 #2-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This is an issue that is best left up to the discretion of the local code official.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Submitted.

Commenter's Reason: The committee's argument for disapproving this code change was that determining plumbing fixtures for a small city park having a ball field with bleachers should be left up to the discretion of the code official. The reason the PMG CAC developed the proposed language was that it felt that the current language in the IPC was not providing the code official direction on how to handle this type of setting and the change would then be providing the code official with some discretion. The current code language could result in one of two things - either being overly restrictive by applying provisions for a large stadium to a small ball field OR not being clearly defined as the occupant load at a small city park ball field would not warrant the number of fixtures as a professional ball park. The proposed code change would eliminate confusion as to when to apply the footnotes to allow for portable toilet facilities in lieu of permanent fixtures for small neighborhood park ball fields.

Because these facilities may not be used all year round, the anticipated attendance is very low. Due to the location of the park, utilities may also be difficult to obtain. This code change recognizes that even a small number of people warrant the need of basic toilet facilities. At the very least portable toilets should be required for those smaller crowds associated with neighborhood park ball fields.

P29-12
Final Action: AS AM AMPC____ D

P35-12
403.3 (IBC [P] 2902.3)

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing Little Caesar Enterprises (JBEngineer@aol.com)

Revise as follows:

403.3 (IBC [P] 2902.3) Required public toilet facilities. Customers, patrons and visitors shall be provided with *public* toilet facilities in structures and tenant spaces intended for public utilization. The number of plumbing fixtures located within the required toilet facilities shall be provided in accordance with Section 403 for all users. Employees shall be provided with toilet facilities in all *occupancies*. Employee toilet facilities shall be either separate or combined employee and *public* toilet facilities.

Exceptions: Public toilet facilities shall not be required in:

1. Open or enclosed parking garages~~. Toilet facilities shall not be required in parking garages~~ where there are no parking attendants.
2. Structures and tenant spaces intended for quick transactions, including take out, pick up and drop off, having a public access area less than or equal to 300 square feet.

Reason: Tenant spaces that are only intended for quick transactions do not need to provide public facilities for customers, patrons, and visitors. The public does not rely on such spaces to provide public toilet rooms. Patrons spend a short period of time completing a transaction, then they depart.

Examples of these types of spaces include: take out food locations, such as Chinese food take outs; pizza take outs; and carry out ribs. Similar quick transaction facilities include: dry cleaners, atm facilities, florists, shoe repair shops, and newspaper stands.

It is recognized that the text of the second exception could be shortened to read: Structures and tenant spaces having a public access area less than or equal to 300 square feet. The added text is provided for clarity.

The purpose of this section has always been to provide comfort facilities for anyone spending a period of time in the public space. Quick transaction spaces are unique, in that people are not in the space for any length of time. Furthermore, the space open to the public is limited to 300 square feet.

It would be a safety and/or health hazard to have the public travel to the working areas of the tenant space to use toilet facilities. Hence, if a public toilet room is added, the space for the toilet room would have to be located in the front space where the small public area is located. This creates a security concern where the public toilet room would block openings in the front tenant space.

The 300 square foot dimension is based on the standard large spaces used by these types of facilities. Most tenant spaces of this type have an area less than 300 square feet for the public.

Cost Impact: This change does not increase the cost of construction.

403.3-P-BALLANCO

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Small spaces intended for momentary occupancy by the public do not require toilet facilities.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Roger Harper, Jr, Louisa County, VA, representing Virginia Plumbing & Mechanical Inspectors Association (VPMIA) & Virginia Building Code Officials Association (VBCOA) requests Disapproval.

Commenter's Reason: What is a "stand alone" carry out facility? The proponent's examples are all establishments that will occupy a space within a new or existing building, usually with several spaces for rent. During the new structure plan review process designers are informed that restrooms and other required fixtures are required to be accessible to the public. During the plan review stage, tenants are generally not known so the fixture count is based on the proposed potential uses and square footage for each space. The building owner may define portions of the building with 2 hour rated walls to allow for a restaurant or two. Tenants come and go however a new structure already has the fixtures in place thus creating no hard ship in the event of a tenant change.

In existing facilities if one of these carry outs are proposed, the space still will generally be required to be brought up to the standards of IBC Chapter 34 or The International Existing Building Codes and this minor proposed change will prolong the intent of the IEBC which is to get structures to a level of accessibility over time.

P35-12
Final Action: AS AM AMPC____ D

P36-12
403.3.1 (IBC [P] 2902.3.1)

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee, the Virginia Plumbing and Mechanical Inspectors Association (VPMIA), the Virginia Building Code Officials Association (VBCOA) and ICC Region 7.

Revise as follows:

403.3.1 (IBC [P] 2902.3.1) Location and access. The required public toilet facilities shall be located in the same building or in an adjacent building that is under the same tenant control. Access to the required facilities shall be from within the building or from the exterior of the building. ~~All~~ Access routes shall comply with the accessibility requirements of the *International Building Code*. The access route to ~~the~~ *public* toilet facilities ~~required by Section 403.3~~ shall not pass through kitchens, storage rooms or closets. The public shall have access to the required toilet facilities at all times that the building is occupied.

Reason: Access to toilet facilities can be from the exterior of a building and facilities for one building can be located in another building given that the required travel distance is met and it's an accessible route. This proposal ensures that the tenant that is required to provide facilities is actually authorized to use toilets in another area during all times that such tenant space is occupied. The current problem is that some creative designs have attempted to utilize facilities where the tenant has absolutely no control over the location of the non-local facilities. Concerning the second line: If access to toilet facilities can be from the exterior of a building, could toilet facilities for one building be located in another building given that the required travel distance is met?

Examples: Could amusement park buildings have central toilet facilities in one building to serve the requirements of those buildings? Could a business office building with an adjacent working warehouse building have the toilet facilities for the warehouse in the office building?

For example, a strip center type mall setting may have an adjacent retail building. The tenants in the mall might expect their customers to use the facilities in the adjacent building, so long as they are not more than 500 feet away and on an accessible route. This proposal prevents that from occurring if the adjacent retail building is not under the same "tenant control." This example creates two serious problems. The first is the retail building owner may not be aware that he is the facility provider for spaces in the strip mall. In addition there is no way to regulate or mandate the hours of operation for the adjacent building to coincide with those of the strip mall. The second is what if the adjacent building operation goes out of business? There are many examples of campus type properties and outlet mall complexes where the required toilet facilities are in another building and this should be allowed if access to such buildings is controlled such that the facilities will always be available when needed.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

403.3.1-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Although the intent of this proposal is good, future contractual disputes between tenants and owners could create a problem for which the code would have no control over resulting in occupants of a building no longer having access to the required number of plumbing fixtures.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC); requests Approval as Submitted.

Commenter's Reason: The committee disapproved this proposal stating that although the intent of this proposal is good, future contractual disputes between tenants and owners could create a problem for which the code would have no control over resulting in occupants of a building no longer having access to the required number of plumbing fixtures
The revised language that was proposed for the location of required public facilities did not intend to include specifically owners as the committee stated only adjacent buildings under the same tenant control. However, there could be some commercial businesses that have a sole owner such as a warehouse or trucking company whereby the restroom facilities are in a totally separate building outside of the main business office. The proposed language was intended to provide useful guidance for the required access when access is allowed from the exterior of the building.

Public Comment 2:

Shawn Strausbaugh, VA Plumbing and Mechanical Inspectors Assoc. (VPMIA), VA Building Code Officials Association (VBCOA), and ICC Region VII, requests Approval as Submitted.

Commenter's Reason: The committee's reason given is exactly the reason why the proposed language is needed. As such if a "contractual " issue arises the code official will have a code section clearly requiring the required toilet facilities must be under the same tenant control and another entity cannot control the use of the required public toilet facilities.

Public Comment 3:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Approval as Submitted.

Commenter's Reason: This change is how many public plumbing facilities are provided. The Committee should not be expressing a concern with future contract disputes. In most installations, the buildings are interconnected. A good example is an outlet mall. Many of these facilities are separate buildings, with a centrally located building housing the plumbing fixtures. There is no need to have public facilities in each building when the centrally located facilities are within the specified distance. Another example is open schools that do not have facilities in each building. This proposal meets the intent of the code for providing access to public facilities. I encourage the membership to overturn the Committee vote and vote to approve this change as submitted.

P36-12
Final Action: AS AM AMPC____ D

P42-12
404.2 (New), 404.3 (New), Chapter 14

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E./JB Engineering and Code Consulting, P.C. representing McGuire Manufacturing (JBEngineer@aol.com)

Add new text as follows:

404.2 Accessible fixture requirements. Accessible plumbing fixtures shall be installed with the clearance, height, spacing, and arrangement in accordance with ICC A117.1.

404.3 Exposed pipes and surfaces. Water supply and drain pipes under accessible lavatories and sinks shall be covered or otherwise configured to protect against contact . Pipe coverings shall comply with ASME A112.18.9.

Add new standards to Chapter 14 as follows:

ASME

A112.18.9-2011 Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures

ICC

A117.1-2009 Accessible and Usable Buildings and Facilities

Reason: Reference should be made to ICC A117.1 in the plumbing code. While this standard is referenced in the Building Code, it should also be referenced in the Plumbing Code since the standard contains requirements for plumbing fixture installations.

One of the common concerns is who inspects accessible plumbing fixtures for compliance with ICC A117.1? Plumbing fixtures are inspected by the plumbing official. Therefore, appropriate reference to the spacing, sizing, and configuration requirements needs to be placed in the plumbing code.

ASME A112.18.9 Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures is the national consensus standard regulating protective covers for water and drain pipes. This Standard is intended to regulate products that must meet the requirements of ICC A117.1. The standard has performance requirements for protectors/insulators for exposed waste and supplies, so a physically challenged person will be protected when using a sink or lavatory in a public/commercial or private/residential facility.

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

Analysis: A review of the standard proposed for inclusion in the code, ASME A112.18.9-2011 and ICC A117.1-2009, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

404.2-P-BALLANCO

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal accurately clarifies the requirement for protecting piping under accessible plumbing fixtures. Similar proposals in past code cycles received good support but the standard for the covers was not finished. Now that the standard is complete, this language is acceptable for addition to the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Roger Harper, Jr, Louisa County, VA, representing Virginia Plumbing & Mechanical Inspectors Association (VPMIA), Virginia Building Code Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: The IPC does not need to start mandating the accessibilities requirements which are very clear in Chapter 11 of the IBC as well as ICC ANSI A117.1-09 (in this case section 606.6). Most jurisdictions use the I-Codes, however some use the IBC but not the IPC which is one reason why this should not be added to the IPC. There is no confusion among the code enforcement community as to who inspects what. Some localities have plumbing inspectors and they should inspect from the plumbing code. The commercial building inspector would catch the supplies and trap protection on his final inspection. Furthermore, adding new standards is moot. If ASME A112.18.9-2011 has anything to do with flame spread/smoke then what's next: Trash bags to comply with this standard? Toilet tissue dispensers? Soap bottles mounted in countertops?

P42-12

Final Action: AS AM AMPC____ D

P45 – 12
405.3.2

<u>Proposed Change as Submitted</u>

Proponent: Shawn Strausbaugh, Arlington County VA Representing, the Virginia Plumbing and Mechanical Inspectors Association and The Virginia Building Code Officials Association and ICC Region 7 (Sstrausbaugh@arlingtonva.us)

Revise as follows:

405.3.2 Public lavatories. In employee and *public* toilet rooms, the required lavatory shall be located in the same room as the water closet.

> <u>**Exception:** In educational use occupancies, the required lavatory shall be permitted to be located adjacent to the room or space containing the water closet provided that not more than one operational door is between the water closet and the lavatory.</u>

Reason: This has been a long standing practice in school construction. It is geared towards helping educate children on the importance of personal hygiene. This arrangement also allows for group wash fixtures to be located adjacent to core toilet rooms. This allows the instructors to wait outside and assure the children wash their hands upon exit of the toilet room. More commonly, it permits the installation of the lavatory to be located within the classroom when water closets are installed in the classroom itself. So when a child uses the facilities they walk through a single door (no different in concept to exiting a typical toilet stall) into the classroom where the instructor can assure hands are washed.

Cost Impact: None

405.3.2-P-STRAUSBAUGH

<u>Public Hearing Results</u>

Committee Action: **Approved as Modified**

Modify the proposal as follows:

405.3.2 Public lavatories. In employee and public toilet rooms, the required lavatory shall be located in the same room as the water closet.

> **Exception:** In educational use occupancies~~, the required~~ lavator~~y~~ies shall be permitted to be located adjacent to the room or space containing the water closet provided that not more than one operational door is between the water closet and the lavatory.

Committee Reason: The modification was made because if the word “the” in front of “required” in the exception is left in, it refers back to ‘the required lavatory’ in the main sentence. By making the change, the exception refers to the lavatory that is in the room with the bathroom.

The committee agreed with the proponent’s written reason statement.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Disapproved and a public comment was submitted.

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing and Mechanical Inspectors Assoc. (VPMIA), VA Building Code Officials Association (VBCOA), and ICC Region VII, requests Approval as Submitted.

Commenter's Reason: The original proposed code change language is clear and concise and use the same terminology found in the existing code language. Based upon the assembly action to disapprove the modification the was approved by the committee it is apparent that the assembly thought the proposed language was clear and concise and did not require changing.

P45-12
Final Action: AS AM AMPC____ D

P53-12
202, 410.1, 410.3, 410.4, Chapter 14

Proposed Change as Submitted

Proponent: John Watson, Manager-Compliance and Sustainability, Elkay Manufacturing, representing Elkay Manufacturing (john.watson@elkay.com)

Add new definitions as follows:

BOTTLE FILLING STATION. A plumbing fixture that is connected to the potable water distribution and building drainage system and is designed and intended for filling personal use drinking water bottles not less than 10 inches (250 mm) in height. Such fixtures can be separate from or integral to a *drinking fountain*.

DRINKING FOUNTAIN. A plumbing fixture connected to the potable water distribution system that provides drinking water in a flowing stream so that the user can consume water directly from the fixture without the use of any accessories. Drinking fountains can incorporate a *bottle filling station*. Wasted water from the flowing stream and from the *bottle filling station* is captured and directed into the building's drainage system. These fixtures have a permanent connection to a building's potable cold water supply and to the building's drainage system through a trap and can incorporate a water filter and a cooling system for chilling the drinking water.

Revise as follows:

410.1 Approval. Drinking fountains shall conform to ASME A112.19.1/CSA B45.2, ~~or~~ ASME A112.19.2/CSA B45.1 or ASME A112.19.3/CSA B45.4. Drinking fountains and *bottle filling stations* with a self contained cooling system for chilling the drinking water ~~and water coolers~~ shall conform to ~~ARI 1010~~ ASHRAE Standard 18. Drinking fountains and ~~water coolers~~ bottle filling stations shall conform to NSF 61, Section 9.

410.3 Substitution. Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other occupancies, where drinking fountains are required, *bottle filling stations* ~~water coolers or bottled water dispensers~~ shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains. Bottled water dispensers shall not be substituted for required drinking fountains.

410.4 Prohibited location. Drinking fountains and *bottle filling stations*~~,water coolers and bottle water dispensers~~ shall not be installed in public ~~restrooms~~ toilet facilities.

Add new standard to Chapter 14 as follows:

American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc.
1791 Tullie Circle, NE
Atlanta, GA 30329

ASHRAE

Standard 18-2008 Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration

Reason: Drinking fountain manufacturers use the term "water cooler" to indicate a drinking fountain that supplies chilled drinking water. However, some people think of water coolers as the bottled water dispensers. My proposal eliminates the term "water cooler" to prevent future misunderstanding of what is allowed and what is not.

Using bottled water dispensers to substitute for a *required* number of permanently installed drinking fountains is just a cheap way for the designer to get around the full intent of the code. Providing permanent fixtures for obtaining drinking water is the intent of the code. Bottled water dispensers frequently run dry, cups for their use are sometimes not to be available and it's too easy for a bottled water service to be discontinued. Bottled water dispensers are temporary and should not be allowed to be a substitute for permanent fixtures.

We need to recognize that the use of personal drinking water bottles or containers has increased dramatically in recent years. Use of such a personal device eliminates having to obtain drinking water from a drinking fountain that might not have been cleaned for some time. Some people just don't like the idea of putting their mouth so close to an area where others have previously done so; and getting water from a lavatory in order to fill a water bottle is no better. So why not realize the trend towards personal water bottle use and have the code allow a bottle filling station substitution for drinking fountains? It is a permanent fixture, it provides access to a clean supply of drinking water, it encourages reuse of bottles (a green practice), reduces the carbon footprint of bottled water delivery (a very green practice) and provides drinking water in a manner that the public is obviously demanding. It's time for the code to recognize this new product and take a stance to provide complete access to safe drinking water.

And finally, the ASHRAE 18 standard is being proposed to replace the ARI 1010 standard that has not be used for many years for water cooling systems. ARI no longer maintains the standard (the last revision was 10 years ago). The code needs to stay abreast of current standards.

Cost Impact: None

Analysis: A review of the standard proposed for inclusion in the code, ASHRAE Standard 18-2008, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

410.1-WATSON

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Dan Buuck, Dipl.-Ing. (FH), representing National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: This proposal eliminates the long-standing substitution of water coolers (bottled water dispensers) for drinking fountains allowed in the code.

More and more people are drinking bottled water these days. What people drink is a matter of personal preference and not a matter of which fixtures are installed. Bottled water is a welcome source of water to many people who do not care for the water provided by the municipality for reasons of taste, impurities or cleanliness. And there are times when some municipalities warn against drinking the water out of the tap. You can mandate more drinking fountains, but that does not mean people will actually use them.

Now the industry has developed bottle filling stations connected to the potable water supply. And they want to get that product in the code as an option while removing the ability to install bottled water dispensers as a replacement for a percentage of those more expensive fixtures. This does not change the fact that it is still water from the municipal water source with the same stigma attached to it as with drinking fountains. Of course a filtered version is also available, but that requires continued maintenance and extra cost—the same reasons used for removing bottled water dispensers from the code in the first place. Nothing is really gained by this code change—at least not for the occupant who will decide for themselves if they will drink bottled water or water from the municipal water system.

Also, because of what was struck in 410.4, bottled water dispensers could now be installed in public restrooms if this proposal becomes code.

Public Comment 2:

Roger Harper, Jr, Louisa County, VA, representing Virginia Plumbing & Mechanical Inspectors Association(VPMIA) & Virginia Building Code Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: With the approval of both P53-12 and P54-12, a conflict will be created when these two proposals merge. P53-12 completely eliminates the ability to substitute water coolers or bottled water dispensers for the required number of drinking fountains, whereas P54-12 incorporates these fixtures. P53-12 limits these substitutions to ONLY bottle filling stations, whereas P54-12 will incorporate bottle filling stations as well. It is our belief that P54-12 provides a more accurately worded requirement (and intention) that also incorporates what P53-12 was attempting to achieve as well.

P53-12
Final Action: AS AM AMPC____ D

P54-12
202, 410.3, 410.4

Proposed Change as Submitted

Proponent: Roger Harper, Jr, Louisa County VA, representing, the Virginia Plumbing and Mechanical Inspectors Association (sharper@louisa.org)

Add new definitions as follows:

DRINKING FOUNTAIN. A plumbing fixture that is connected to the potable water distribution system and the drainage system. The fixture allows the user to obtain a drink directly from a stream of flowing water without the use of any accessories.

WATER DISPENSER. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fixture is connected to the potable water distribution system of the premises. This definition also includes a freestanding apparatus for the same purpose that is not connected to the potable water distribution system and that is supplied with potable water from a container, bottle or reservoir.

WATER COOLER. A drinking fountain that incorporates a means of reducing the temperature of the water supplied to it from the potable water distribution system.

Revise as follows:

410.3 Substitution. Where restaurants provide drinking water in a container free of charge, *drinking fountains* shall not be required in those restaurants. In other occupancies where *drinking fountains* are required, ~~water coolers or bottled~~ *water dispensers* shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains.

410.4 Prohibited location. *Drinking fountains, water coolers* and ~~bottle~~ *water dispensers* shall not be installed in public restrooms.

Reason: There is often confusion regarding what is or is not a water cooler. Some people think that a water cooler is a drinking fountain since typically, they do also cool the water that is being dispensed. Others think that a water cooler is a bottled water dispenser that is capable of cooling the water dispensed. Currently the code does not define any of the terms. In reality, drinking fountains are drinking fountains and everything else is some form of a water dispenser. Whether or not the water is cooled is irrelevant. The code does not require cooled water. The code can be simplified in Section 410.3 by referring only to drinking fountains or their alternative, water dispensers. The new definitions establish that a drinking fountain and a water dispenser that is connected to the potable water supply system are both plumbing fixtures by definition and a bottled water dispenser is not a plumbing fixture by definition. It is necessary to be clear as to what the code requires to be provided and also what the code intends to allow as an alternative. This proposal also paves the way for new technology that is being marketed and installed today, namely water dispensers that are built into a wall, connected to the potable water supply system and dispense water into cups, glasses and bottles. These units typically treat the potable water with additional filtering and/or reverse osmosis treatment.

Cost Impact: none

410.3-P-HARPER

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee voted approved as submitted for P53-12 and this proposal is an extension of that proposal that adds a needed definition for water coolers.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dan Buuck, Dipl.-Ing. (FH), representing National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: This proposal would be unnecessary if P53 is approved. The committee's reason for approving this proposal was the addition of the definition for "water cooler". P53 eliminated all references to the term "water cooler" in the body of the code.

If P53 is disapproved in at the Final Action Hearings in Portland, this proposal would have the same effect of prohibiting bottled water dispensers from replacing some of the required drinking fountains. If that is the case, my comments for P53 would apply to this proposal.

P54-12
Final Action: AS AM AMPC____ D

P58-12
413.3

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing InSinkErator (JBEngineer@aol.com)

Revise as follows:

413.3 Commercial food waste grinder waste outlets. Commercial food waste grinders shall be connected to a drain not less than 11/2 inches (38 mm) in diameter. Commercial food waste grinders shall be connected and trapped separately from any other fixtures or sink compartments <u>and shall not discharge through a grease interceptor</u>.

Reason: This is a companion change to the change proposed to Section 1003. A food waste grinder should never discharge through a grease interceptor. The purpose of a food waste grinder is to pulverize food waste to small enough particles to discharge to the sewer. If a grinder connects to a grease interceptor, the food particles will separate out, defeating the purpose of a food waste grinder. Similarly, if a food waste grinder discharges to a solids interceptor, the food particles will be separated.

Cost Impact: This change does not increase the cost of construction.

413.3-P-BALLANCO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: To be consistent with the committee's action on P198-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing InSinkErator, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

413.3 Commercial food waste grinder waste outlets. Commercial food waste grinders shall be connected to a drain not less than 11/2 inches (38 mm) in diameter. Commercial food waste grinders shall be connected and trapped separately from any other fixtures or sink compartments and shall not discharge through a <u>hydromechanical</u> grease interceptor.

Commenter's Reason: I would encourage the membership to overturn the motion to deny and vote to approve this change, as modified. One of the concerns expressed and discussed after the hearing was the discharge of food waste disposers to large outdoor gravity grease interceptors. The modification of this change will restrict the discharge of food waste disposers to being allowed through gravity grease interceptors only. This is accomplished by prohibiting the discharge to hydromechanical grease interceptors.

It has been well established that the addition of food particles added to hydromechanical grease interceptor is detrimental to the performance of the interceptor. This documentation has been submitted to the Code Committee and the membership in the past. The code currently does not require food waste disposers to discharge to a grease interceptor. It merely states that when they do, there should be a solids interceptor. The thought process is that the solids interceptor will capture the food waste particles. The problem with this thought process is that the food particles will always bypass the solids interceptor and foul up the grease interceptor. Modern food waste disposers are so efficient that the food particles are very small in size. A solids interceptor would not be capable of capturing all the food particles.

The other problem with this thought process is that it defeats the purpose of a food waste disposer. Food waste is clean waste that can be readily turned into energy at the wastewater treatment plant. If you intercept the food waste, it makes no sense to install a food waste disposer.

It is unfortunate that some of the discussion at the hearing before the Code Committee reverted to whether food waste disposers should be installed in commercial kitchens. This change has nothing to do with that. Food waste disposers are already permitted. The only point of discussion is whether they should discharge through a grease interceptor. Any professional knowledgeable on grease interceptors or food waste knows that food waste disposers should never discharge through a grease interceptor.

P58-12

Final Action: AS AM AMPC____ D

P62-12
419.4 (New)

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

419.4 Nonwater urinal connection. The fixture drain for a nonwater urinal shall independently connect to a branch drain that serves one or more lavatories, water closets or water-using urinals that discharge upstream of such nonwater urinals.

Reason: Nonwater urinals have such a concentrated discharge that fixture drains and branch drain lines carrying only urine have a tendency to accumulate urine salt deposits. Designing such systems with water using fixtures is a method that solves the potential clogging problem by keeping the drain lines washed out with the discharge of other types of fixtures.. The proposed language is adapted from what is currently in the IgCC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

419.4 (NEW)-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The opposition testimony was compelling in stating that there is not any data to support that nonwater urinals are causing widespread problems. To write code language to be mandatory to fix a product that is not performing, is not an acceptable way to solve the problem. If the product does not perform properly then other action should be taken.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Submitted.

Commenter's Reason: The committee missed the important fact that the IgCC already requires what this proposal is putting in the IPC. IgCC Section 702.5 states: "The fixture drain for nonwater urinals shall connect to a branch drain that serves one or more lavatories, water closets or water-using urinals that discharge upstream of such urinals." The reason why this requirement was included in the IgCC was to *promote* the installation of nonwater urinals so that water could be conserved. The requirement does this by easing the concern of persons in the plumbing industry who are convinced, either by real evidence or hearsay, that nonwater urinals should not be installed because the lack of flushing water can cause a build-up of urine salt deposits in drain piping that, in turn, could lead to frequent drain line blockages. But the requirement, by itself, is strictly a plumbing system installation requirement that is more appropriate material for the IPC. If this proposal is successful, it is intended that a proposal will be submitted to remove the requirement from the IgCC.

P62-12
Final Action: AS AM AMPC____ D

P64-12

420.1.1 (New), Chapter 14

Proposed Change as Submitted

Proponent: Fred Constantino, American Society of Mechanical Engineers (ASME), representing the ASME A112 Plumbing Materials and Equipment Standards Committee.

Add new text as follows:

420.1.1 Dual flush devices. Dual flush devices for water closets shall comply with ASME A112.19.10.

Add new standard to Chapter 14 as follows:

ASME
A112.19.10–2003(R2008) Dual Flush Devices for Water Closets

Reason: Dual flush devices for water closets is a device that consist of a full flush of 1.6 gpf and a reduce flush of less than 1.1 gpf and these products do exist and should be required to comply with some performance requirements. This is a National standard (ANSI) which covers the performance requirements for these types of systems.

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

Analysis: A review of the standard proposed for inclusion in the code, ASME A112.19.10, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

420.1.1(NEW)-P-CONSTANTINO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The standard is applicable to retrofit devices for 3.5 gallon per flush water closets and not 1.6 gpf water closets as the proponent's reason statement indicates.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

420.1.1 Dual flush devices. Dual flush devices for existing 3.5 gallon per flush water closets shall comply with ASME A112.19.10.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This standard only applies to existing water closets that have a 3.5 gallon per flush flushing volume. The current code does not permit these water closets, however, there are millions still in existence in the United States. These existing water closets can be retrofitted with a dual flushing device that complies with the referenced standard.

P64-12

Final Action: AS AM AMPC____ D

P71-12
424.3

Proposed Change as Submitted

Proponent: Edward R. Osann, Natural Resources Defense Council, representing self (eosann@nrdc.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing self (misuriello@verizon.net)

Revise as follows:

424.3 Individual shower valves. Individual shower and tub-shower combination valves shall be balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valves that conform to the requirements of ASSE 1016 or ASME A112.18.1/CSA B125.1 when tested at a flow rate of 1.5 gpm ± 0.1 gpm (5.75 L/m ± 0.35 L/m). ~~and~~ Such valves shall be installed at the point of use. Such valves shall be factory marked with the manufacturer's minimum rated flow and such marking shall be visible at final inspection. Shower and tub-shower combination valves required by this section shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions. In-line thermostatic valves shall not be utilized for compliance with this section.

Reason: The thermal protection afforded by shower valves can be compromised if the flow rate of the showerhead is less than the flow rate for which the protective components of the valve have been designed. As noted by Martin and Johnson (2008) (as cited in Codes and Standards Enhancement Initiative (CASE), "Multi-Head Showers and Lower-Flow Shower Heads," *2013 California Building Energy Efficiency Standards,* California Utilities Statewide Codes and Standards Team, September 2011), combinations of valves and shower heads were tested to determine whether pressure-compensating valves and thermostatic valves rated for 2.5gpm would perform adequately at lower flow rates. The tests included 22 shower valves from six manufacturers, and the valves were assessed on their ability to maintain water temperature within certain bounds for a given time after a change in pressure event, as described by the ASSE 1016-2005 standard for shower valves. The results indicated that a significant share of shower valves rated for 2.5 gpm failed to provide the thermal protection specified by ASSE 1016 when tested at lower flow rates. As summarized in the CASE report (p. 15): "These results indicate that shower valve temperature maintenance is strongly affected by flow rate, and that new showers with lower-flow shower heads would have to be installed with valves that are designed for 2.0 and lower flow rates."

Showerheads with maximum flow rates below 2.5 gpm are widely available on the market today, and simple replacement of a showerhead is typically not subject to code. Since shower valve components are located behind finished walls, replacement of showerheads is likely to be more frequent than replacement of shower valves. This proposed change seeks to reduce the likelihood that consumers replacing a showerhead will compromise the thermal protection offered by a building subject to this code by ensuring that shower valves can fully accommodate showerheads with lower flow rates than the current maximum federal standard of 2.5 gpm. The current EPA WaterSense specification for showerheads has a maximum flow rate of 2.0 gpm, and many showerheads are already available with flow rates between 2.0 and 1.5 gpm. As manufacturers continue to innovate with more water- and energy-efficient showerheads, the code change proposed here will help ensure that new buildings built to this code can safely accommodate showerheads with lower flow rates that may be selected by building occupants in future years.

Note that this language does not require that the showerhead itself have a flow rate of 1.5 gpm, but simply that the shower valve provide the thermal protection called for under the recognized standard when tested at a flow rate as low as 1.5 gpm.

Cost Impact: Conforming products are on the market today without a significant cost premium. The code change proposal will not increase the cost of construction.

424.3-P-OSANN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The problems with shower valves not performing at flow rates lower than 2.5 gpm needs to be addressed by the product standards, not by the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Edward Osann, Natural Resources Defense Council, representing self, requests Approval as Submitted.

Commenter's Reason: The committee erred in deferring a health and safety concern with the performance of shower valves to another standard-setting body, when the issue could readily be remedied in the code. The "performance" at issue is the maintenance of thermal protection for the bather. The proliferation of showerheads in both the new installation and replacement markets that operate well below the current maximum flow rate of 2.5 gallons per minute (gpm) poses a challenge to the thermal protection offered by shower valves designed and tested at 2.5 gpm and no less. As of this filing, over 600 models of showerheads under 33 brands are certified in the US EPA WaterSense database as operating at 2.0 gpm or less. Undoubtedly more models are offered that operate at or below this range but are not WaterSense certified. And even more will be on the market by 2015 when this code is published. Under the proposal as submitted, shower valves must maintain the thermal protection called for by the ASSE test procedure when tested at 1.5 gpm, and valves must be factory marked with the tested flow rate to allow for ease of inspection. This proposal does not change the test procedure or the pass/fail criteria, only the flow rate at which the test is to be performed, in the interest of health and safety of building occupants.

P71-12
Final Action: AS AM AMPC____ D

P72-12
424.4

Proposed Change as Submitted

Proponent: Edward R. Osann, Natural Resources Defense Council, representing himself (eosann@nrdc.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing himself (misuriello@verizon.net)

Revise as follows:

424.4 Multiple (gang) showers. Multiple (gang) showers supplied with a single-tempered water supply pipe shall have the water supply for such showers controlled by an *approved* automatic temperature control mixing valve that conforms to ASSE 1069 or CSA B125.3 <u>when tested at a flow rate of 1.5 gpm ± 0.1 gpm (5.75 L/m ± 0.35 L/m)</u>, or each shower head shall be individually controlled by a balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valve that conforms to ASSE1016 or ASME A112.18.1/CSA B125.1 <u>when tested at a flow rate of 1.5 gpm ± 0.1 gpm (5.75 L/m ± 0.35 L/m)</u> and is installed at the point of use. <u>Such valves shall be factory marked with the manufacturer's minimum rated flow and such marking shall be visible at final inspection.</u> Such valves shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturers' instructions.

Reason: The thermal protection afforded by shower valves can be compromised if the flow rate of the showerhead is less than the flow rate for which the protective components of the valve have been designed. As noted by Martin and Johnson (2008) (as cited in Codes and Standards Enhancement Initiative (CASE), "Multi-Head Showers and Lower-Flow Shower Heads," *2013 California Building Energy Efficiency Standards,* California Utilities Statewide Codes and Standards Team, September 2011), combinations of valves and shower heads were tested to determine whether pressure-compensating valves and thermostatic valves rated for 2.5gpm would perform adequately at lower flow rates. The tests included 22 shower valves from six manufacturers, and the valves were assessed on their ability to maintain water temperature within certain bounds for a given time after a change in pressure event, as described by the ASSE 1016-2005 standard for shower valves. The results indicated that a significant share of shower valves rated for 2.5 gpm failed to provide the thermal protection specified by ASSE 1016 when tested at lower flow rates. As summarized in the CASE report (p. 15): "These results indicate that shower valve temperature maintenance is strongly affected by flow rate, and that new showers with lower-flow shower heads would have to be installed with valves that are designed for 2.0 and lower flow rates."

Showerheads with maximum flow rates below 2.5 gpm are widely available on the market today, and simple replacement of a showerhead is typically not subject to code. Since shower valve components are located behind finished walls, replacement of showerheads is likely to be more frequent than replacement of shower valves. This proposed change seeks to reduce the likelihood that consumers replacing a showerhead will compromise the thermal protection offered by a building subject to this code by ensuring that shower valves can fully accommodate showerheads with lower flow rates than the current maximum federal standard of 2.5 gpm. The current EPA WaterSense specification for showerheads has a maximum flow rate of 2.0 gpm, and many showerheads are already available with flow rates between 2.0 and 1.5 gpm. As manufacturers continue to innovate with more water- and energy-efficient showerheads, the code change proposed here will help ensure that new buildings built to this code can safely accommodate showerheads with lower flow rates that may be selected by building occupants in future years.

Note that this language does not require that the showerhead itself have a flow rate of 1.5 gpm, but simply that the shower valve provide the thermal protection called for under the recognized standard when tested at a flow rate as low as 1.5 gpm.

Cost Impact: Conforming products are on the market today without a significant cost premium. The code change proposal will not increase the cost of construction.

424.4-P-OSANN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The problems with shower valves not performing at flow rates lower than 2.5 gpm needs to be addressed by the product standards, not by the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Edward Osann, Natural Resources Defense Council, representing self, requests Approval as Submitted.

Commenter's Reason: As with P71, the committee erred in deferring a health and safety concern with the performance of shower valves to another standard-setting body, when the issue could readily be remedied in the code. The "performance" at issue is the maintenance of thermal protection for the bather. The proliferation of showerheads in both the new installation and replacement markets that operate well below the current maximum flow rate of 2.5 gallons per minute (gpm) poses a challenge to the thermal protection offered by shower valves designed and tested at 2.5 gpm and no less. As of this filing, over 600 models of showerheads under 33 brands are certified in the US EPA WaterSense database as operating at 2.0 gpm or less. Undoubtedly more models are offered that operate at or below this range but are not WaterSense certified. And even more will be on the market by 2015 when this code is published. Under the proposal as submitted, shower valves must maintain the thermal protection called for by the ASSE test procedure when tested at 1.5 gpm, and valves must be factory marked with the tested flow rate to allow for ease of inspection. This proposal does not change the test procedure or the pass/fail criteria, only the flow rate at which the test is to be performed, in the interest of health and safety of building occupants.

P72-12
Final Action: AS AM AMPC____ D

P82-12
504.6

<u>Proposed Change as Submitted</u>

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

504.6 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

(Items 1 through 13 remain unchanged)

<u>14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is constructed of PEX or PE-RT tubing. The outlet end of such tubing shall be fastened in place.</u>

Reason: PEX and PE-RT tubing use insert fittings for connections. The bore size for a ¾ inch male adapter fitting is small such that there is concern that the discharge from a T & P valve could be restricted. The proposed language requires that PEX and PE-RT tubing used for relief valve discharge piping be one size larger so that the insert fitting has a larger bore which would not restrict flow.

PEX and PE-RT tubing is somewhat flexible and where supplied from a coil, the tubing has a memory to stay in a coil shape. This flexibility and memory to a coil shape can cause the discharge end of the tubing to be displaced from its required or intended position. To prevent displacement, new language is being added to require that the outlet end of the tubing be fastened in place.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

504.6-P-STRAUSBAUGH.PMGCAC

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: There is no data given to support that ¾ inch PEX pipe or tube will not work for the application.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Replace proposal as follows:

504.6 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

(Items 1 through 13 remain unchanged)

14. Have the outlet end of the piping fastened in place where such piping is constructed of PEX or PE-RT tubing.

Commenter's Reason: Because the committee found issue with the sizing limitation of the original proposal, this public comment changes the original proposal to only require that the end of flexible tubing (PEX and PE-RT) T & P valve discharge piping be fastened in place. The size of PEX and PE-RT tubing used for T&P discharge piping will be dictated by the tubing manufacturer's installation instructions.

P82-12

Final Action: AS AM AMPC____ D

P89-12
604.2

Proposed Change as Submitted

Proponent: Gary Klein, Affiliated International Management, LLC, representing self (gary@aim4sustainability.com)

Revise as follows:

604.2 System interconnection. At the points of interconnection between the hot and cold water supply piping systems and the individual fixtures, appliances or devices, provision shall be made to prevent flow between such piping systems.

> **Exception:** Hot or tempered water recirculation systems that pump water from a hot or tempered water pipe through a cold water pipe back to the hot water source shall be permitted provided that the system complies with all of the following:
>
> 1. The system is demand activated by a switch operated by the user of the fixture, a motion sensor triggered by the presence of the user of the fixture, a flow switch activated by the flow of hot water at a fixture or a door switch activated by the door to the room containing hot water-supplied fixtures. a fixture, a door switch activated by the door to the room containing hot water-supplied fixtures or a voice activated command.
> 2. After the pump starts, the controls shall allow the pump to operate until the water temperature in the return pipe rises not more than 10ºF (5.6 ºC) above the initial temperature of the water in the pipe. The controls shall not allow the pump to operate when the temperature in the pipe exceeds 102ºF (38.9 ºC). Controls shall limit pump operation to not more than 5 minutes for each activation in the event that both means of shutting off the pump have failed.
> 3. The manufacturer of the controls for the recirculation pump provides installation and operation instructions that provide details of the operation of the controls and such instructions are available at the jobsite for inspection by the code official.

Reason: As I understand it, the intent of IPC Section 604.2 is to prevent interconnections between the hot and cold piping systems so that hot water is not drawn unintentionally into the cold-water piping and vice-versa. The two most obvious issues with such unintentional interconnections is that 1) hot water could flow from a cold water faucet which might cause a potential for scalding and 2) hot water might be prevented from ever reaching certain fixtures.

The reason for the proposed exception is to resolve the question of whether or not a "no return pipe" hot water recirculation system violates the intent of this code section.

Typical "no return pipe" hot water recirculation systems utilize a pump in the hot water line to cause flow of water from the hot water piping through a special valve and into the cold water piping near a fixture that is most remote from the water heater. Some systems have the pump operating continuously or on timer to run continuously during certain time periods of the day. Even though the pump might be running continuously or semi-continuously, the special valve controls the flow of water in the hot water pipe to the cold water pipe. Other systems are demand controlled such that the user activates the pump operation only when hot water is intended to be used.

When the temperature sensing mechanism determines that the temperature of the water in the hot water piping is either rising quickly (demand controlled) or is approximately 105 degrees F (aquastat controlled), the valve automatically closes to stop flow so that the cold water line is not continuously being filled with hot water. The valve also prevents the flow of hot water to the cold supply pipe while cold water is flowing from the faucet.

Regardless of the shut-off mechanism, the overall operation of "no return pipe" hot water systems is the same - a valve controls when flow is allowed to pass from the hot water piping to the cold-water piping.

In my opinion, even without the proposed revisions, these "no return pipe" hot water recirculation systems do not violate the intent of the code. Because the valve prevents water of a temperature greater than approximately 105 degrees F from being introduced into the cold-water piping, the potential for scalding is not an issue. The valve also prevents cold water from entering into the hot water piping so the issue of cold water replacing hot water in a water distribution system doesn't exist.

However, “no return pipe” hot water recirculation systems that use timers, aquastats or a combination of timers and aquastats to control the flow of hot water into the “temporary” cold-water return line can operate up to 24 hours a day, either intentionally or unintentionally; intentionally if the timer is set to allow the pump to run continuously. Unintentionally if the aquastat has been disconnected; or the valve is jammed open; or if the temperature drop between the water heater and the shut-off valve with aquastat is large enough to prevent the shut-off temperature from ever being reached. An example: the water heater is set at 125F, the aquastat is set to close the valve at 105F and the temperature drop between the water heater and the aquastat is 25F. This large temperature drop is possible when the pipes are installed in a vented crawl space or under a slab. The reason the pump was installed was to overcome a hot water delivery problem, which these applications almost certainly had! The problem is that with a 25F temperature drop, the temperature at the aquastat will never reach 105F (125-25 = 100F) and the valve will never close, allowing water to continually, <u>and in some sense, unintentionally</u>, pass into the cold-water line.

In contrast, demand controlled priming pumps shut off based on a temperature rise, rather than an absolute temperature. As an example, when the pump is activated, the controls determine the temperature of the water in the pipe, which is likely to be close to ambient room temperature or about 65-70F. The controls allow the pump to run until the temperature rises about 5F, and then shut off typically when the water temperature is between 70 and 75F. There are other safety mechanisms built into the controls that restrict operation to no more than 5 minutes or when the temperature rises to 105F. Since these pumps only operate on demand, when <u>intentionally</u> activated shortly before hot water is desired, they restrict the time hot water is flowing in the cold water piping to typically less than 20 minutes a day in residential occupancies served by their own water heater or boiler, and similarly small durations in other occupancies. In contrast, timer, aquastat and combination timer and aquastat controlled pumps typically operate 4-8 hours per day and often much longer, up to 24/7.

In addition to coming closest to meeting the intent of this section, which is to prevent unintentional flow between hot and cold water supply piping, demand controlled hot water priming pumps are significantly more energy efficient that the other options. The energy costs of operation are a combination of the heat losses in the piping and the electricity requirement of the pump: the heat losses dominate the energy costs. The energy costs of demand-controlled hot water priming pumps are at least 75 percent and typically 90 percent less than the alternatives.

It is for these reasons that I have proposed only allowing the exception for pumps that prime the hot or tempered water supply piping on demand.

I urge your support for this proposal. Thank you.

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

No new requirements have been added, only a clarification of an existing section.

604.2-P-KLEIN

<u>Public Hearing Results</u>

Committee Action: Disapproved

Committee Reason: The proposed language ties the designer's hands as to how he goes about providing a recirculation system for a building. This is overly restrictive.

Assembly Action: None

<u>Individual Consideration Agenda</u>

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

Public Comment:

Gary Klein, Affiliated International Management, LLC, representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

604.2 System interconnection. At the points of interconnection between the hot and cold water supply piping systems and the individual fixtures, appliances or devices, provision shall be made to prevent flow between such piping systems.

> <u>**Exception:** Recirculation systems that pump water from a hot or tempered water pipe through a cold water pipe back to the hot water source shall be permitted provided that the recirculation system has a demand activated control that complies with all of the following:</u>
>
> 1. <u>The control starts the pump upon sensing the presence of a user of a fixture or appliance, receiving a signal from the action of a user of a fixture or appliance or sensing the flow of hot or tempered water to a fixture or appliance.</u>
>
> 2. <u>The control limits the water temperature increase in the cold water supply piping to not more than 10ºF (5.6 ºC) greater than the initial temperature of the water in the pipe and limits the temperature entering the cold water supply pipe to 102ºF (38.9 ºC).</u>

Commenter's Reason: The committee disapproved the original proposal, stating that: "The proposed language ties the designer's hands as to how he goes about providing a recirculation system for a building. This is overly restrictive."

This comment addresses the committee's concerns by simplifying the proposed language and making the requirements based on performance rather than prescription.

The reason for the exemption is to make it clear that it is allowable to install a recirculation pump demand activated controls that uses the cold water line as a temporary return back to the water heater. Demand activated recirculation pumps are installed in situations where it takes too long for hot or tempered water to arrive at that hot water location in a wide variety of occupancies including homes, apartments, offices and airports, to name a few. More than 150,000 such systems have been installed in the US over the past 20 years, the majority in existing buildings using the cold water line as the temporary return. Putting this exemption into the code will enable inspection of these installations so that we can ensure they are done safely.

The remainder of the reasons why under-sink demand activated recirculation pumps should be the only allowable exception for this section are contained in the original proposal.

I urge your support for these changes. Thank you for considering this comment.

P89-12

Final Action: AS AM AMPC____ D

P90-12
Table 604.3

Proposed Change as Submitted

Proponent: Edward R. Osann, Natural Resources Defense Council, representing self (eosann@nrdc.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing self (misuriello@verizon.net)

Revise as follows:

TABLE 604.3
WATER DISTRIBUTION SYSTEM DESIGN CRITERIA REQUIRED CAPACITY AT FIXTURE SUPPLY PIPE OUTLETS

FIXTURE SUPPLY OUTLET SERVING	FLOW RATE[a] (gpm)	FLOW PRESSURE (psi)
Bathtub, balanced-pressure, thermostatic or combination balanced-pressure/ thermo-static mixing valve	4	20
Bidet, thermostatic mixing valve	2	20
Combination fixture	4	8
Dishwasher, residential	2.75	8
Drinking fountain	0.75	8
Laundry tray	4	8
Lavatory, private	~~2~~ 0.8	8
Lavatory, private, mixing valve	0.8	8
Lavatory, public	0.4	8
Shower	~~3~~ 2.5	8
Shower, balanced-pressure, thermostatic or combination balanced-pressure/ thermo-static mixing valve	~~3~~ 2.5[b]	20
Sillcock, hose bibb	5	8
Sink, residential	~~2.5~~ 1.75	8
Sink, service	3	8
Urinal, valve	12	25
Water closet, blow out, flushometer Valve	25	45
Water closet, flushometer tank	1.6	20
Water closet, siphonic, flushometer Valve	25	35
Water closet, tank, close coupled	3	20
Water closet, tank, one piece	6	20

For SI: 1 pound per square inch = 6.895 kPa,1 gallon per minute = 3.785 L/m.
a. For additional requirements for flow rates and quantities, see Section 604.4.
b. Where the shower mixing valve manufacturer indicates a lower flow rating for the mixing valve, the lower value shall be applied.

Reason: TABLE 604.3 WATER DISTRIBUTION SYSTEM DESIGN CRITERIA REQUIRED CAPACITY AT FIXTURE SUPPLY PIPE OUTLETS requires plumbing distribution system design to achieve flow rates of *at least* 3 gpm for showers, 2.5 gpm for sink faucets, and 2 gpm for lavatory faucets, all of which are excessive as minimum requirements. The *minimum* flow rate for a shower in this table is above the allowable *maximum* flow rate for a showerhead as specified by Table 604.4 of this code and by the nationwide standard that has been in effect for nearly 20 years. Similarly, the minimum flow rate for lavatories does not distinguish between public and private fixtures, and thus sets a minimum flow for public lavatories that is in excess of the maximum flow allowable under Table 604.4 of this code. And for residential sinks other than service sinks, the *minimum* flow rate is again set higher than the allowable *maximum* flow rate for a sink faucet as specified by Table 604.4. For applications at the low end of the acceptable range of water pressure, these excessive minimum flow values tend to encourage the oversizing of pipes leading to fixture outlets, leaving a larger volume of cooled hot water to purge before use, and thus exacerbating the problem of the energy and water lost while waiting for actual hot water to arrive at the fixture. In some installations, these excessive minimum values may require water pressure booster systems that might otherwise be unnecessary.

Under this proposal, public lavatories would be distinguished from private lavatories, single-handle mixing valves for private lavatories would be recognized, and the minimum flow rates for lavatory, residential sink, and shower supply pipes would be adjusted downward. Minimum flow rates for showers would be set at 2.5 gpm, or such lower flow rate as would match the manufacturer's minimum rated flow for the mixing valve to provide the level of thermal protection prescribed by the industry standard. The minimum flow rate for a residential sink, other than a service sink, would be set at 1.75 gpm, which is 80 percent of the value of the maximum flow rate allowed by this code under Table 604.4. The minimum flow rate for a public lavatory would be set at 0.4 gpm, 80 percent of the value of the maximum flow rate allowed by this code under Table 604.4. The minimum flow rate for a private lavatory would be set at 0.8 gpm, which is the minimum flow rate prescribed for private lavatory faucets by the US EPA's WaterSense specification (version 1.0, October 2007).

Cost Impact: This proposal will have the effect of reducing the diameter of pipe that is allowed to serve lavatories, sinks, and showers in some installations, and may also eliminate the need for water pressure booster systems in some applications. This code change proposal will not increase the cost of construction.

T604.3-P-OSANN

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement. This will provide more flexibility to the industry.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Len Swatkowski, representing Plumbing Manufacturers International (PMI), requests Disapproval.

Commenter's Reason: We would move to reject this proposal based on the lack of overall coordination between flow rates, flow pressures and pipe diameters interacting with thermostatic and pressure control valves purposed for the prevention of thermal shock and scalding events. This patchwork of changes needs to be review by a committee of qualified plumbing engineers with the same level of accuracy as was used to originally create this table. There needs to be a much larger study of the plumbing system requirements before these changes can be understood.

P90-12

Final Action: AS AM AMPC____ D

P91-12
Table 604.4

Proposed Change as Submitted

Proponent: Edward R. Osann, Natural Resources Defense Council, representing self (eosann@ndrc.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing himself (misuriello@verizon.net)

Revise as follows:

TABLE 604.4
MAXIMUM FLOW RATES AND CONSUMPTION FOR
PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	~~2.2~~ 1.5 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a]	~~2.5~~ 2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	~~1.0~~ 0.5 gallon per flushing cycle
Water closet	~~1.6~~ 1.3 gallons per flushing cycle[c]

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m,1 pound per square inch = 6.895 kPa.
a. A hand-held shower spray is a shower head.
b. Consumption tolerances shall be determined from referenced standards.
c. The effective flush volume for a dual-flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush.

Reason: The maximum flow rates and water consumption levels in the current Table 604.4 for water closets, urinals, shower heads, and lavatory faucets equate to nationwide standards enacted nearly 20 years ago. In December, 2010, the US Department of Energy determined that states were no longer preempted from adopting more stringent efficiency standards for these products. (*Federal Register*, Vol. 75, No. 245, December 22, 2010, p. 80289; this document is attached).

Today, fixtures and fittings that perform well at flush volumes and flow rates lower than the values currently shown in Table 604.4 are widely available. Since 2006, the establishment of the WaterSense voluntary labeling program for water efficient products and services by the Environmental Protection Agency has provided a framework for the recognition of products that are substantially more efficient than minimum federal requirements while maintaining full functionality and customer satisfaction. WaterSense criteria were established for tank-type toilets (1.28 gpf) in 2007; lavatory faucets (1.5 gpm @ 60 psi) in 2007; urinals (0.5 gpf) in 2009; and showerheads (2.0 gpm @ 80 psi) in 2010. Manufacturers have responded by bringing large numbers of models to market that meet or exceed WaterSense specifications. Based on the most recent reports by WaterSense partners, the following figures regarding the number of WaterSense labeled models available as of October 2011 indicate the widespread availability and commercial viability of plumbing products that are more efficient than the federal minimum standards shown in Table 604.4:

- Tank-type water closets 886 models from 60 brands
- Lavatory faucets and accessories 809 models from 86 brands
- Urinals
  - 47 models of fixtures from 9 brands
  - 41 models of valves from 4 brands
- Showerheads 402 models from 28 brands

With the pace of introduction of new models that meet WaterSense specifications, it is reasonable to expect that these figures will be substantially larger by 2015.

Improving the water efficiency of water closets, urinals, shower heads, and lavatory faucets in new construction will save building owners money and reduce the likelihood of municipal water and wastewater capacity constraints that can lead to moratoria on new connections.

NRDC estimates that nationwide adoption of the revised values in this proposal, effective 2016, can be expected to save:

- 243.1 million gallons of water per day by 2030;
- More than 2.8 billion kilowatt hours per year by 2030;
- More than 178 hundred million therms of natural gas per year by 2030; and
- Consumers will realize more than $2.18 billion dollars in reduced energy and water costs.

Cost Impact: While the costs of plumbing fixtures and fittings vary greatly due to style, trim, colors, and materials, the incremental cost of greater efficiency alone for products meeting the flush volumes and flow rates contained in this proposal is negligible. This code change proposal will not increase the cost of construction.

T604.4-P-OSANN

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee believes that these changes are premature. More studies need to be done before a decision like this can be justified.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Edward Osann, Natural Resources Defense Council, representing self, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

TABLE 604.4
MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	1.5 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a]	<u>2.5</u> ~~2.0~~ gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	0.5 gallon per flushing cycle
Water closet	<u>1.6</u> ~~1.3~~ gallons per flushing cycle~~[c]~~

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m,1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

~~c. The effective flush volume for a dual-flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush. In public settings, the maximum water use of a dual flush toilet is based solely on its full flush operation, not an average of full and reduced volume flushes.~~

Commenter's Reason: The modifications recommended in this comment would remove the changes proposed in the original proposal regarding the maximum flush volume for toilets and the maximum flow rate for showerheads. Drain line carry studies are currently underway, but data on the efficacy of specific flush volumes for waste transport are unlikely to be completed in time for consideration at the final code action hearing in October. Committee action recommending rejection of P-71 and P-72 casts uncertainty over whether the code should reduce the maximum flow rate of showerheads, if not concurrently addressing the thermal protection afforded by shower valves. Nevertheless, the changes thus remaining from the original proposal – reducing the maximum flow rate for private lavatories from 2.2 to 1.5 gallons per minute and reducing the maximum flush volume for urinals from 1.0 gallons per flush to 0.5 gallons per flush – are widely attained by fixtures and fittings on the market today. If approved as modified by this comment, P91 will not increase construction costs, will save substantial amounts of water, save consumers money, and bolster the reliability of public water supplies.

P91-12

Final Action: AS AM AMPC____ D

P92-12
604.5

<u>Proposed Change as Submitted</u>

Proponent: Gary Klein, Affiliated International Management, LLC, representing self **(**gary@aim4sustainability.com)

Revise as follows:

604.5 Size of fixture supply. The minimum size of a fixture supply pipe shall be as shown in Table 604.5.The fixture supply pipe shall terminate not more than 30 inches (762 mm) from the point of connection to the fixture. A reduced size flexible water connector installed between the supply pipe and the fixture shall be of an *approved* type. The supply pipe shall extend to the floor or wall adjacent to the fixture. The minimum size of individual distribution lines utilized in gridded or parallel water distribution systems shall be as shown in Table 604.5.

<u>Exceptions:</u>

1. <u>Where the developed length of a fixture supply pipe is 50 feet (15 240 mm) or less and the maximum fixture flow rate does not exceed 0.5 gpm (1.9 lpm), the minimum size of fixture supply pipe shall be 1/4 inch (6.4 mm).</u>
2. <u>Where the developed length of a fixture supply pipe is 50 feet (15 240 mm) or less and the maximum fixture flow rate does not exceed 1 gpm (3.8 lpm), the minimum size of fixture supply pipe shall be 5/16 inch (8 mm).</u>
3. <u>Where the developed length of a fixture supply pipe is 50 feet (15 240 mm) or less and the maximum fixture flow rate does not exceed 1.5 gpm (5.7 lpm), the minimum size of fixture supply pipe shall be 3/8 inch (9.5 mm).</u>

Reason: The 2012 IGCC approved GEW 327 that contained a footnote to a table limiting the flow rate of hot or tempered water in small diameter piping (1/4, 5/16 and 3/8 inch) to 0.5, 1, and 1.5 gpm respectively. Putting a requirement in a footnote is not the best code language. The table also limited the length of these pipe diameters to 50 feet, or 50 feet of developed length, whichever is less (within the context of the 2012 IPC).

This proposal takes the requirement out of the footnote of a table and makes the flow rate and developed length requirements applicable to hot, tempered or cold-water distribution lines.

Why limit the maximum fixture flow rate when 1/4, 5/16 and 3/8 inch diameter piping is being used? The answer is that the flow rates were selected, using the Hazen-Williams formulas, to keep the velocity below 5 feet per second, which minimizes pressure drop, reduces noise and limits the rate of any internal corrosion. The same formulas were used to limit the pressure drop at these flow rates to not more than 5 psi in the 50 foot lengths of 1/4, 5/16 and 3/8 inch diameter piping.

Why limit the length of the small diameter tubing to 50 feet of developed length? The answer is that this restriction is necessary to correlate with the changes to Section 607.2 of the IPC that limited the distance between the source of hot or tempered water and the fixtures to no more than 50 feet of developed length. While this is particularly important in hot water supply piping, it is also a very reasonable restriction for cold water supply piping used for low flow rate fixtures. Pressure loss at lengths greater than 50 feet would be excessive and unacceptable, as would heat loss in the hot or tempered water supply piping. In addition, for the low flow rate fixtures used with the small diameter piping, limiting length to 50 feet reduces the time-to-tap and the amount of water wasted while waiting for hot or tempered water to arrive, thereby improving performance for the user as well as water and energy waste.

I urge your support for this proposal. Thank you.

Cost Impact: The code change proposal will not increase the cost of construction. In fact, if the smaller diameter piping becomes commonly used, it might decrease the costs of construction.

604.5-P-KLEIN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The fitting inserts as well as the maximum velocities that haven't been shown could create hazards in the pipe and could be too small.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gary Klein, Affiliated International Management, LLC, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

604.5 Size of fixture supply. The minimum size of a fixture supply pipe shall be as shown in Table 604.5.The fixture supply pipe shall terminate not more than 30 inches (762 mm) from the point of connection to the fixture. A reduced size flexible water connector installed between the supply pipe and the fixture shall be of an *approved* type. The supply pipe shall extend to the floor or wall adjacent to the fixture. The minimum size of individual distribution lines utilized in gridded or parallel water distribution systems shall be as shown in Table 604.5.

Exceptions:

1. Where the ~~developed length of a fixture supply pipe is 50 feet (15 240 mm) or less and the~~ maximum fixture flow rate does not exceed 0.5 gpm (1.9 lpm), the minimum size of fixture supply pipe shall be 1/4 inch (6.4 mm).
2. Where the ~~developed length of a fixture supply pipe is 50 feet (15 240 mm) or less and the~~ maximum fixture flow rate does not exceed 1 gpm (3.8 lpm), the minimum size of fixture supply pipe shall be 5/16 inch (8 mm).
3. Where the ~~developed length of a fixture supply pipe is 50 feet (15 240 mm) or less and the~~ maximum fixture flow rate does not exceed 1.5 gpm (5.7 lpm), the minimum size of fixture supply pipe shall be 3/8 inch (9.5 mm).

Commenter's Reason: The logic of the wording in the original proposal was incorrect. The 2012 IPC already requires that the distance between the source of hot water and the uses not exceed 50 feet of developed length, so it is not necessary to include it here. This comment corrects the logic.

The reason that the pipe diameters have been paired with flow rates is so that pressure drop due to friction and the velocity within the pipe can be kept within acceptable limits. The Hazen-Williams formula used by plumbing engineers to design water supply systems was used to calculate the pressure drop and velocity for each combination of flow rate and pipe diameter in the exception. Maximum flow rates were selected when the pressure drop was below 5 psi and the velocity was below 5 feet per second for each nominal pipe diameter. A safety factor was built into these numbers, as the flow rate shown is less than the calculated value.

This exception to the values in Table 604.5 has been proposed because it seems important to include provisions in the IPC for smaller diameter tubing and for lower flow rate devices.

I urge your support for these changes. Thank you for considering this comment.

P92-12

Final Action: AS AM AMPC____ D

P101-12
Table 605.5, Chapter 14

Proposed Change as Submitted

Proponent: Kevin Simko, Victaulic representing Victaulic (ksimko@victaulic.com)

Revise as follows:

TABLE 605.5
PIPE FITTINGS

MATERIALS	STANDARDS
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME 16.26; ASME B16.29<u>; ASTM B 75: ASTM B 152; ASTM B 584</u>
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53<u>; ASTM A395; ASTM A 536; ASTM F 1476: ASTM F 1548</u>
Stainless steel (Type 304/304L)	ASTM A 312; ASTM A 778<u>; ASTM A 351; ASTM A403: ASTM A 743; ASTM A 744; ASTM A 890</u>
Stainless steel (Type 316/316L)	ASTM A 312; ASTM A 778<u>; ASTM A 351; ASTM A 403: ASTM A 743; ASTM A 744; ASTM A 890</u>
Steel	ASME B16.9; ASME B16.11; ASME B16.28<u>; ASTM A 53; ASTM A 106; ASTM A 234; ASTM A 395; ASTM A 536; ASTM F1476; ASTM F1548</u>

(Portions of table not shown remain unchanged.)

Add new standards to Chapter 14 as follows:

ASTM

<u>A106/A106M-11</u>	<u>Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service</u>
<u>A234/A234M-11a</u>	<u>Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service</u>
<u>A 351-10</u>	<u>Standard Specification for Castings, Austenitic, for Pressure-Containing Parts</u>
<u>A 395/A395M-99(2009)</u>	<u>Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures</u>
<u>A 403-11</u>	<u>Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings</u>
<u>A 536-84(2009)</u>	<u>Standard Specification for Ductile Iron Castings</u>
<u>A 743/A743M-06(2010)</u>	<u>Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application</u>
<u>A 744/A744M-10e1</u>	<u>Standard Specification for Castings, Iron-Chromium-Nickel, Corrosion Resistant, for Severe Service</u>
<u>A 890/A890M-10</u>	<u>Standard Specification for Castings, Iron-Chromium-Nickel-Molybdenum Corrosion-Resistant, Duplex (Austenitic/Ferritic) for General Application</u>
<u>B 584-11</u>	<u>Standard Specification for Copper Alloy Sand Castings for General Applications</u>
<u>F 1476-07</u>	<u>Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications</u>

F1548-01(2006)	Standard Specification for the Performance of Fittings for Use with Gasketed Mechanical Couplings Used in Piping Applications

Reason: The materials currently listed in Table 605.5 do not fully represent the materials being used for potable water systems in the industry. The code is overly-restrictive with regard to pipe materials and does not allow for the use of materials that offer improved mechanical and electrochemical properties compared with allowed materials. The additions of the standard materials will allows the use of high grade materials that provide improved performance. ,amy of these materials are also currently used in the International Mechanical Code and other piping codes.

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

T605.5-P-SIMKO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Some of the proposed standards are inappropriate as they do not cover fittings but only cover the materials to make fittings (ASTM B 75, B 152 and the standards that cover castings). Some standards have non-mandatory language (ASTM A234, A395, A536).

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Kevin J. Simko, representing Victaulic, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 605.5 PIPE FITTINGS

MATERIAL	STANDARD
Copper or copper alloy	ASSE 1061; ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29; ~~ASTM B 75; ASTM B 152; ASTM B 584~~ ASTM F-1476; ASTM F-1548
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53; ~~ASTM A 395; ASTM A 536;~~ ASTM F-1476; ASTM F-1548
Stainless steel (Type 304/304L)	ASTM A 312; ASTM A 778; ~~ASTM A 351; ASTM A 403; ASTM A 743; ASTM A 744; ASTM A 890~~ ASTM F-1476; ASTM F-1548
Stainless steel (Type 316/316L)	ASTM A 312; ASTM A 778; ~~ASTM A 351; ASTM A 403; ASTM A 743; ASTM A 744; ASTM A 890~~ ASTM F-1476; ASTM F-1548
Steel Pipe	ASME B16.9; ASME B16.11; ASME B16.28; ~~ASTM A 53; ASTM A 106; ASTM A 234; ASTM A 395; ASTM A 536;~~ ASTM F-1476; ASTM F-1548

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The standards listed in the table include a mix of actual fitting standards as well as a material specification for pipe (ASTM A-312). However, the standards currently listed in Table 605.5 do not fully represent the materials or products being used for potable water systems in the industry. The table does not address any standard for grooved mechanical joints or grooved fittings. The ASTM F-1476 and ASTM F-1548 standards outline these criteria. Grooved mechanical joints are currently being used for potable water systems and the addition of the ASTM F-1476 and ASTM F-1548 standards will provide a common criteria for grooved mechanical joints which are currently accepted for use by the code.

The goal here is to remove the material specifications originally proposed and replace them with two standards covering grooved mechanical joints.

No standards/specifications that were included in Table 605.5 in the 2012 IPC have been removed from the table.

Public Comment 2:

Jeremy Brown, representing NSF International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 605.5 PIPE FITTINGS

MATERIAL	STANDARD
Copper or copper alloy	ASSE 1061; ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29; ~~ASTM B 75; ASTM B 152; ASTM B 584~~ ASTM F-1476; ASTM F-1548
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53; ~~ASTM A 395; ASTM A 536;~~ ASTM F-1476; ASTM F-1548
Stainless steel (Type 304/304L)	ASTM A 312; ASTM A 778; ~~ASTM A 351; ASTM A 403; ASTM A 743; ASTM A 744; ASTM A 890~~ ASTM F-1476; ASTM F-1548
Stainless steel (Type 316/316L)	ASTM A 312; ASTM A 778; ~~ASTM A 351; ASTM A 403; ASTM A 743; ASTM A 744; ASTM A 890~~ ASTM F-1476; ASTM F-1548
Steel Pipe	ASME B16.9; ASME B16.11; ASME B16.28; ~~ASTM A 53; ASTM A 106; ASTM A 234; ASTM A 395; ASTM A 536;~~ ASTM F-1476; ASTM F-1548

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The code needs to address grooved mechanical joints and grooved fittings. The original proposal contained material standards (which don't normally get referenced in codes) and product standards. The proponent tried to fix this by a floor amendment in Dallas, but it was ruled out of order simply because of the amount of standards which needed to be removed from the proposal. ASTM F-1476 and ASTM F-1548 are the appropriate standards for reference in this section.

Since the ICC modification by public comment format can be confusing, let me clarify that in the end, only ASTM F1476 and ASTM F-1548 are being added to the existing code table. The strikeouts you see in the table above are being removed from the proposal only, and these standards were never in the previous code. In other words, no standards are being removed from the current code, this proposal only adds two new ones.

P101-12

Final Action: AS AM AMPC____ D

P103-12

605.14, 605.14.1, 605.14.2, 605.14.3, 605.14.4, 605.14.5, 605.14.6 (New), 605.14.7 (New), 605.14.8 (New), 605.15

Proposed Change as Submitted

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing The Copper Development Association (penniefeehan@me.com)

Revise as follows:

605.14 Copper pipe and tubing. Joints between copper or copper-alloy pipe, tubing, and ~~or~~ fittings shall comply with Sections 605.14.1 through 605.14.~~5~~8.

605.14.1 Brazed joints. Brazed joints between copper pipe or tubing and fittings shall be made with a brazing alloy having a liquid temperature exceeding 1000˚F (538˚C). ~~All~~ Joint surfaces to be brazed shall be cleaned bright by manual or mechanical means. The ends of pipe or tubing shall be cut square and shall be reamed to the full inside diameter. Burrs on the outside end of the pipe or tubing shall be removed. Where required by the brazing alloy manufacturer's instructions, an approved brazing flux shall be applied to the joint surfaces. The joint shall be brazed with a brazing filler metal conforming to AWS A5.8. Brazing filler metal shall be applied at the point where the pipe or tubing enters the socket of the fitting.

605.14.2 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical joints shall include compression type, flanged type, grooved type and press type.

605.14.3 Soldered joints. Solder joints between copper pipe or tubing and fittings shall be made in accordance with the methods of ASTM B 828 with the following sequence of joint preparation and operation: measuring and cutting, reaming, cleaning, fluxing, assembly and support, heating, applying the solder, cooling and cleaning. ~~All cut~~ The ends of pipe or tub~~e~~ing shall be cut square and shall be reamed to the full inside diameter of the pipe or tub~~e~~ing. ~~end.~~ Burrs on the outside end of the pipe or tubing shall be removed. ~~All~~ Joint surfaces to be soldered shall be cleaned bright by manual or mechanical means. ~~A~~ Flux conforming to ASTM B 813 shall be applied to the pipe or tubing and fittings. Such flux shall be noncorrosive and nontoxic after soldering. ~~be applied.~~ Pipe or tubing shall be inserted to the base of the fitting. Excess flux shall be removed from the exterior of the joint. The assembled joint shall be supported to create a uniform capillary space around the joint. An LP gas or acetylene air /fuel torch shall be used to apply heat to the assembled joint. The heat shall be applied with the flame perpendicular to the pipe or tubing. The flame shall be moved alternately between the fitting cup and the pipe or tubing. Solder in compliance with ASTM B 32 shall be applied to the joint surfaces until capillary action draws the molten solder into the cup of the fitting. ~~The joint shall be soldered with a solder conforming to ASTM B 32.~~ The soldered joint shall not be disturbed until cool. Remaining flux residue shall be cleaned from the exterior of the joint.

605.14.4 Threaded joints. Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

605.14.5 Welded joints. ~~All~~ Welded joint surfaces shall be cleaned. The joint shall be welded with ~~an~~ *approved* filler metal.

605.14.6 Flared joints. Flared joints for water pipe shall be made by a tool designed for that operation.

605.14.7 Push-Connect joints. Removable and non-removable push fit fittings for copper tubing or pipe shall comply with ASSE 1061. Push fit fittings for copper pipe or tubing shall have an *approved* elastomeric O-ring that seals the joint. The end of pipe or tubing shall be cut square, chamfered and reamed to full inside diameter. The pipe or tubing shall be fully inserted into the fitting and the pipe or tubing shall be marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the pipe or tubing to verify that the pipe or tubing is fully inserted into the fitting and the gripping mechanism has engaged on the pipe or tube.

605.14.8 Pressed-Connect joints. Pressed fittings for copper pipe or tubing shall have an elastomeric O-ring that seals the joint. The pipe or tubing shall be fully inserted into the fitting, and the pipe or tubing shall be marked at the shoulder of the fitting. Pressed fittings for copper pipe or tubing shall have an *approved* elastomeric O-ring that forms the joint. The ends of pipe or tubing shall be cut square, chamfered and reamed to full inside diameter. The fitting alignment shall be checked against the mark on the pipe or tubing to verify that the pipe or tubing is fully inserted into the fitting. The joint shall be pressed using the tool recommended by the manufacturer of the press fitting.

~~**605.15 Copper tubing.** Joints between copper or copper alloy tubing or fittings shall comply with Sections 605.15.1 through 605.15.4.~~

~~**605.15.1 Brazed joints.** Joint surfaces shall be cleaned. An *approved* flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.~~

~~**605.15.2 Flared joints.** Flared joints for water pipe shall be made by a tool designed for that operation.~~

~~**605.15.3 Mechanical joints.** Mechanical joints shall be installed in accordance with the manufacturer's instructions.~~

~~**605.15.4 Soldered joints.** Solder joints shall be made in accordance with the methods of ASTM B 828. All cut tube ends shall be reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned. A flux conforming to ASTM B 813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B 32. The joining of water supply piping shall be made with lead-free solders and fluxes. "Lead free" shall mean a chemical composition equal to or less than 0.2-percent lead.~~

(Renumber subsequent sections)

Reason: The above language combines pipe and tubing into one section and provides the joining methods of copper and copper alloys as referenced in Table 605.5. In addition, important language from the standards has been added to aid the end user.

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

605.14-P-FEEHAN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Manufacturer's guidelines are not enforceable as code language. The code official is not at the jobsite while joints are being made in order to verify that the steps indicated by the guidelines are being followed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Pennie L. Feehan, Pennie L. Feehan Consulting, representing CDA – Copper Development Association, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

605.12.1 Brazed joints. All joint surfaces shall be cleaned bright by manual or mechanical means. An approved flux shall be applied where required. The joint shall be brazed with ~~a~~ filler metals having a melting point range between 1,100°F (593°C) and 1500°F (815°C) conforming to AWS A5.8.

605.14.1 Brazed joints. All joint surfaces shall be cleaned bright by manual or mechanical means. An approved flux shall be applied where required. The joint shall be brazed with ~~a~~ filler metals having a melting point range between 1,100°F (593°C) and 1500°F (815°C) conforming to AWS A5.8.

605.14.3 Soldered joints. Solder joints shall be made in accordance with the methods of ASTM B 828. All ~~C~~cut tube ends shall be reamed to the full inside diameter of the tube end. All j~~J~~oint surfaces shall be cleaned bright by manual or mechanical means. ~~A~~ ~~f~~Flux conforming to ASTM B 813 shall be applied to all joint surfaces. The joint shall be soldered with a solder conforming to ASTM B 32. The joining of water supply piping shall be made with lead-free solder and fluxes. "Lead free" shall mean a chemical composition equal to or less than 0.2-percent lead.

605.15.1 Brazed joints. Joint surfaces shall be cleaned bright by manual or mechanical means. An approved flux shall be applied where required. The joint shall be brazed with ~~a~~ filler metals having a melting point range between 1,100°F (593°C) and 1500°F (815°C) conforming to AWS A5.8.

605.15.4 Soldered joints. Solder joints shall be made in accordance with the methods of ASTM B 828. All cut tube ends shall be cut square and reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned bright by manual or mechanical means. ~~A~~ ~~f~~Flux conforming to ASTM B 813 shall be applied to all joint surfaces. The joint shall be soldered with a solder conforming to ASTM B 32. The joining of water supply piping shall be made with lead-free solders and fluxes. "Lead free" shall mean a chemical composition equal to or less than 0.2-percent lead.

Commenter's Reason: This proposal adds language that provides clear directions to the end user and provides uniformity with the IMC.

P103-12

Final Action: AS AM AMPC____ D

P107-12
605.16.2

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self (JBEngineer@aol.com)

Revise as follows:

605.16.2 Solvent cementing. Joint surfaces shall be clean and free from moisture~~,~~. Joints shall be made in accordance with the pipe manufacturer's installation instructions. Where such instructions require ~~and~~ that ~~an~~ ~~*approved*~~ primer be used, the primer shall be applied to the joint surfaces and a solvent cement, orange in color and conforming to ASTM F 493, shall be applied to the joint surfaces. Where such instructions allow for a one step solvent cement, yellow in color and conforming to ASTM F 493, to be used, the joint surfaces shall not require application of a primer before the solvent cement is applied. The joint shall be made while the cement is wet and in accordance with ASTM D 2846 or ASTM F 493. Solvent cemented joints shall be permitted above or below ground.

~~**Exception:** A primer is not required where all of the following conditions apply:~~

1. ~~The solvent cement used is third-party certified as conforming to ASTM F 493.~~
2. ~~The solvent cement used is yellow in color.~~
3. ~~The solvent cement is used only for joining ½ inch (12.7 mm) through 2 inch (51 mm) diameter CPVC pipe and fittings.~~
4. ~~The CPVC pipe and fittings are manufactured in accordance with ASTM D 2846.~~

Reason: This section is currently very convoluted. The requirements can be simplified by referencing the pipe manufacturer's installation instructions. The installation instructions are part of the listing which is required by the code. This will also recognize changes to the listing of the joining method, rather than requiring constant changing of this section.

The current requirements are incorrect since UL lists ASTM F442 for joining with one-step solvent cement. Furthermore, UL lists the joining for pipe up to 3 inch in diameter. Neither requirement is addressed in the current code text.

Cost Impact: This change does not increase the cost of construction.

605.16.2-P-BALLANCO

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement. The revised language simplifies the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

605.16.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. Joints shall be made in accordance with the pipe, fitting and solvent cement manufacturer's installation instructions. Where any of the ~~such~~ instructions require that a primer be used, the primer shall be applied to the joint surfaces and a solvent cement, orange in color and conforming to ASTM F 493, shall be applied to the joint surfaces. Where all of the ~~such~~ instructions allow for the use of a one step solvent cement, primer shall not be applied to the joint surfaces and a solvent cement, yellow or red in color and conforming to ASTM F 493, shall be applied to the joint surfaces. ~~to be used, the joint surfaces shall not require application of a primer before the solvent cement is applied.~~ The joint shall be made while the cement is wet and in accordance with ASTM D 2846 or ASTM F 493. Solvent cemented joints shall be permitted above or below ground.

Commenter's Reason: I submitted change P107 and P108. These were separate subject matters needing to be addressed individually. Since both changes were recommended for approval by the Plumbing Code Change Committee, I am submitting this comment to combine the requirements of the two changes. This will clarify how the coloring of the one step solvent cement applies. By approving this change, there is no need to correlate the two changes.

Public Comment 2:

Michael Cudahy, representing Plastic Pipe and Fittings Association (PPFA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

605.16.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. Joints shall be made in accordance with the pipe and solvent cement manufacturer's installation instructions. Where any of the ~~such~~ instructions require that an *approved* primer be used, the primer shall be applied to the joint surfaces and a solvent cement, orange in color and conforming to ASTM F 493, shall be applied to the joint surfaces. Where all of the ~~such~~ instructions allow for a one step solvent cement, yellow in color and conforming to ASTM F 493, to be used, the joint surfaces shall not require application of a primer before the solvent cement is applied. The joint shall be made while the cement is wet and in accordance with ASTM D 2846 or ASTM F 493. Solvent cemented joints shall be permitted above or below ground.

Commenter's Reason: The pipe manufacturer's instructions may be lacking in some information. We recommend also following the solvent cement manufacturer's instructions. The revised wording requires that the more stringent of the instructions will apply.

P107-12
Final Action: AS AM AMPC____ D

P108-12
605.16.2

<u>Proposed Change as Submitted</u>

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self (JBEngineer@aol.com)

Revise as follows:

605.16.2 Solvent cementing. Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. Solvent cement, orange in color and conforming to ASTM F 493, shall be applied to joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D 2846 or ASTM F 493. Solvent cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM F 493.
2. The solvent cement used is yellow <u>or red</u> in color.
3. The solvent cement is used only for joining ½ inch (12.7 mm) through 2 inch (51 mm) diameter
   CPVC pipe and fittings.
4. The CPVC pipe and fittings are manufactured in accordance with ASTM D 2846 <u>or ASTM F442</u>.

Reason: ASTM F442 CPVC is used in sprinkler systems, as well as, plumbing systems. With the use of multipurpose piping systems in one and two family dwellings and townhouses, it has become common to see both ASTM F442 and ASTM D2846 pipe being installed. UL has listed ASTM F442 pipe for joining with one step solvent cement. However, UL requires the solvent cement to be red in color. The yellow and red one step solvent cement are the same, other than the color. This will allow the use of a single color solvent cement when doing a multipurpose residential sprinkler installation.

Cost Impact: This change does not increase the cost of construction.

605.16.2-P-BALLANCO

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

Michael Cudahy, representing Plastic Pipe and Fittings Association (PPFA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

605.16.2 Solvent cementing. Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. Solvent cement, orange in color and conforming to ASTM F 493, shall be applied to joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D 2846 or ASTM F 493. Solvent cement joints shall be permitted above or below ground.

Exception: A primer ~~is~~ shall not be required where all of the following conditions apply:

1. The pipe manufacturer's instructions allow for one step solvent cementing of joints.
~~1~~2. The solvent cement used ~~is third-party certified as~~ conform~~ing~~s to ASTM F 493.
~~2~~3. The solvent cement used is yellow or red in color.
~~3~~4. ~~The~~ Yellow-colored solvent cement is used for joining only 1/2 inch (12.7 mm) through 2 inch (51 mm) diameter ~~CPVC water distribution~~ pipe and fittings that comply with ASTM D 2846.
~~4. The CPVC pipe and fittings are manufactured in accordance with ASTM D 2846 or ASTM F442.~~

Commenter's Reason: The pipe manufacturer's instructions should be followed for one step cementing applicability as well as cement color. Yellow one-step is intended for use on CPVC CTS pipe, made to ASTM D 2846. Red one-step cement could be used as a transition on a multipurpose fire sprinkler and water distribution CPVC system.

P108-12
Final Action: AS AM AMPC____ D

P117 – 12
605.7.1 (New), Chapter 14

Proposed Change as Submitted

Proponent: Fred Constantino, American Society of Mechanical Engineers (ASME), representing the ASME A112 Plumbing Materials and Equipment Standards Committee.

Add new text as follows:

605.7.1 Quarter-turn shut-off valves. Manually operated, quarter-turn shut off valves, 2 inches (51mm) or less in size, shall conform to ASME A112.4.14.

Add new standard to Chapter 14 as follows:

ASME
A112.4.14–2004(R2010) Manually Operated, Quarter-Turn Shutoff Valves for Use in Plumbing Systems

Reason: ASME A112.4.14 Manually Operated, Quarter-Turn Shutoff Valves for Use in Plumbing Systems is a National standard (ANSI). These valves are intended for indoor installation as potable water shutoff valves between the meter and the supply stop. Valves governed by this Standard are intended for service at temperatures between 34°F (1°C) and 180°F (82°C), with an allowable working pressure rating not less than 125 psi (862 kPa).

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

Analysis: A review of the standard proposed for inclusion in the code, ASME A112.4.14-2004(R2010) with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Disapproval.

P117-12
Final Action: AS AM AMPC____ D

P123-12
605.26 (New), Chapter 14

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Add new text as follows:

605.26 Brass fittings and brass valves for plastic piping systems. Where used as components of plastic piping systems and where made from copper alloys, brass fittings and brass valves shall comply with NSF14.

Reason: Dezincification of yellow brass piping components has become a real problem. There are 32,000 houses in Las Vegas that are being re-piped at a cost in excess of over $300 million due to dezincification of brass fittings in PEX domestic water systems. It is also occurring in other parts of the country (southern California and Hawaii to name just two). This also occurs in brass valves. 20 years ago Nibco had this problem when they started making brass valves in Taiwan. They figured out what they were doing wrong and it stopped. Now we have all these products being made abroad and the problem has come back times 10 or even 100.

The ASTM standards for these products allow several different alloys and since the codes are not specific as to which alloy to use for what, some manufacturers choose the least expensive one. Some of these alloys require more copper and allow less zinc (red brasses having the least amount of zinc) and other alloys require less copper and allow more zinc (yellow brasses). A poorly made yellow brass valve may be ok on a domestic water line in Chicago, or a drain line or air line or even a condenser water line in Las Vegas or San Diego. However, it will certainly fail in short order in a domestic water line in Las Vegas or San Diego or Honolulu. It is all about the local water and quality of the brass valve or PEX fitting. The brass valves and fittings that are failing meet the current codes. You can't treat the water because people drink it. The only solution is to regulate better through the codes and local enforcement.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

Analysis: This code change proposal references NSF Standard 14, which is already referenced in the code. However, the proposed change to code text is written to correlate with a new edition of the standard NSF Standard 14-2010a, rather than the edition presently referenced in the code, which is the 2008e edition. The update to this standard will be considered by the Administrative Code Committee during the 2013 Code Development Cycle. Should this code change proposal be approved, but the update to the standard not be approved, the code text will revert to the text as it appears in the 2012 Edition of the Code.

605.26-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Disapproval.

Commenter's Reason: I would encourage the membership to vote against the motion to approve this change and vote to deny. NSF 14 is not a materials standard. This is unprecedented in the Plumbing Code. Never has there been a requirement added to a brass valve using a plastics standard. This would also result in a nightmare for inspectors.

Any brass valve installed when there is plastic pipe would require a listing to NSF 14. If the water distribution system is piped in copper tube and the faucet has PEX supply tubes, all of the valves would have to be listed to NSF 14. Yet, NSF 14 is a plastic certification standard, not a brass valve standard. For multipurpose piping systems, every residential sprinkler would have to be listed to NSF 14. That is ridiculous.

The justification given is dezincification. Yet, the CAC has not studied in depth the issue of dezincification the way many of us in the industry have. This is a knee jerk reaction to headlines, not a requirement based in technical fact.

The NSF 14 Committee added a dezincification test requirement to the standard. This is a major error made by the Committee. I have petitioned the NSF 14 Committee to remove this test from the standard. There is more technical support for the removal of this test requirement than there is to support such a test.

When the dezincification test was first proposed to NSF 14, the claim was that there needs to be some test since there are all these lawsuits regarding the matter. A lawsuit is not technical justification for adding a test requirement. Most claims made by the plaintiffs' attorney are wrong. We should not be adding requirements to the Plumbing Code to keep attorneys at bay.

NSF 14 should never have material requirements for copper alloys in the standard. The standard is a plastic standard. Yes, there are copper alloy components to plastic piping systems. However, the material requirements for copper alloys should be left to the committees responsible for that particular material. For many of the plastic products, that would be the ASTM standards. This is where a test requirement for copper alloy belongs, not NSF 14.

When dealing with metal components, it is a recognized fact that all metals in plumbing systems corrode. To think otherwise is foolishness. Copper alloys corrode, so does copper tube, so does galvanized steel, so does cast iron. In other words, corrosion is a part of life in the plumbing industry. What we attempt to do is reduce the rate of corrosion to extend the life of a product.

With metallic components, there are many ways to extend the life of the material. It often involves more than simply changing the formulation of the material. Heat treatment and cooling play an important role in developing a material that reduces the rate of corrosion. We have been using copper alloys, also known as yellow brasses, for more than 80 years in the plumbing industry. I might add - with much success. So, the question you need to ask is, "Why do we, all of the sudden, need a test on dezincification?"

ISO 6509 was developed after testing was conducted in Göteborg, Sweden. Water was circulated for 3-1/2 years at a temperature of 140 degrees F. The water used in the testing was Göteborg water. After the conclusion of this test, the researchers attempted to duplicate the same impact on brass in a 24 hour time period. In doing so, they did not develop any end point criteria. The researchers, however, suggested an end point criteria that, in their opinion, equated to 60 years of life. It should also be noted that the fittings being tested were already in service for a period of 4 years.

There are many problems with this research. There is no water in the United States or Canada that is of the same poor quality as that of Göteborg, Sweden in the 1970's when this research was conducted. Even today, Göteborg, Sweden has a poorer quality water than the water in the United States. So why should we use a test based on water that is not used in the United States?

The other problem with the requirement is the end point criteria. The engineering community in the United States has always used a time period of 30 years for longevity testing of construction products. Europe has used values of 50 years, 60 years, and 70 years. There is no engineering accuracy to these values. To choose a length of time of 60 years using Swedish water running continuously at 140 degrees F is ridiculous. Again, there is no technical basis for such a test requirement.

The researchers also assume a straight line rate of corrosion over the years. Research done by metallurgists over the last three years has proven this to be inaccurate. The rate of corrosion begins at one rate, than reduces. The corrosion rate occurs in a curve, not a straight line. Hence, the assumptions are again wrong by these researchers. Using their analysis, you would have a life of probably 250 years. That proves even more how ridiculous the end point criteria is that was chosen by the NSF 14 Committee.

ISO 6509 is only good for verifying that yellow brass corrodes by dezincification, which is technically de-alloying. That is somewhat of a "duh" statement. We already know the corrosion process. We don't have to prove it by a useless test.

Unfortunately, no one can equate ISO 6509 to performance in a plumbing system installed in the United States or Canada. That is because this has not been studied. All that has been done is analysis of what one "thinks" it equates to. That is not good enough to change a standard so significantly.

Another way to view this test requirement is to consider an equivalent test for galvanized steel products. Galvanized steel has a corrosion rate higher than copper alloy. If we had a galvanized steel equivalent corrosion test, there would be no galvanized steel permitted to be installed in plumbing systems. That does not make any sense. Similarly, the dezincification test does not make any sense.

Substantiation supporting the inclusion of a dezincification test should never be based on "I think it is a good idea" or "The attorneys think we should add this." There should be proper technical justification. There is none for the inclusion of ISO 6509 to NSF 14. If you review the ASME and ASTM standards on copper alloy, you will not find any requirement for a dezincification test using ISO 6509.

It was apparent that no testing was done on manufacturers' products prior to the inclusion of the dezincification test. Some recent tests proved how ineffective ISO 6509 is. To date, six manufacturers' PEX fittings were put through the ISO 6509 test for longer than 24 hours (the time required on the test). The dezincification ranged from 50 percent to 100 percent in the fittings. Yet the fittings passed the ASTM F877 test requirements. When brought to failure, the PEX tube failed, not the fittings.

Interestingly, NSF 14 assumes these fittings are not acceptable since they could not pass the dezincification test. How can we exclude perfectly acceptable fittings because of some made up testing of a certain grade of brass? This establishes a very poor precedence.

Before adding this test requirement to NSF 14, the Committee did not do any failure analysis of copper alloy in the United States and Canada. This is dangerous and often results in invalid tests being added to standards. There are billions of yellow brass fittings, faucets, valves, fixture fittings, and backflow preventers installed throughout the country. If yellow brass was such a problem, we would see millions of failures, not a handful, by comparison.

Unfortunately, the Plumbing Code Committee and the ICC membership has not been able to evaluate the alleged dezincification failures. I have for many projects. The vast majority of the failures were related to improper installation. This cannot be corrected by adding a dezincification test to the standard. It would appear that the NSF 14 Committee was completely unaware of this.

One manufacturer of yellow brass components for a particular adapter fitting could not pass the dezincification test. They conducted a survey of failures of that fitting. I should mention that they have manufactured thousands of those fittings over the last 35 years. They could not find one failure. Not one fitting was returned, not one fitting was identified as failing in the field. How can we make a perfectly good fitting unacceptable? What changed to make this fitting no longer permissible to install?

If there really was a problem, perhaps adding a test would be acceptable. But again, that test should be to the ASTM standards, not NSF 14. The dezincification test was added because of assumed problems with PEX fittings. However, it applies to any plastic piping component. The failure rate of PEX fittings manufactured by US manufacturers is insignificant. The failure rate of non-PEX products is nonexistent.

P123-12

Final Action: AS AM AMPC____ D

P126-12

202, 606.8 (New), 606.8.1 (New), 606.8.2 (New)

Proposed Change as Submitted

Proponent: Edward R. Osann, Natural Resources Defense Council, representing self (eosann@nrdc.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing himself (misuriello@verizon.net)

Add new definitions as follows:

WATER METER. A device that measures the volume of water supplied from a public water main to a building or to an irrigated landscape and that is used by a public water supplier to bill for water.

WATER SUB-METER. A device, other than a *water meter*, installed on a water distribution pipe or makeup water pipe that measures the volume of water supplied to a specified space or specified equipment within a building or at the building site.

Add new text as follows:

606.8 Water measurement required for multi-family residential occupancies. The volume of water supplied to buildings of R-2 residential occupancy or a mixed-use occupancy that includes an R-2 residential occupancy shall be measured as required by Sections 606.8.1 and 606.8.2.

606.8.1 Sub-meters for individual multi-family dwelling units. *Water sub-meters* shall be installed to measure the volume of water supplied to each dwelling unit. *Water sub-meters* shall be installed in accordance with the manufacturer's instructions. Where point of use *water sub-meters* capable of communicating water consumption data remotely are installed at every fixture within the dwelling unit, a dwelling unit *water sub-meter* shall not be required.

> **Exception**: *Water sub-meters* shall not be required for dormitories, fraternities, sororities, and boarding houses (non-transient).

606.8.2 Sub-meters for water features and landscaped areas. A *water sub-meter* shall be installed to measure the volume of water supplied to an outdoor water feature or to an automatically controlled irrigation system serving irrigated landscapes having a combined area exceeding 2,500 ft^2 (232 m^2). Such *water sub-meter* shall be installed in accordance with the manufacturer's instructions.

> **Exception:** A *water sub-meter* shall not be required for an irrigated landscape that is supplied through a *water meter* dedicated to the landscape irrigation system.

Reason: This proposal requires the installation of water sub-meters for individual units in newly constructed apartment buildings. Public water suppliers typically do not install meters of their own on water supply piping to individual units, and occupants typically pay for water and sewer service as part of their rent or condominium fee.

Sub-metering in new multi-family buildings, when used for allocating the cost of water and wastewater service to individual dwelling units, ensures that water users receive an appropriate signal regarding the volume and cost of their water use, and thus incentivizes residents to undertake responsible water use and prompt reporting of fixtures in need of repair. Sub-metering is also useful in identifying leakage or unintended use in unoccupied dwelling units within multifamily buildings.

The National Multiple Family Sub-metering and Allocation Study (2004), sponsored by the US EPA and thirteen public water suppliers in different parts of the country, demonstrated that sub-metering reduces indoor water consumption substantially, by about 16% or 7,960 gallons per household unit per year, as a mid-range estimate. Nationwide, an estimated 5.9 million additional households will be living in multifamily housing by 2030 compared with 2015 (US Energy Information Agency, *Annual Energy Outlook 2011*, Residential Sector Key Indicators and Consumption, Reference Case). If beginning in 2016 all new multifamily housing is equipped with sub-meters used for billing allocation, even a conservative savings estimate of 3,110 gallons per unit per year (the value at the lower bound of the confidence band of the 2004 National Study estimate) yields water savings of 388 million gallons per day by 2030. Additionally, the measurement of water used for landscape purposes and for outdoor water features, such as swimming pools, ornamental ponds, and fountains, is essential to the effective management and avoidance of waste in large landscape maintenance.

606.8-P-OSANN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The requirement for meters and submeters is well above the code minimum for providing for health and safety of the buildings occupants. These requirements do not belong in the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Edward Osann, Natural Resources Defense Council, representing self, requests Approval as Submitted.

Commenter's Reason: The committee's action to disapprove this proposal was based on the assertion that submetering of new multi-family residential buildings provides no health and safety benefits for building occupants. To the contrary, submetering supports the early detection and repair of leaks and damaged fixtures which can contribute to hazardous and unsafe conditions such as mold growth, bathroom slip and fall, and ice accumulation. Submetering can accomplish this by a) alerting building managers to excessive use in individual units (occupied or unoccupied) that may be attributable to significant leakage that may go undetected or unreported until damage and unsafe conditions extends to multiple dwelling units or common areas; and, b) providing a financial incentive to building residents to more promptly report damaged or leaking fixtures and fittings to management for timely repair before hazardous conditions emerge. Additionally, the enormous estimated water savings attributable to submetering in new multi-family buildings – 388 million gallons per day nationwide by 2030 (undisputed by the committee) – is significant enough to enhance the reliability of public water supplies and the avoidance of water service curtailments.

P126-12
Final Action: AS AM AMPC____ D

P128-12
607.2, 607.2.1 (New), Table 605.2.1 (New)

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

607.2 Hot or tempered water supply to fixtures. The piping ~~developed length of hot or tempered water piping~~, from the source of hot water to the fixture ~~that require hot or tempered water,~~ shall ~~not exceed~~ contain not more than 75 fluid ounces of water and shall be not more than 50 feet (15 240 mm) in length. Recirculating system piping and heat-traced piping shall be considered to be sources of hot or tempered water.

607.2.1 Pipe volumes. Table 605.2.1 shall be used to determine the water volume in piping.

TABLE 605.2.1
PIPING VOLUME

Size Nominal, Inch	Copper Type M	Copper Type L	Copper Type K	CPVC CTS SDR 11	CPVC SCH 40	CPVC SCH 80	PE-RT SDR 9	Composite ASTM F 1281	PEX CTS SDR 9
FLUID OUNCES OF WATER PER FOOT OF TUBE									
3/8”	1.06	0.97	0.84	N/A	1.17	N/A	0.64	0.63	0.64
1/2”	1.69	1.55	1.45	1.25	1.89	1.46	1.18	1.31	1.18
3/4”	3.43	3.22	2.90	2.67	3.38	2.74	2.35	3.39	2.35
1”	5.81	5.49	5.17	4.43	5.53	4.57	3.91	5.56	3.91
1 1/4	8.70	8.36	8.09	6.61	9.66	8.24	5.81	8.49	5.81
1 1/2	12.18	11.83	11.45	9.22	13.20	11.38	8.09	13.88	8.09
2”	21.08	20.58	20.04	15.79	21.88	19.11	13.86	21.48	13.86

Reason: This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

The 2012 IPC limits the run of hot water lines in Section 607.2 to 50’. The IgCC, however, limits hot water line length based on the volume in the pipe, therefore the maximum length is different for different sizes of pipe. The IPC should be revised to better correspond with the IgCC and provisions for recirculation systems should be updated to include demand-based recirculation. This method of reducing water waste is much more accurate than simply stated a “catch-all” maximum length.

Cost Impact: None

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee thought that the 75 fluid ounces limitation was too restrictive and unrealistic to apply to all buildings.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

607.2 Hot or tempered water supply to fixtures. The piping developed length of hot or tempered water piping, from the source of hot water to the fixture that requires hot or tempered water, shall not exceed contain not more than ~~75~~ 300 fluid ounces of water and shall be not more than 50 feet (15 240 mm) in length. Recirculating system piping and heat-traced piping shall be considered to be sources of hot or tempered water.

607.2.1 Pipe volumes. Table 60~~5~~7.2.1 shall be used to determine the water volume in piping.

TABLE 60~~5~~7.2.1
PIPING VOLUME

Size Nominal, Inch	TYPE OF PIPING								
	Copper Type M	Copper Type L	Copper Type K	CPVC CTS SDR 11	CPVC SCH 40	CPVC SCH 80	PE-RT SDR 9	Composite ASTM F 1281	PEX CTS SDR 9
	FLUID OUNCES OF WATER PER FOOT OF TUBE								
3/8	1.06	0.97	0.84	N/A	1.17	N/A	0.64	0.63	0.64
1/2	1.69	1.55	1.45	1.25	1.89	1.46	1.18	1.31	1.18
3/4	3.43	3.22	2.90	2.67	3.38	2.74	2.35	3.39	2.35
1	5.81	5.49	5.17	4.43	5.53	4.57	3.91	5.56	3.91
1 1/4	8.70	8.36	8.09	6.61	9.66	8.24	5.81	8.49	5.81
1 1/2	12.18	11.83	11.45	9.22	13.20	11.38	8.09	13.88	8.09
2	21.08	20.58	20.04	15.79	21.88	19.11	13.86	21.48	13.86

Commenter's Reason: The committee thought that the 75 fluid ounces limitation was too restrictive and unrealistic to apply to all buildings. Increasing the limit to 300 fluid ounces would allow for 50 feet of all one-inch pipe. The table number was incorrect in the original submission and is now corrected. The heading "TYPE OF PIPING" was added to the table for clarity.

Public Comment 2:

Michael Cudahy, representing Plastic Pipe and Fittings Association (PPFA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

607.2 Hot or tempered water supply to fixtures. The piping developed length of hot or tempered water piping, from the source of hot water to the fixture that requires hot or tempered water, shall not exceed contain not more than ~~75~~ 300 fluid ounces of water and shall be not more than 50 feet (15 240 mm) in length. Recirculating system piping and heat-traced piping shall be considered to be sources of hot or tempered water.

607.2.1 Pipe volumes. Table 60~~5~~7.2.1(1) or Table 607.2.1(2) shall be used to determine the water volume in piping.

TABLE 60~~5~~7.2.1(1)
PIPING VOLUME

Size Nominal, Inch	TYPE OF PIPING								
	Copper Type M	Copper Type L	Copper Type K	CPVC CTS SDR 11	CPVC SCH 40	CPVC SCH 80	PE-RT SDR 9	Composite ASTM F 1281	PEX CTS SDR 9
	FLUID OUNCES OF WATER PER FOOT OF TUBE								
3/8	1.06	0.97	0.84	N/A	1.17	N/A	0.64	0.63	0.64
1/2	1.69	1.55	1.45	1.25	1.89	1.46	1.18	1.31	1.18
3/4	3.43	3.22	2.90	2.67	3.38	2.74	2.35	3.39	2.35
1	5.81	5.49	5.17	4.43	5.53	4.57	3.91	5.56	3.91
1 1/4	8.70	8.36	8.09	6.61	9.66	8.24	5.81	8.49	5.81
1 1/2	12.18	11.83	11.45	9.22	13.20	11.38	8.09	13.88	8.09
2	21.08	20.58	20.04	15.79	21.88	19.11	13.86	21.48	13.86

TABLE 605.2.1(2)
AVERAGE PIPING VOLUME AND MAXIMUM PIPING LENGTH

NOMINAL PIPE SIZE (inch)	VOLUME (liquid ounces per foot of length)	MAXIMUM PIPE LENGTH (feet)
¼ [a]	0.33	50
5/16 [b]	0.5	50
3/8 [c]	0.75	50
1/2	1.5	50
5/8	2	50
3/4	3	50
7/8	4	50

NOMINAL PIPE SIZE (inch)	VOLUME (liquid ounces per foot of length)	MAXIMUM PIPE LENGTH (feet)
1	5	50
1 1/4	8	38
1 1/2	11	27
2	18	17

a. Flow rate shall not exceed 0.5 gpm.
b. Flow rate shall not exceed 1.0 gpm
c. Flow rate shall not exceed 1.5 gpm

Commenter's Reason: Based upon the committee's response that 75 ounces was too restrictive, I am proposing 300 ounces as this is the volume of 50 feet of an average 1 inch pipe. This is much less restrictive than 75 ounces. If a jurisdiction wishes to conserve additional hot water energy and reduction of potable water waste, they will adopt the IgCC where the volume limitation is 75 ounces. But for the IPC, a reasonable volume limit of 300 ounces provides a lot of design flexibility while preventing an unintended situation like 50 feet of 2 inch plus piping from being installed without consideration.

Table 607.2.1(1) provides volumes for specific types of piping for calculating the exact volume of hot water from the source to the fixture. Table 607.2.1 (2), which was proposed by Gary Klein, is being added to provide an alternative to volume calculation that does not require knowledge of the exact type of piping to be used. It is not necessary to be exact about the volume calculation as the volume limitation is arbitrary. The point is to provide some restriction on the volume of water that could be wasted while waiting for hot water to arrive at the fixture.

Also, with Gary Klein's suggestion, I have added footnotes to Table 607.2.1(2) to deal with pressure drop in smaller sized tubing.

P128-12

Final Action: AS AM AMPC____ D

P129-12

607.2.2 (New), 607.2.2.1(New), 607.2.2.2 (New)

Proposed Change as Submitted

Proponent: Gary Klein, Affiliated International Management, LLC, representing self

Add new text as follows:

607.2.2 Hot or tempered water recirculation systems. Hot or tempered water recirculation systems shall be provided with a recirculation pump. Gravity and thermo-syphon circulation systems shall be prohibited. Recirculation system pump controls shall comply with Sections 607.2.2.1 and 607.2.2.

607.2.2.1 Recirculating pump controls. Recirculating pump controls that allow timer-activated, water temperature-activated or continuous operation of the pump shall be prohibited. Recirculating pumps shall be demand activated by one of the following means:

1. A switch operated by the user of the fixture.
2. A motion sensor triggered by the presence of the user of the fixture.
3. A flow switch activated by the flow of hot water at a fixture.
4. A door switch activated by the door to the room containing hot water-supplied fixtures.
5. A voice activated command.

After the pump starts, the controls shall allow the pump to operate until the water temperature in the return pipe rises not more than 10ºF (5.6 ºC) above the initial temperature of the water in the pipe. The controls shall not allow the pump to operate when the temperature in the pipe exceeds 102ºF (38.9 ºC). Controls shall limit pump operation to not more than 5 minutes for each activation in the event that both means of shutting off the pump have failed.

607.2.2.2 Control manufacturer instructions . The manufacturer of the controls for the recirculation pump shall provide installation and operation instructions that provide details of the operation of the controls. Such instructions shall be available at the jobsite for inspection by the code official.

(Renumber subsequent section)

Reason:

1. This proposal was approved on consent at the 2012 IgCC Final Action Hearing in Phoenix. The wording in this proposal has the same content and has been modified for better correlation with the IPC. The description of the allowable pump control – on demand – has been drawn from the definition of Demand Recirculation Water System in the 2012 IECC.
2. Circulation systems with demand controlled pumps are significantly more energy efficient than any other type of hot water circulation system. The table below shows the relative energy consumption for all types of circulating systems covered in this section. The annual energy needed to keep the loop hot with water heated electrically or with natural gas are shown separately from the energy needed for the pump. The majority of the energy is lost in keeping the water in the loop at the desired temperature (all of it if there is a gravity loop). Two lengths of circulation loop are analyzed: 100 feet and 200 feet. The costs and savings remain proportional as the length of the circulation loop and the flow rate of the pump increase. Savings from demand controlled pumping systems have been documented by the Southern California Gas Company, which is now running an energy efficiency program that supports their installation.

Annual Energy Required for Operating Circulation Systems

		Recirculation						Demand Controlled Priming	
		Daily Hours of Operation							
		24	12	8	6	4	2		
1	**Small Hot Water System: Trunk, Branch, and Twig**								
	Loop Heat Losses							**Loop Heat Losses**	
	Natural Gas (therms)	292	146	97	73	49	24	Natural Gas (therms)	3
	Electric (kWh)	6,388	3,194	2,129	1,597	1,065	532	Electric (kWh)	67
	Pump Energy(kWh)	438	219	146	110	73	37	**Pump Energy(kWh)**	8
2	**Medium Hot Water System: Trunk, Branch, and Twig**								
	Loop Heat Losses							**Loop Heat Losses**	
	Natural Gas (therms)	584	292	195	146	97	49	Natural Gas (therms)	6
	Electric (kWh)	12,775	6,388	4,258	3,194	2,129	1,065	Electric (kWh)	133
	Pump Energy(kWh)	438	219	146	110	73	37	**Pump Energy(kWh)**	16

3. The IPC requires that the hot water piping in automatic temperature maintenance systems be insulated with at least 1 inch of pipe insulation. The water in the circulation loop will stay hot for a very long time – 45 minutes for ¾ inch nominal pipe up to 2 hours for 2-inch nominal pipe – if the circulating pump is shut off.
4. If this is the case, why run the pump? Why run the pump when no one is in the building or when no one is demanding hot water? The only time it makes sense to run the pump is shortly before hot water is needed: hence the requirement that the pump be controlled on-demand by one of the mechanisms in the section.

Thank you for considering this proposal.

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

607.2.2 (NEW)-P-KLEIN

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee thought the requirements were overly restrictive and confusing. This material is more appropriate for the IgCC.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gary Klein, Affiliated International Management, LLC, representing self, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

607.2.2 Hot or tempered water recirculation systems. Hot or tempered water recirculation systems shall be provided with a recirculation pump. Gravity and thermo-syphon circulation systems shall be prohibited. Recirculation pumps, recirculation pump controls and temperature sensors for recirculation pump controls shall be provided with access. Recirculation system pump controls shall be in accordance with Section 607.2.2.1 or Section 607.2.2.2.

607.2.2.1 Demand activated pump controls. Demand activated recirculation pump controls shall be provided. Such controls shall start the pump upon sensing the presence of a user of a fixture or appliance, receiving a signal from the action of an action of a user of a fixture or appliance or sensing the flow of hot or tempered water to a fixture or appliance. The controls shall limit the water temperature increase in the return water piping to not more than 10ºF (5.6 ºC) greater than the initial temperature of the water in the return pipe and shall limit the return water temperature to 102ºF (38.9 ºC).

607.2.2.2 Combined timer and water-temperature pump controls. Combined timer and water-temperature activated recirculation pump controls shall be provided. Such controls shall operate the pump not more than 15 minutes in any hour and shall prevent operation of the pump when the temperature set point is reached.

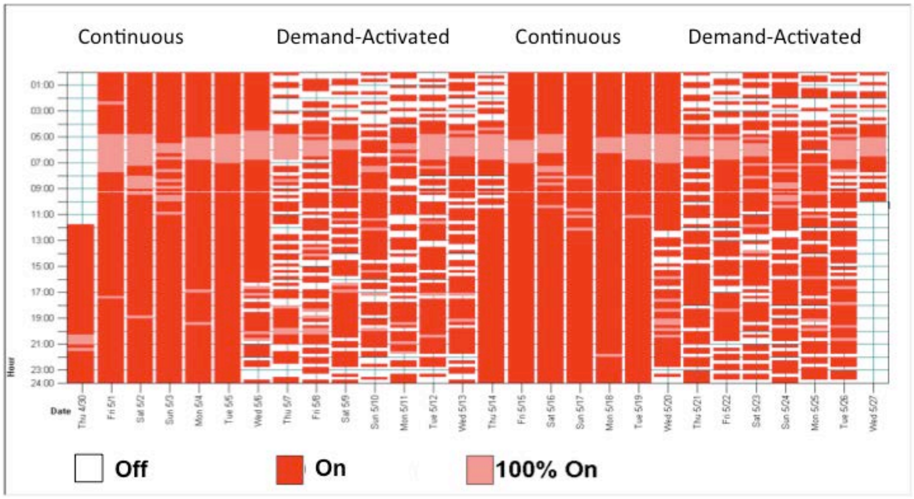
Commenter's Reason: The committee disapproved the original proposal because they "thought the requirements were overly restrictive and confusing." In order to be less restrictive, this comment revises the proposal to include an additional means of controlling recirculation pumps. In order to be less confusing, this comment simplifies the text describing demand activated recirculation pump controls, making it more performance based and less prescriptive.

The additional method of controlling circulation pumps is based on taking advantage of the fact that the IPC requires that recirculation piping be insulated. As discussed in the original reason statement, pipe insulation slows down the rate at which the water in the pipes cools down so that it is not necessary to run the pump continuously to maintain acceptable water temperatures in the loop. The requirements limiting pump operation to not more than 15 minutes in any hour will result in the pump running a maximum of 6 hours a day. Combining the timer with a water-temperature activated control will reduce the run time roughly 50 percent. In many cases the total hours of operation can be reduced still further by setting the timer to more closely match the building's operation schedule. Running the pump significantly fewer hours each day will also reduce the likelihood and rate of internal corrosion of the pipe. It will also reduce wear and tear on the water heater or boiler by reducing their run-time. Both of these factors will increase longevity of the system and reduce operational costs.

Figure 1 shows the differences in run-time at the water heater (or boiler) between a continuously pumped recirculation loop and one that has a demand activated recirculation pump control. The test results come from studies done by Southern California Gas Company on multi-family buildings with central water heaters and recirculation systems. Most systems tested were built before insulation was required on hot water recirculation loops. White means the water heater or boiler was off. Red means some percent of run-time between zero and continuous. Pink means the water heater or boiler was running continuously.

A recirculation pump with a combined timer and water-temperature activated recirculation pump control will have run-times between these two extremes.

Figure 1 Run-time of Water Heater (or Boiler) with Two Different Pump Controls



I urge your support for these changes. Thank you for considering this comment.

P129-12

Final Action: AS AM AMPC____ D

P130-12

607.2.3 (New), 607.2.3.1 (New), 607.2.3.2 (New), 607.2.3.2.1 (New), 607.2..3.2.2 (New), Table 607.2.3.1 (New)

Proposed Change as Submitted

Proponent: Gary Klein, Affiliated International Management, LLC, representing self (gary@aim4sustainability.com); Janine Snyder, Colorado Code Consulting, LLC representing self (janinesnyder@yahoo.com)

Add new text as follows:

607.2.3 Efficient hot and tempered water supply piping. Hot and tempered water supply piping shall comply with either the maximum allowable pipe length or maximum allowable pipe volume methods in this section.

607.2.3.1 Maximum allowable pipe length method. The maximum allowable pipe length from the source of hot or tempered water to the termination of the fixture supply pipe shall be in accordance with the maximum pipe length columns in Table 607.2.3.1. Where the length contains more than one size of pipe, the largest size pipe shall be used for determining the maximum allowable length of the pipe in Table 607.2.3.1.

607.2.3.2 Maximum allowable pipe volume method. The water volume in the piping shall be calculated in accordance with Section 607.2.3.3. The maximum volume of hot or tempered water in the piping to public lavatory faucets, metering or non-metering, shall be 2 ounces (0.06 L). For other fixtures the maximum volume shall be 64 ounces (1.89 L) for hot or tempered water from a water heater or boiler; and 24 ounces (0.7 L) for hot or tempered water from recirculating system or heat-traced piping.

607.2.3.2.1 Water volume determination. The volume shall be the sum of the internal volumes of pipe, fittings, valves, meters and manifolds between the source of hot water and the termination of the fixture supply pipe. The volume shall be determined from the liquid ounces per foot column of Table 607.2.3.1. The volume contained within fixture shut off valves, flexible water supply connectors to a fixture fitting or within a fixture fitting shall not be included in the water volume determination. Where hot or tempered water is supplied by recirculating system or heat-traced piping, the volume shall include the portion of the fitting on the source pipe that supplies water to the fixture.

607.2.3.3 Maximum flow rate. The flow rate of fixtures shall be limited to 0.5 gpm where connected to 1/4 inch piping; to 1 gpm where connected to 5/16 inch piping; and to 1.5 gpm where connected to 3/8 inch piping.

TABLE 607.2.3.1
MAXIMUM LENGTH OF PIPE

NOMINAL PIPE SIZE (INCH)	LIQUID OUNCES PER FOOT OF LENGTH	MAXIMUM PIPE LENGTH		
		SYSTEM WITHOUT A CIRCULATION LOOP OR HEAT TRACED LINE (FEET)	SYSTEM WITH A CIRCULATION LOOP OR HEAT TRACED LINE (FEET)	LAVATORY FAUCETS—PUBLIC (METERING AND NON-METERING) (FEET)
1/4	0.33	50	16	6
5/16	0.5	50	16	4
3/8	0.75	50	16	3
1/2	1.5	43	16	2

NOMINAL PIPE SIZE (INCH)	LIQUID OUNCES PER FOOT OF LENGTH	MAXIMUM PIPE LENGTH		
		SYSTEM WITHOUT A CIRCULATION LOOP OR HEAT TRACED LINE (FEET)	SYSTEM WITH A CIRCULATION LOOP OR HEAT TRACED LINE (FEET)	LAVATORY FAUCETS—PUBLIC (METERING AND NON-METERING) (FEET)
5/8	2	32	12	1
3/4	3	21	8	0.5
7/8	4	16	6	0.5
1	5	13	5	0.5
1 ¼	8	8	3	0.5
1 ½	11	6	2	0.5
2 or larger	18	4	1	0.5

Reason:

1. The 2012 IPC reduced the allowable distance from the source of hot or tempered water to the fixtures from100 to 50 feet. This was an excellent change. However, limiting the length did not get at the real issue, which is the volume from the source to the use, Limiting volume has the effect of limiting pressure losses due to length, reducing the time it takes for hot water to arrive (time-to-tap) and reducing the amount of water wasted while waiting for the hot water (volume-to-hot). Limiting the volume in the hot water supply system piping also has the effect of reducing the energy losses during use and when the water in the pipes eventually cools down.
2. This proposal builds on the 2012 IPC by limiting the volume, while staying within the 50 foot developed length restriction, which is the intent of the proponents.
   a. It is possible for a single pipe to be installed 50 feet long with no fittings in between the source and the fixture; in that case the developed length is the same as the actual length.
   b. When fittings and valves are needed, which is likely, the actual length may need to be reduced to accommodate the extra pressure drop. This is most likely to be necessary for nominal ¼, 5/16 and 3/8 inch pipe in hot water supplies without recirculation system or heat-traced piping, however, it may also be necessary for other diameters too if the fittings and valves create significant restrictions to flow.
3. The core of this proposal was approved at the 2012 IGCC Final Action Hearing in Phoenix. The wording has been revised so that it fits within context of Section 607.2 of the IPC. The footnote has been removed so that the language could be more appropriately worded as a requirement.
   a. The proposal that was approved at the IGCC FAH was revised from the original wording in IGCC Public Version 2. Improvements include clarifying the distinctions between two types of hot water supply systems; those with a recirculation system or heat traced trunk line and those without and providing for a means of compliance without it being necessary to calculate the volume for most applications. This makes it easier for everyone involved.
   b. The table in PV 2 contained ounces per foot of different types of hot or tempered water piping. Based on recommendations from several code officials around the country, the table was revised to
      I Simplify the calculations, when necessary, by averaging the volumes for the different types of piping for each nominal pipe diameter and then rounding off to a simple to use and easy to remember number. The volumes that were averaged were taken from the table in PV 2 and are also contained in Table E 202.1 of the IPC. The revised table is now applicable to all piping materials approved now or in the future for use with hot or tempered water.
      II Include 1/4, 5/16, 5/8 and 7/8 inch nominal diameters. Piping materials are available in these diameters, although they are not widely used. Including them in this table provides values that will enable their use.
      III Limit the maximum fixture flow rate when 1/4, 5/16 and 3/8 inch diameter piping is being used (Section 607.2.3.3). The flow rates in the footnote were selected, using the Hazen-Williams formulas, to keep the velocity below 5 feet per second, which minimizes pressure drop, reduces noise and limits the rate of any internal corrosion. The same formulas were used to limit the pressure drop at these flow rates to no more than 5 psi in the 50 foot lengths of 1/4, 5/16 and 3/8 inch diameter piping; the pressure drop will be much less in the shorter lengths in the other columns.
      IV Limit the length of the small diameter tubing (1/4 – 1/2 inch inclusive) at 50 feet in hot water supply piping without recirculation systems or heat-traced lines. This correlates with the changes adopted in the 2012 IPC. Another reason for not using the 64-ounce volume allowance in small tubing is that otherwise the maximum length of 5/16 inch tubing could be 128 feet and 1/4 inch tubing could be 192 feet! Pressure loss at these lengths would be excessive and unacceptable, as would heat loss. In addition, limiting length to 50 feet reduces the time-to-tap and the amount of water wasted while waiting for hot water to arrive, thereby improving performance for the user as well as water and energy waste.
      V Limit the length of the small diameter tubing (1/4 – 1/2 inch inclusive) at 16 feet in hot water supply piping with recirculation systems or heat-traced lines. The purpose of the circulation loop or heat-traced line is to bring the source of hot water close (in volume) to the fixtures, thereby reducing the time-to-tap and the waste of water and energy. Given typical floor-to-ceiling heights in the occupancies covered by this code, it is possible to reach the angle stop of a lavatory or a tub-shower valve with 16 feet of pipe coming down the wall from a recirculation system in the ceiling. Additionally, limiting the length of the smaller diameter tubing will improve the time-to-tap for the lower flow rate fixtures the tubing is intended to serve.

VI Limit the length serving lavatory faucets – public (metering and non-metering) in all hot water supply systems. These are the faucets where we wait a very long time for hot water to arrive – or we give up! Lavatory faucets are generally used for very short periods of time and hot water needs to arrive very quickly for it to be useful. Since the flow rates are so low, it is critical that there be very little volume between the source of hot water and these faucets. I know that 2 ounces, and the corresponding feet are very small, but if we do this, hot water will arrive in less than 5 seconds after we turn on the faucet. And, there are several cost effective, energy efficient ways to meet this requirement.

VII It is the intent of the proponents that either the maximum allowable volume or maximum allowable length method be allowed in any occupancy.

VII It is also the intent of the proponents that the contents of this section apply to all occupancies.

4. Adopting this proposal will improve the performance of hot water distribution systems by:
   a. Helping to ensure that the pressure drop from the source of hot water to the fixtures is not excessive.
   b. Reducing the time it takes to get hot water after opening a tap. This is particularly important for lavatory faucets-public, which, in accordance with Federal law that has been in effect since the mid-1990s, are required to have flow rates no larger than 0.5 gallons per minute (non-metering) or 0.25 gallons per cycle (metering).
   c. Reducing the waste of water while waiting for hot water to arrive.
   d. Reducing the energy losses during delivery, use and cool down phases of all hot water events.
5. We urge your support for this proposal. Thank you.

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

The 2012 IPC limits the distance from the source of hot water to the use to no more than 50 feet of developed length. There is no limit on the volume in this length of pipe. (By way of reference, the 2009 IPC had a limit of 100 feet and no limit on the volume, so the 2012 IPC is an improvement over 2009.)

This code change minimizes the volume in the piping between the source of hot water and the uses. It has the effect of eliminating long, large volume pipe runs resulting in sizable material and labor savings.

In most cases, reducing the volume between the sources of hot water and the fixtures will reduce costs. There are generally many more branches, and particularly fixture branches, than there are trunk lines, recirculation system or heat-traced piping in a building. Getting the source closer to the use reduces the number of feet in each of these branches and it will also reduce the diameter: both of these reduce costs of the hot water supply piping as well as any insulation that is required. In some cases it will be necessary to increase the length of the trunk or recirculation system piping to get closer to the fixtures. In others the architect and engineers will decide to locate the hot water uses more centrally: this will reduce the costs of the hot water, the cold water, the drain lines and any required insulation too!

There are two primary cases to be considered: (1) when the source of hot water is a water heater or boiler and (2) when the source of hot water is recirculation system or heat-traced piping.

Assuming that there is a bathroom group at the end of the 50 feet of length, it would be very common to see a 1-inch pipe, either from a water heater or from a circulation loop in any occupancy. This pipe contains approximately 2 gallons. In order for hot water to get to the bathroom group a minimum of 2 gallons will run down the drain before the hot water arrives. In practice, we observe 3-4 gallons will run down the drain. (If the pipe were 3/4-inch nominal, the volume would be closer to 1.25 gallons and the typical waste would range from 1.25 to 2.5 gallons. However, if someone decided to use a 1.5-inch branch line to the bathroom group, the volume in the pipe would be more than 4.25 gallons and the waste would range from 4.25 to more than 8 gallons.)

Based on the above example, it is reasonable to assume that the amount of water currently wasted while waiting for hot water to arrive ranges from 1 gallon (128 ounces) to more than 4 gallons (512 ounces), the savings from a water heater will range from 50% ((128-64)/128) for a branch from a water heater to the use to 95% ((512-24)/512) for a branch from recirculation system or heat-traced piping to the use.

In addition to lower first costs, there are significant savings in water, energy and time. All of this water came through the water heater, so there is energy attached to it. There is also energy lost as the hot water moves from the source to the use, even if it is insulated. If the hot water is on an upper story, there is energy expended in lifting it to that floor. In addition, there is energy embedded in the cold water that came to the building and to the water that is taken away for wastewater treatment.

607.2.3 (NEW)-P-KLEIN-SNYDER

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee thought that the volume limitations were too restrictive and unrealistic to apply to all buildings.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gary Klein, Affiliated International Management, LLC, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

607.2.3 Efficient hot and tempered water supply piping. Hot and tempered water supply piping shall be in accordance with Section 607.2.3.1 or Section 607.2.3.2. ~~comply with either the maximum allowable pipe length or maximum allowable pipe volume methods in this section.~~ The flow rate through ¼ inch piping shall not exceed 0.5 gpm (1.9 Lpm). The flow rate through 3/8 inch piping shall not exceed 1 gpm (3.8 Lpm). The flow rate through 5/16 inch piping shall not exceed 1.5 gpm (5.7 Lpm).

607.2.3.1 Maximum allowable pipe length method. The maximum allowable ~~pipe~~ piping length from the source of hot or tempered water to the termination of the fixture supply pipe shall be in accordance with the maximum ~~pipe~~ piping length column~~s~~ in Table 607.2.3.1. Where the ~~length~~ piping contains more than one size of pipe, the largest size of pipe within the piping shall be used for determining the maximum allowable length of the ~~pipe~~ piping in Table 607.2.3.1

607.2.3.2 Maximum allowable pipe volume method. The water volume in the piping shall be calculated in accordance with Section 607.2.3.~~3.~~2.1 The maximum volume of hot or tempered water in the piping ~~to~~ serving public lavatory faucets, metering or non-metering, shall be 2 ounces (0.06 L). For other fixtures, fixture supply fittings and appliances the maximum volume shall be 64 ounces (1.89 L) where the source of ~~for~~ hot or tempered water ~~from~~ is a water heater or boiler; and 24 ounces (0.7 L) where the source of ~~for~~ hot or tempered water ~~from~~ is a recirculating system or heat-traced piping.

607.2.3.2.1 Water volume determination. The volume shall be the sum of the internal volumes of pipe, fittings, valves, meters and manifolds between the source of hot or tempered water and the termination of the fixture supply pipe. The volume in the piping shall be determined from the ~~liquid ounces per foot~~ volume column ~~of~~ in Table 607.2.3.1. The volume contained within fixture shut off valves, within flexible water supply connectors to a fixture fitting ~~or~~ and within a fixture fitting shall not be included in the water volume determination. Where hot or tempered water is supplied by a recirculating system or heat-traced piping, the volume shall include the portion of the fitting on the source pipe that supplies water to the fixture.

~~**607.2.3.3 Maximum flow rate.** The flow rate of fixtures shall be limited to 0.5 gpm when connected to 1/4 inch piping; to 1 gpm when connected to 5/16 inch piping; and to 1.5 gpm when connected to 3/8 inch piping.~~

TABLE 607.2.3.1
PIPING VOLUME AND MAXIMUM PIPING LENGTHS ~~OF PIPE~~

NOMINAL PIPE SIZE (inch)	VOLUME (liquid ounces per foot length)	MAXIMUM ~~pipe~~ PIPING LENGTH ~~(feet)~~		
		WATER FROM A WATER HEATER OR BOILER ~~System without a Circulation Loop or Heat Traced Line (feet)~~	WATER FROM A RECIRCULATION LOOP OR HEAT TRACED PIPE ~~System with a Circulation Loop or Heat Traced Line (feet)~~	LAVATORY FAUCETS—PUBLIC ~~(metering and non-metering) (feet)~~
1/4	0.33	50	50 ~~16~~	6
5/16	0.5	50	48 ~~16~~	4
3/8	0.75	50	32 ~~16~~	3
1/2	1.5	43	16	2
5/8	2	32	12	1
3/4	3	21	8	0.5
7/8	4	16	6	0.5
1	5	13	5	0.5
1 ¼	8	8	3	0.5
1 ½	11	6	2	0.5
2 or larger	18	4	1	0.5

Commenter's Reason: As an I-code, the IPC specifies minimally acceptable requirements for plumbing. Delivery of hot water to a user in a timely manner is one measure of plumbing performance. The American Society of Plumbing Engineers (ASPE) specifies the delivery of hot water to the user in 10 seconds or less as "acceptable performance", delivery of hot water to the user in 30 seconds or less as "marginal performance", and delivery of hot water in more than 30 seconds as "unacceptable performance".

Implementing this proposal will improve health and safety by correlating the IPC with local health codes and with good plumbing engineering and plumbing practice. It will also result in satisfied users, including those in areas with low water pressure.

The core of this proposal is to make sure the volume of water in the pipes, which must be cleared out before hot water can be delivered, does not prevent the delivery of hot water in a timely manner. If you agree that delivery of hot water should be at least "marginally acceptable" in terms of time-to-tap, then you need to support this proposal.

Supporting Information:

The following documents the values in this proposal and demonstrates the response to the committee's comments. The committee disapproved P130 because the "volume limitations were too restrictive and unrealistic to apply to all buildings." In response, this comment increases the lengths for smaller diameter branches from circulation loops or heat-traced lines. It also improves the readability of the code text.

Why implementing the 2012 IPC often results in "Unacceptable Performance"

The 2012 IPC allows for 50 feet of developed length – of any diameter –from the source of hot or tempered water to the fixtures. However, the delivery of hot water is a question of volume (length and diameter) between the source and the uses and flow rate of the use. At current legal flow rates for faucets, showers and many appliances, 50 feet of piping contains more water than can be cleared out in the Marginally Acceptable time of 30 seconds or less, let alone the Acceptable Performance time of 10 seconds or less.

We are all familiar with the problem of waiting for hot water to arrive. When it takes too long at hand washing sinks, many of us just give up and use whatever temperature comes out. When it takes too long at a shower, we watch the water run down the drain until the water is hot enough to use. When it takes too long in public restrooms or at hand washing sinks in food service establishments, it becomes a concern for our public health code colleagues.

Providing hot or tempered water to public lavatory faucets is a special case, and the reason we have called it out in this proposal. The time-to-tap is particularly important for hand washing events, which tend to be of very short duration, generally 5-10 seconds long. Large volume in the fixture supply piping, low flow rates and short events result in it taking a very long time for the water to get warm. Correcting this requires keeping the volume small enough so that hot water arrives in a timely fashion when only one faucet with a maximum fixture fitting flow rate of 0.5 gpm or a maximum volume per cycle of 0.25 gallons is being used. Having even Marginally Acceptable performance requires piping lengths much less than 50 feet long.

Can a volume limit be applied to all buildings?

Yes. The specifics have to do with the configuration of the hot water system within the building. There are three typical configurations for a hot water system: a central water heater (or boiler) with trunks and branches serving each use or group of uses; a central water heater (or boiler) with a circulation loop or heat traced trunk line and branches to each use; distributed water heaters (or boilers) located close to the uses they serve. Buildings can have one or a combination of these systems as long as the 2012 IPC requirement of no more than 50 feet of developed length on any path from the source to the use is met.

The volume limitations in this proposal work in any building. Buildings with vertical risers will be able to comply by locating the fixture fittings and appliances close to a circulated riser; this should not be a problem as they are relatively close already. Buildings with a central corridor circulation loop will be able to comply by locating the hot water fixture fittings and appliances closer to the corridor or by moving the loop closer to the fixture fittings and appliances. Buildings with public lavatories can meet the volume and length limits in this proposal in several ways including bringing circulation loops closer to the faucets, priming the branch lines that run behind the wall when people enter the lavatory, heat tracing the branch lines or installing water heaters in the bathroom or under the sinks.

In some buildings, no changes to architectural design will be needed – it will only be necessary to design and install the plumbing to meet the new code. In other buildings changes in the architectural design will be needed so that the hot water system will meet the new code. It is likely that we will see more buildings with combinations of hot water delivery systems. Based on my experience with improving the performance of hot water systems throughout the US, costs for additional water heaters or for somewhat longer circulation loops and heat traced trunk lines will be more than offset by the savings in smaller diameter trunk lines and in shorter branches that are often of smaller diameter because their length is smaller too.

What should be the maximum allowable volume?

Implementing the IPC should result in at least marginally acceptable performance at legal flow rates, in all occupancies, even in areas with low water pressure. The American Society of Plumbing Engineers (ASPE) has established performance criteria for the timely delivery of hot or tempered water (Domestic Water Heating Design Manual – 2nd Edition, ASPE, 2003, page 234). Table 1, taken from text in ASPE's manual presents the time-to-tap performance criteria. According to this table, 30 seconds is the maximum amount of time to have Marginal Performance. Anything longer is unacceptable.

Table 1 ASPE Performance Criteria for Hot Water Delivery (Look for the color key in the rest of this comment.)

	Acceptable Performance	1 – 10 seconds
	Marginal Performance	11 – 30 seconds
	Unacceptable Performance	31+ seconds

So how much water is contained the IPC allowable limit of 50 feet of developed pipe length? Will clearing out this volume of water result in at least marginally acceptable performance? Table 2 shows the volume contained in 50 feet of pipe for nominal diameters up to 4 inches. (I realize that 50 feet of developed length is almost always shorter than 50 feet of pipe, but for simplicity, I have used 50 feet in the table.)

Let's look at a few examples: 50 feet of ¾ inch tubing contains 1.2 gallons, 50 feet of 1 inch contains just under 2 gallons, 50 feet of 2 inch contains 7 gallons and 50 feet of 4 inch contains more than 28 gallons. This is the minimum volume that must be cleared out of the pipe before hot water will get from the source to the use. (Based on research conducted by the California Energy Commission, the actual volume that will come out before hot water arrives is more than volume contained in the pipe. In ¾ inch nominal pipe, approximately 25 percent more water will come out at 2 gpm; 50 percent more will come out at 1 gpm and 100 percent more will come out at 0.5 gpm. The amount of additional water that comes out gets larger as the pipe diameter increases.)

Table 2 also shows the consequences of the volume in terms of the time-to-tap for flow rates of 2, 1 and 0.5 gpm. This range of flow rates is typical of showers, sinks and public lavatory faucets. Near the top of the table, the minimum time to clear out the cold water in the pipe is shown in seconds, further down it is shown in minutes. (NA is shown when we considered the flow rate to be excessive for the pipe diameter – either too much pressure drop or excessive velocity, or both – based on an analysis using the Hazen-Williams formula.)

The time-to-tap is particularly important for hand washing events in public lavatories, which tend to be of very short duration. It becomes essential to keep the volume from the source to the use very small when the fixture fitting flow rate is only 0.5 gpm. Looking at the row for ½ inch nominal tubing in Table 2, the minimum time to clear out the cold water would be 1.2 minutes. Assuming that each hot water draw lasts 5 seconds, and that all draws happen right after each other, the 15th user would get hot water. If the branch line were larger, say ¾ inch, the minimum time increases to 2.3 minutes and the 28th user would get hot water. If the branch line was 1 inch, the minimum time increases to 3.9 minutes and the 47th user would get hot water.

None of the times shown in Table 2 are within the Acceptable Performance range. This means that if plumbers or plumbing engineers design a hot water system to meet the minimum 2012 IPC, without also paying attention to the volume in the piping it will most often result in Unacceptable Performance. The best they can get is Marginal Performance in a limited number of cases.

Table 2 Volume in 50 feet of pipe of different nominal diameters. (This helps explain why it takes too long to get hot water in so many buildings.)

 = 1 gallon of water

Nominal Pipe Size (inch)	Volume in the Pipe (gallons)	Time Until Hot Water Arrives At Selected Flow Rates (minutes unless noted) 2 gpm	1 gpm	0.5 gpm
1/4	0.13	NA	NA	15 sec
5/16	0.20	NA	12 sec	23 sec
3/8	0.29	NA	18 sec	35 sec
1/2	0.59	15 sec	35 sec	1.2
5/8	0.78	20 sec	47 sec	1.6
3/4	1.2	29 sec	1.2	2.3
7/8	1.6	39 sec	1.6	3.1
1	2.0	49 sec	2	3.9
1 1/4	3.1	1.6	3.1	6.3
1 1/2	4.3	2.1	4.3	8.6
2	7.0	3.5	7	14
2 1/2	12.5	6.3	13	25
3	17.2	8.6	17	34
4	28.1	14	28	56

Table 3 compares the time-to-tap performance different volumes that are being discussed at this Final Action Hearing. The flow rates in the table are typical of faucets and showerheads, and many appliances such as dishwashers and washing machines.

Table 3 Time-to-Tap Performances of Different Volumes in the Piping from the Source to the Use

Volume in the Pipe (ounces)	Minimum Time-to-Tap (seconds) at Selected Flow Rates					
	0.25 gpm	0.5 gpm	1 gpm	1.5 gpm	2 gpm	2.5 gpm
24	45	23	11	8	6	5
64	120	60	30	20	15	12
75	141	70	35	23	18	14
300	563	281	141	94	70	56

Using ASPE's criteria, only 3 data points in Table 3 have Acceptable Performance; 9 have Marginal Performance; all the rest have Unacceptable Performance. None of the volumes have Acceptable Performance for the low flow rates (0.5 gpm and smaller) found in public lavatory faucets. In addition, the Performance times shown in the 0.25 and 0.5 gpm columns are longer than the actual event itself, which is often only 5-10 seconds long. To make any sense at all, hot water must reach the faucet before the event is over, which is why there is a separate volume requirement in this proposal for the fixture fittings with these flow rates that are found in public lavatories.

We need to assess the performance when flow rates are between 1 and 1.5 gpm, not the maximum values of 2.2 and 2.5 gpm allowed by code for faucets and showers respectively. Why? One reason is that the flow rates of faucets and showers are rated at pressures of 60 and 80 psi respectively. In practice, operating pressures are often less than the rated pressure and the actual flow rate is less than the rated flow rate. In addition, hot water is only a portion of the total flow rate. The reduction in flow rate is most noticeable in areas with low water pressure to begin with. Another reason is that studies done in Indiana, California and Minnesota have found that even when full flow rate faucets and showers had been installed, the hot water portion of the flow was most often between 1 and 1.5 gpm. In this range of flow rates, the 300-ounce volume has Unacceptable Performance. The 75-ounce volume has both Unacceptable and Marginal Performance. The 64-ounce volume has Marginal Performance. The 24-ounce volume has both Marginal and Acceptable Performance. I believe the IPC should provide at least marginally acceptable performance at typical flow rates for all areas in the jurisdiction, including those with low pressure.

The delivery of hot water to public lavatory faucets needs to be considered separately because of potential health issues. The events are short and the flow rates are low. Table 4 shows the time-to-tap performance based on the requirements in the proposal. The 0.25 and 0.5 gpm columns show that even at very low flow rates this volume will result in Acceptable Performance according to ASPE criteria. Given the short amount of time people spend washing their hands in public restrooms, it does not make sense to Marginal Performance category for determining the volume from the source to the use for public lavatory faucets. The volume was chosen so that hot water would arrive in the first part of the hot water event so that <u>every</u> person who uses the public lavatory will have the benefits of hot water.

Table 4 Time-to-Tap Performance when the Volume in the Piping from the Source to the Use is 2 ounces

Volume in the Pipe (ounces)	Minimum Time-to-Tap (seconds) at Selected Flow Rates					
	0.25 gpm	0.5 gpm	1 gpm	1.5 gpm	2 gpm	2.5 gpm
2	3.8	1.9	0.9	0.6	0.5	0.4

Now to the decision:

The provisions in the 2012 IPC (and previous versions), which only limit the feet, do not give guidance on the volume and as we have shown, often as not result in Unacceptable Performance. Unfortunately, many of us have experienced this! In contrast, this proposal contains the provisions necessary to support the correlation of the plumbing and health codes with good plumbing engineering design and plumbing installation practice.

There are 3 key questions that we are asking you to answer:

1. Do you want the IPC to support the provisions in local health codes to supply hot or tempered water for hand washing for <u>every</u> user of public lavatory faucets?
2. Do you want the IPC to support the ability of plumbers and plumbing engineers to provide hot water within 30 seconds after opening the tap; this is the <u>Acceptable and Marginal Performance</u> ranges as defined the American Society of Plumbing Engineers. (See the arrows next to Tables 3 and 4.)
3. Do you want the IPC to provide these levels of performance in all parts of your jurisdiction, including those with low water pressure?

If so, please support this comment,

Thank you for considering this comment.

P130-12
Final Action: AS AM AMPC____ D

P131-12
607.3, 607.3.1, 607.3.2

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

607.3 Thermal expansion control. ~~A means of controlling increased pressure caused by thermal expansion shall be provided where required in accordance with Sections 607.3.1 and 607.3.2.~~ Where a storage water heater is supplied with cold water that passes through a check valve, pressure reducing valve or backflow preventer, a thermal expansion tank shall be connected to the water heater cold water supply pipe at a point that is downstream of all check valves, pressure reducing valves and backflow preventers. Thermal expansion tanks shall be sized in accordance with the tank manufacturer's instructions and shall be sized such that the pressure in the water distribution system shall not exceed that required by Section 604.8.

~~**607.3.1 Pressure-reducing valve.** For water service system sizes up to and including 2 inches (51 mm), a device for controlling pressure shall be installed where, because of thermal expansion, the pressure on the downstream side of a pressure-reducing valve exceeds the pressure-reducing valve setting.~~

~~**607.3.2 Backflow prevention device or check valve.** Where a backflow prevention device, check valve or other device is installed on a water supply system utilizing storage water heating equipment such that thermal expansion causes an increase in pressure, a device for controlling pressure shall be installed.~~

Reason: Any time there is a pressure reducing device, a check valve or a backflow preventer in the cold water piping to a storage-type water heater, a means to compensate for thermal expansion must be installed. This is typically accomplished with an expansion tank. Other methods for relieving thermal expansion pressure, such additional relief valves, waste water for the life of the system. Thermal expansion tanks are required by most storage water heater manufacturers to protect the water heater. Expansion tank manufacturers typically size their tanks so that the water distribution system pressure will remain just shy of the pressure required to open a 150 psi water heater relief valve. This will allow the system pressure to exceed the maximum pressure intended by Section 604.8, which is unacceptable.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

607.3-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gary Kozan, CPD, Ridgeway Plumbing, requests Disapproval.

Commenter's Reason: This ill-conceived proposal will require a thermal expansion tank at every water heater, eliminating all other options for controlling increased pressure caused by thermal expansion. The outcome would be expensive, overly-restrictive, and usually unnecessary.

The effect of thermal expansion on overall system pressure depends upon temperature rise, recovery rate, fixture usage, and volume of piping. In temperate climates, for example, water heaters typically recover only 30 – 50 degrees of temperature rise. Often, the amount of "expanded water" is insufficient to elevate the pressure above the code-induced limit of 80 psi. For such applications, a pressure relief valve affords adequate protection at less cost with no water wasted.

This is also the case in multi-family systems, where the brief operation of any plumbing fixture or appliance at any time anywhere in the building instantly dissipates any pressure buildup. The piping system never reaches 80 psi. This has been confirmed time and again in the field with a lazy-hand pressure gauge. A single pressure relief valve set for 80 psi, installed on the incoming water service, will "protect" the entire system without discharging a single drop of water.

Approval of this proposal will require football-sized thermal expansion tanks to be installed at every water heater in a multi-family building. This is pointless as well as impractical, with water heaters already being crammed into A/C closets.

The proponent's reasoning contains many false or misleading statements. Relief valves do not *"waste water for the life of the system."* Thermal expansion tanks are not *"required"* by most water heater manufacturers. Expansion tank manufacturers do not size their tanks so that the pressure will remain *"just shy of . . . 150 psi"*. And contrary to the proponent's statement, this proposal will have a significant cost impact as expensive expansion tanks are installed at every water heater.

Designers and contractors desire the flexibility to address thermal expansion by the most appropriate and economical means. The current code language provides choices; this proposal does not. I strongly urge DISAPPROVAL.

P131-12

Final Action: AS AM AMPC____ D

P135 – 12
608.8, 608.8.1

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

608.8 Identification of nonpotable water systems. Where *nonpotable* water systems are installed, the piping conveying the nonpotable water shall be identified either by color marking or metal tags in accordance with Sections 608.8.1 through 608.8.~~3~~2.

608.8.1 Signage Required. All nonpotable water outlets such as hose connections, open ended pipes, and faucets shall be identified ~~at the point of use for each outlet with the words, "Nonpotable-not safe for drinking~~ ." with signage that reads as follows: "Non-potable water is utilized for [application name]. Caution: non-potable water. DO NOT DRINK."The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inches in height and in colors in contrast to the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure 608.8.1 shall appear on the signage required by this section.

608.8.~~1~~2 ~~Information~~. Distribution Pipe Labeling and Marking. Non-potable distribution piping shall be of the color purple and shall be embossed or integrally stamped or marked with the words: "CAUTION: NONPOTABLE WATER – DO NOT DRINK" or shall be installed with a purple identification tape or wrap. Pipe identification shall include the contents of the piping system and an arrow indicating the direction of flow. Hazardous piping systems shall also contain information addressing the nature of the hazard. Pipe identification shall be repeated at intervals not exceeding 25 feet (7620 mm) and at each point where the piping passes through a wall, floor or roof. Lettering shall be readily observable within the room or space where the piping is located.

608.8.2.1 Color. The color of the pipe identification shall be discernable and consistent throughout the building. The color purple shall be used to identify reclaimed, rain and gray water distribution systems.

608.8.2.2 Lettering Size. The size of the background color field and lettering shall comply with Table 608.8.2.2.

608.8.2.3 Identification Tape. Where used, identification tape shall be at least 3 inches wide and have white or black lettering on purple field stating "CAUTION: NON-POTABLE WATER – DO NOT DRINK". Identification tape shall be installed on top of non-potable rainwater distribution pipes, fastened at least every 10 feet to each pipe length and run continuously the entire length of the pipe.

Table 608.8.2.2

SIZE OF PIPE IDENTIFICATION

PIPE DIAMETER (inches)	LENGTH BACKGROUND COLOR FIELD (inches)	SIZE OF LETTERS (inches)
$^3/_4$ to $1^1/_4$	8	0.5
$1^1/_2$ to 2	8	0.75
$2^1/_2$ to 6	12	1.25
8 to 10	24	2.5
over 10	32	3.5

For SI 1 inch = 25.4 mm.

Figure 706.2 Pictograph – DO NOT DRINK

Figure 608.1.1 Pictograph – DO NOT DRINK

Reason: Water distribution systems of other than potable water are being installed in buildings and the code needs to require marking of the piping and signage for the outlets for safety reasons. The basis for this new language is text from the IgCC and is written to be in alignment with the IgCC requirements.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The coloring requirements for nonpotable water piping should be expanded to differentiate between the different types of nonpotable water as each has different quality levels. Identification tape is mentioned in the last section of the proposal but the first section says that only color marking or metal tags shall be used. This needs corrected.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Approved as Submitted and a public comment was submitted.

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

608.8 Identification of nonpotable water systems. Where *nonpotable* water systems are installed, the piping conveying the nonpotable water shall be identified either by color marking ~~or~~ ,metal tags or tape in accordance with Sections 608.8.1 through 608.8.~~3~~2.

Remainder of proposal is unchanged.

Commenter's Reason: At the suggestion of the committee, the proposal was modified to add "tape" to Section 608.8 as one of the ways that piping could be identified because Section 608.8.2.3 Identification tape, specifies that piping can be identified with tape.

With respect to the committee's comment about that the color identification of different nonpotable waters should differ and not just all be identified with the color purple: One of the basic purposes of the IPC is to protect the potable water supply from contamination by nonpotable water supplies. Having various nonpotable water supplies differently colored does not provide for any increase in safety of the potable water supply. The water industry as a whole has been struggling for some time with the issue of colors of piping carrying various nonpotable waters and has yet to come to any conclusion for a variety of reasons (not enough available colors, consensus issues). The IPC only needs to be concerned about keeping water potable-all other waters are nonpotable and where color is used for identification, purple is the only color that is currently widely recognized as indicating nonpotable water. There is no need at this time for the IPC to try to break new ground to establish a color identification system for nonpotable waters, especially in the public comment phase of the code change process.

P135-12
Final Action: AS AM AMPC____ D

P139-12
608.13.6

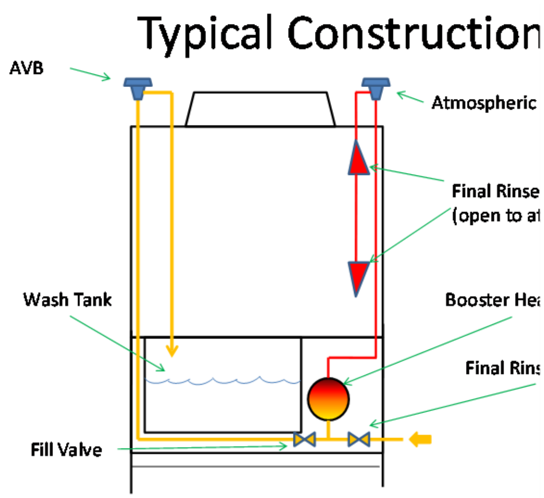
Proposed Change as Submitted

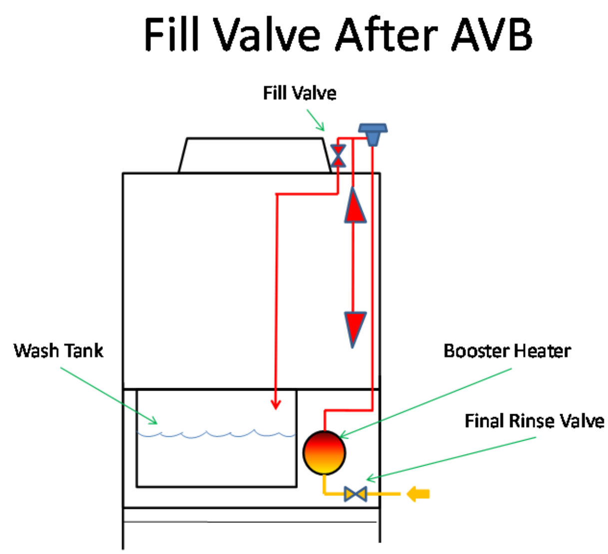
Proponent: Joel F. Hipp, Hobart Corporation representing Hobart Corporation (joel.hipp@hobartcorp.com)

Revise as follows:

608.13.6 Atmospheric-type vacuum breakers. Pipe applied atmospheric-type vacuum breakers shall conform to ASSE 1001 or CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, CSA B64.2.2 or CSA B64.7. These devices shall operate under normal atmospheric pressure when the critical level is installed at the required height. <u>The outlet of a pipe applied atmospheric vacuum breaker shall not have a valve downstream except where there are multiple outlets where not less than one outlet is continuously open to atmosphere.</u>

Reason: Commentary for paragraph 608.13.6 of the 2006 IPC states, “The outlet of atmospheric vacuum breakers must remain open to the atmosphere by terminating with a pipe, spout or similar unobstructed opening. Valves must not be installed downstream of this device because this would subject the device to supply pressure, thereby rendering it inoperative.” However, when designed properly, a valve can be located downstream from the AVB. The following figures illustrate this on a commercial dishwasher application.





Even though the fill valve is downstream from the atmospheric vacuum breaker, the “TEE” between the two allows pressure to remain atmospheric at all times. Although the commentary is not a substitute for the code, it is often interpreted and enforced as code language. For this reason we urge the committee to add the wording as proposed.

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

608.13.6-P-HIPP

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The change violates the standard as it would rely on a human to leave a valve open.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Joel Hipp representing Hobart, Div. ITW Food Equipment Group, LLC, requests Approval as Submitted.

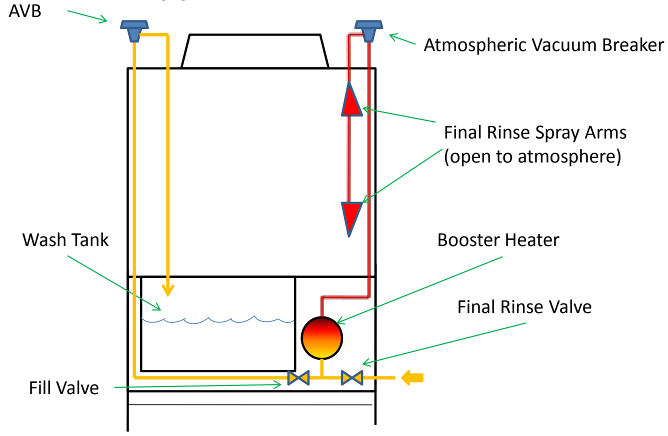
Commenter's Reason: The committee action for this issue was "DISAPPROVED" with the committee reason that "the change violates the standard as it would rely on a human to leave a valve open." When this issue was presented at the public hearing, there were no questions from the committee regarding the operation of the valve that could be located downstream from the AVB. However, after the public testimony, a committee member made the statement that he did not approve of the change because it "depended upon an operator to ensure a manual valve was open". This statement is not accurate and there was no opportunity for the presenter to explain the fact that the proposed wording requires the AVB to be open to atmosphere regardless of the position of the downstream valve.

Furthermore, a member of the assembly who claimed to be representing ASSE stated that ASSE was opposed to the proposed change. The individual did not provide any rationale for this dissention. A formal request for interpretation was submitted to ASSE and the official response is pending at the time of this writing. However, preliminary indications are that the proposed modification does indeed meet the intent of ASSE standard 1001 for atmospheric backflow preventers. The formal response from ASSE should be available by the start of the Final Action Hearings.

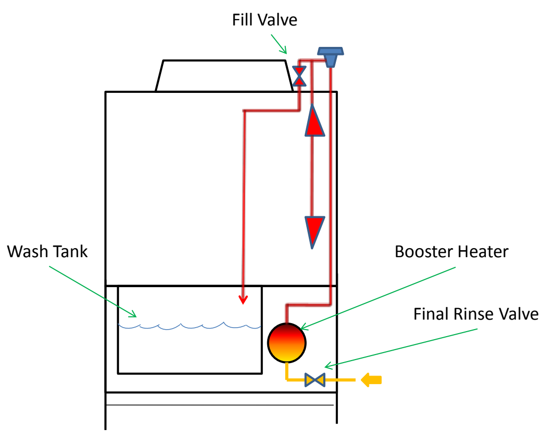
The basic premise of this proposed change is that there is more than one way to meet a requirement in the Code. The current wording of the Code is design restrictive in that it prescribes the method of meeting the objective rather than simply stating the objective itself. The intent of this code section is to ensure the AVB never has backpressure applied to it. The illustrations provided show that a valve can be located downstream of the AVB and still provide proper atmospheric venting to the device, without reliance on human intervention.

This plumbing configuration has been evaluated by NSF International and Certified as meeting the intent of the requirements on a commercial dishwasher application. A copy of the NSF email is attached. Also attached please find an ICC opinion from 2011 that states the design meets the intent of the Code. This design has been evaluated by many plumbing inspectors in end-use applications with the same conclusion. Not approving this proposal would be taking a step backwards in the evolution of innovative plumbing solutions.

Typical Construction



Fill Valve After AVB



P139-12
Final Action: AS AM AMPC____ D

P142-12
608.13.10 (New)

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Add new text as follows:

608.13.10 Dual check valve backflow preventer. Dual check valve backflow preventers shall conform to ASSE 1024 or CSA B64.6.

Reason: Table 608.1 lists ASSE 1024, CSA B64.6 (dual check valves) but currently there is no code text associated with these devices. This new section is added to correct this problem.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

608.13.10 (NEW)-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

608.13.10 Dual check ~~valve~~ backflow preventer. Dual check ~~valve~~ backflow preventers shall conform to ASSE 1024 or CSA B64.6.

Committee Reason: The modification was made to correct the name of the device to be inline with the title of the standard. The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Submitted.

Commenter's Reason: The committee modification to remove the word valve from the language so that the language matched the title of the ASSE standard was incorrect. The title of ASSE 1024 is "Performance Requirements for Dual Check Valve Type Backflow Preventers". The word valve is appropriate to be in the code language.

P142-12
Final Action: AS AM AMPC____ D

P145 – 12
608.15.4.3 (New)

<u>Proposed Change as Submitted</u>

Proponent: Bob Scott, Kye Lehr and Robert Gallegos, Colorado Department of Regulatory Agencies, Division of Registrations Electrical and Plumbing Boards

Add new text as follows:

<u>**608.15.4.3 Urinal Flushometers.** Integral vacuum breakers for urinal flushometers shall be located with the critical level located not less than 6 inches (152 mm) above the highest portion of the fixture.</u>

Reason: This added verbiage will remove confusion on installation of flushometers on urinals where the critical level must be a located at least 6 inches above the top of the fixture.

Cost Impact: None.

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The change accurately depicts the flood level rim of the urinal because of the integral piping that goes all through the china or plastic of the fixture. The flood level rim is just not the lip of the urinal but is all the way to the top of the urinal.

Assembly Action: **Disapproved**

<u>Individual Consideration Agenda</u>

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Disapproved.

P145-12
Final Action: AS AM AMPC____ D

P147-12
610.1

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

610.1 General. New ~~or repaired~~ potable water systems shall be purged of deleterious matter and disinfected prior to utilization. The method to be followed shall be that prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in either AWWA C651 or AWWA C652, or as described in this section. This requirement shall apply to "on-site" or "in-plant" fabrication of a system or to a modular portion of a system.

1. The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.
2. The system or part thereof shall be filled with a water/chlorine solution containing not less than 50 parts per million (50 mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water/chlorine solution containing not less than 200 parts per million (200 mg/L) of chlorine and allowed to stand for 3 hours.
3. Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.
4. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.

Reason: The current language seems to suggest that anytime a general repair is made to a potable water system that the entire system must then be disinfected. For example, one riser valve in a 35 story high rise is repaired or replaced. Is it the intent of the code to then require the entire potable water system to be disinfected? Repairs should not trigger the need for disinfection of an entire water system.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

610.1-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Repairs are sometimes not permitted. It would be too costly and too interruptive to perform a system disinfection each time a repair is made.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.3.4 Disinfection of system. After construction ~~or major repair~~, the individual water supply system shall be purged of deleterious matter and disinfected in accordance with Section 610.

Remainder of proposal is unchanged.

Commenter's Reason: After the public hearing, it was realized that the approved proposal created a conflict with Section 602.3.4. This public comment corrects the conflict.

P147-12

Final Action: AS AM AMPC____ D

P152-12
701.7

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing self (JBEngineer@aol.com)

Delete without substitution:

~~**701.7 Connections.** Direct connection of a steam exhaust, blowoff or drip pipe shall not be made with the building drainage system. Waste water where discharged into the building drainage system shall be at a temperature not greater than 140°F (60°C). Where higher temperatures exist, *approved* cooling methods shall be provided.~~

Reason: This section was added to be consistent with Section 803.1. Section 803.1 dates back to the A40.8-1955 National Plumbing Code. The requirement for limiting the temperature of the hot water was based on concerns that temperatures above 140 degrees will remove the galvanizing from galvanized steel pipe. Today, there are numerous other piping materials used for sanitary drainage systems. Most piping materials can handle waste temperatures in excess of 140 degrees.

The last sentence has no meaning since there are no approved cooling methods identified. The common method is adding cold water to the waste stream. However, this is an unnecessary waste of water.

Cost Impact: This change does not increase the cost of construction.

701.7-P-BALLANCO

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Michael Cudahy, representing Plastic Pipe and Fittings Association (PPFA), requests Disapproval.

Commenter's Reason: PPFA has issue with a number of potential problems with this proposal's increased discharge temperatures including, but not limited to; personal safety issues from contacting a hot DWV pipe, additional thermal expansion causing damage, thermal shock potentially causing damage, and potentially unintended damage to existing systems of unknown materials. PPFA believes the code will need some additional guidance in the section to safely limit discharge temperature based on material type, potentially require protective insulation and additional engineering calculations before such a change is accepted.

P152-12
Final Action: AS AM AMPC____ D

P155-12
702.5 (New), 803.1

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self

Revise as follows:

702.5 Temperature rating. Where the wastewater temperature will be greater than 140°F (60°C), the sanitary drainage piping material shall be rated for the highest temperature of the wastewater.

~~**803.1 Waste water temperature.** Steam pipes shall not connect to any part of a drainage or plumbing system and water above 140°F (60°C) shall not be discharged into any part of a drainage system. Such pipes shall discharge into an indirect waste receptor connected to the drainage system.~~

Reason: Section 803.1 dates back to the A40.8-1955 National Plumbing Code. The requirement for limiting the temperature of the hot water was based on concerns that temperatures above 140 degrees will remove the galvanizing from galvanized steel pipe. Today, there are numerous other piping materials used for sanitary drainage systems. Most piping materials can handle waste temperatures in excess of 140 degrees.

In the 1950's, the means of cooling waste water was the addition of cold water. This is a waste of water that the code no longer permits.

Cost Impact: This change does not increase the cost of construction.

702.5 (NEW)-BALLANCO

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Michael Cudahy, representing Plastic Pipe and Fittings Association (PPFA), requests Disapproval.

Commenter's Reason: PPFA has issue with a number of potential problems with this proposal's increased discharge temperatures including, but not limited to; personal safety issues from contacting a hot DWV pipe, additional thermal expansion causing damage, thermalshock potentially causing damage, and potentially unintended damage to existing systems of unknown materials. PPFA believes the code will need some additional guidance in the section to safely limit discharge temperature based on material type, potentially require protective insulation and additional engineering calculations before such a change is accepted.

Public Comment 2:

Tim Mulvey, E. Ruff & Associates, representing self, requests Disapproval.

Commenter's Reason: This proposed code change will increase the cost of construction because the materials that are capable of handling temperatures above 140F are more expensive than normal drain materials and the cost of adding a tempering device. There are drain tempering solutions on the market that cool the waste water to below 140F while conserving cooling water.

P155-12
Final Action: AS AM AMPC____ D

P156-12
702.7

Proposed Change as Submitted

Proponent: William (Bill) LeVan, Cast Iron Soil Pipe Institute, representing self

Add new text as follows:

702.7 Cast iron soil pipe, fittings and mechanical joint hubless couplings. Upon request by the code official, certificates of conformance shall be provided by the manufacturer to the code official indicating that cast iron pipe, cast iron fittings and mechanical joint hubless couplings are in compliance with Sections 705 and 702.

Reason: This will ensure the purchaser and/or owner meet or exceed the requirements of the code and manufacturer requirements.

702.7 (NEW)-P-LEVAN

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposed language ensures safety and code compliance by providing the code official current and accurate ratings on the pipe that is used.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Roger Harper, Jr, Louisa County, VA, representing Virginia Plumbing & Mechanical Inspectors Association (VPMIA) & Virginia Building Code Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: This language is already covered in this code and is absolutely redundant to provide a section dedicated to something already being enforced. This language is (1) an administrative issue that it already covered by Section 105 and (2) cast iron piping, fittings, and mechanical joint hubless couplings are already required to comply with Sections 705 and 702.

P156-12
Final Action: AS AM AMPC____ D

P159-12
705 (New)

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Add new text as follows:

SECTION 705
REPLACEMENT OF UNDERGROUND SEWERS
BY PIPE BURSTING METHODS

705.1 General. This section shall govern the replacement of existing building sewer piping by pipe-bursting methods.

705.2 Applicability. The replacement of building sewer piping by pipe bursting methods shall be limited to gravity drainage piping of sizes 6 inches and smaller. The replacement piping shall be of the same nominal size as the existing piping.

705.3 Pre-installation inspection. The existing piping sections to be replaced shall be inspected internally by a recorded video camera survey. The survey shall include notations of the position of cleanouts and the depth of connections to the existing piping.

705.4 Pipe. The replacement piping shall be of extra high molecular weight PE3408 material and shall be manufactured with an SDR of 17 and in compliance with ASTM F 714.

705.5 Pipe fittings. Pipe fittings to be connected to the replacement piping shall be of extra high molecular weight PE3408 material and shall be manufactured with an SDR of 17 and in compliance with ASTM D2683.

705.6 Cleanouts. Where the existing building sewer did not have cleanouts meeting the requirements of this code, cleanout fittings shall be installed as required by this code.

705.7 Installation procedure. The installation procedure shall be in accordance with the following steps:

1. The existing pipe section to be replaced shall be cleaned of debris.
2. The beginning and end of the piping section to be replaced shall be exposed as necessary to enable pulling equipment to be properly installed and the replacement piping to be inserted without bending of the pipe at less than the minimum allowable bending radius as recommended by the pipe manufacturer.
3. A pulling cable shall be retrieved from the pulling end of the piping to be replaced and pulled to the insertion end of the piping to be replaced.
4. A pipe bursting and pulling head shall be connected to one end of the replacement piping. The bursting/pulling head shall be connected to the pulling cable.
5. In accordance with the pulling equipment and pipe bursting head manufacturer's operating instructions, the pipe bursting/pulling head shall be simultaneously operated and pulled through the existing piping until the end of the new piping exits at the pulling end of the operation.
6. The pipe bursting/pulling head shall be disconnected from the new piping and the pulling equipment removed from the area. The replacement piping ends shall be cut to length as required and shall be connected to the existing piping beyond the pipe section that was replaced. Connections to the ends of the replacement piping shall be in accordance with Section 705.
7. Where a connection to the replacement piping at a point between the pulling end and the insertion end of the pipe section that was replaced is required, the replacement piping shall be

exposed at that location. A section of replacement piping shall be removed and a fitting of the appropriate configuration in accordance with Table 706.3 shall be installed. The connections between the fitting and the pipe shall be made in accordance with Section 705.16.

705.8 Post-installation inspection. The completed replacement piping section shall be inspected internally by a recorded video camera survey. The video survey shall be reviewed and approved by the code official prior to pressure testing of the replacement piping system.

705.9 Pressure testing. The replacement piping system as well as the connections to the replacement piping shall be tested in accordance with Section 312.

(Renumber subsequent sections)

Add new standards to Chapter 14 as follows:

ASTM

D2683-04	Standard Specification for Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.
F 714-06a	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) based on Outside Diameter.

Reason: The IPC lacks coverage concerning the replacement of sewer systems by pipe bursting methods. These methods are being widely used throughout the country. Proper guidance concerning this type of replacement provides additional value to the code.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

705 (NEW)-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This section is needed as this method is being successfully used. However, the installation procedures should not be included. The committee suggests bringing it back in a public comment without the installation procedures.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Michael Cudahy, Plastic Pipe and Fittings Association (PPFA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

705.4 Pipe. The replacement piping shall be ~~of extra high molecular weight PE3408 material and shall be~~ manufactured with an SDR of 17 and in compliance with ASTM F 714.

~~**705.7 Installation procedure.** The installation procedure shall be in accordance with the following steps:~~

1. ~~The existing pipe section to be replaced shall be cleaned of debris.~~
2. ~~The beginning and end of the piping section to be replaced shall be exposed as necessary to enable pulling equipment to be properly installed and the replacement piping to be inserted without bending of the pipe at less than the minimum allowable bending radius as recommended by the pipe manufacturer.~~
3. ~~A pulling cable shall be retrieved from the pulling end of the piping to be replaced and pulled to the insertion end of the piping to be replaced.~~
4. ~~A pipe bursting and pulling head shall be connected to one end of the replacement piping. The bursting/pulling head shall be connected to the pulling cable.~~
5. ~~In accordance with the pulling equipment and pipe bursting head manufacturer's operating instructions, the pipe bursting/pulling head shall be simultaneously operated and pulled through the existing piping until the end of the new piping exits at the pulling end of the operation.~~
6. ~~The pipe bursting/pulling head shall be disconnected from the new piping and the pulling equipment removed from the area. The replacement piping ends shall be cut to length as required and shall be connected to the existing piping beyond the pipe section that was replaced. Connections to the ends of the replacement piping shall be in accordance with Section 705.~~
7. ~~Where a connection to the replacement piping at a point between the pulling end and the insertion end of the pipe section that was replaced is required, the replacement piping shall be exposed at that location. A section of replacement piping shall be removed and a fitting of the appropriate configuration in accordance with Table 706.3 shall be installed. The connections between the fitting and the pipe shall be made in accordance with Section 705.16.~~

705.~~8~~ 7 Post-installation inspection. The completed replacement piping section shall be inspected internally by a recorded video camera survey. The video survey shall be reviewed and approved by the code official prior to pressure testing of the replacement piping system.

705.~~9~~ 8 Pressure testing. The replacement piping system as well as the connections to the replacement piping shall be tested in accordance with Section 312.

Remainder of proposal is unchanged.

Commenter's Reason: The committee found issues with the language of the instructions, so I am deleting them, but I have a concern over section 705.4 limiting the pipe to only one resin type when ASTM F714 allows several to be used

Public Comment 2:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**705.7 Installation procedure.** The installation procedure shall be in accordance with the following steps:~~

1. ~~The existing pipe section to be replaced shall be cleaned of debris.~~
2. ~~The beginning and end of the piping section to be replaced shall be exposed as necessary to enable pulling equipment to be properly installed and the replacement piping to be inserted without bending of the pipe at less than the minimum allowable bending radius as recommended by the pipe manufacturer.~~
3. ~~A pulling cable shall be retrieved from the pulling end of the piping to be replaced and pulled to the insertion end of the piping to be replaced.~~

4. ~~A pipe bursting and pulling head shall be connected to one end of the replacement piping. The bursting/pulling head shall be connected to the pulling cable.~~
5. ~~In accordance with the pulling equipment and pipe bursting head manufacturer's operating instructions, the pipe bursting/pulling head shall be simultaneously operated and pulled through the existing piping until the end of the new piping exits at the pulling end of the operation.~~
6. ~~The pipe bursting/pulling head shall be disconnected from the new piping and the pulling equipment removed from the area. The replacement piping ends shall be cut to length as required and shall be connected to the existing piping beyond the pipe section that was replaced. Connections to the ends of the replacement piping shall be in accordance with Section 705.~~
7. ~~Where a connection to the replacement piping at a point between the pulling end and the insertion end of the pipe section that was replaced is required, the replacement piping shall be exposed at that location. A section of replacement piping shall be removed and a fitting of the appropriate configuration in accordance with Table 706.3 shall be installed. The connections between the fitting and the pipe shall be made in accordance with Section 705.16.~~

705.8 7 Post-installation inspection. The completed replacement piping section shall be inspected internally by a recorded video camera survey. The video survey shall be reviewed and approved by the code official prior to pressure testing of the replacement piping system.

705.~~9~~ 8 Pressure testing. The replacement piping system as well as the connections to the replacement piping shall be tested in accordance with Section 312.

Remainder of proposal is unchanged

Commenter's Reason: Based upon the committee's recommendation, the installation procedures have been removed from the original code change proposal.

P159-12

Final Action: AS AM AMPC____ D

P164 – 12
705.8.2, 705.14.2

<u>Proposed Change as Submitted</u>

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association (mikec@cmservnet.com)

Revise as follows:

705.8.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

<u>**Exception:** A primer is not required where both of the following conditions apply:</u>

1. <u>The solvent cement used is third-party certified as conforming to ASTM D 2564.</u>
2. <u>The solvent cement is used only for joining PVC drain, waste and vent pipe and fittings in non-pressure applications in sizes up to and including 4 inch (102 mm) in diameter.</u>

705.14.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTMD2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

<u>**Exception:** A primer is not required where both of the following conditions apply:</u>

1. <u>The solvent cement used is third-party certified as conforming to ASTM D 2564.</u>
2. <u>The solvent cement is used only for joining PVC drain, waste and vent pipe and fittings in non-pressure applications in sizes up to and including 4 inch (102 mm) in diameter</u>

Reason: To introduce an exception in chapter 7, Sanitary Drainage, allowing for the practice of one-step solvent cementing of non-pressure DWV systems 4” and under.

This exception allows for an optional one-step procedure for joining non-pressure DWV PVC piping systems 4” in diameter and below with solvent cement conforming to ASTM D 2564. This method is practiced, and the code should include specific language to indicate when it is acceptable.

Pressure testing completed by NSF International has shown that solvent cement conforming to ASTM D 2564, when used without primer on PVC DWV pipe and fittings, both solid wall and cell core, generates bonding forces well in excess of what is required for these systems. The strength of the joint often exceeds the pipe and fitting pressure capacity.

Bibliography: NSF International report J-00036842.can be found on the PPFA website, www.ppfahome.org//ICC09/PPFA_NSF_J-00036842.pdf

Cost Impact: None

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: Pipe in the real world is not as pristine as it would be in a laboratory setting when testing without primer. The code should continue requiring primer to ensure that good joints are made consistently.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Approved as Submitted.

P164-12
Final Action: AS AM AMPC____ D

P165-12

705.9, 705.9.1, 705.9.2, 705.9.3, 705.9.4, 705.9.5, 705.10, 705.10.1, 705.10.2, 705.10.3

Proposed Change as Submitted

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing The Copper Development Association (penniefeehan@me.com)

Revise as follows:

705.9 Copper pipe and tubing. Joints between copper or copper-alloy pipe, tubing, and ~~or~~ fittings shall comply with one of the methods indicated in Sections 705.9.1 through 705.9.5.

705.9.1 Brazed joints. Brazed joints between copper pipe or tubing and fittings shall be made with a brazing alloy having a liquid temperature exceeding 1000˚F (538˚C). ~~All~~ Joint surfaces to be brazed shall be cleaned bright by manual or mechanical means. The ends of pipe or tubing shall be cut square and shall be reamed to the full inside diameter. Burrs on the outside end of the pipe or tubing shall be removed. Where required by the brazing alloy manufacturer's instructions, an approved brazing flux shall be applied to the joint surfaces. The joint shall be brazed with a brazing filler metal conforming to AWS A5.8. Brazing filler metal shall be applied at the point where the pipe or tubing enters the socket of the fitting.

705.9.2 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical joints shall include compression type, flanged type, grooved type and press type.

705.9.3 Soldered joints. Solder joints between copper pipe or tubing and fittings shall be made in accordance with the methods of ASTM B 828 with the following sequence of joint preparation and operation: measuring and cutting, reaming, cleaning, fluxing, assembly and support, heating, applying the solder, cooling and cleaning. ~~All cut~~ The ends of pipe or tub~~e~~ing shall be cut square and shall be reamed to the full inside diameter of the pipe or tub~~e~~ing. ~~end.~~ Burrs on the outside end of the pipe or tubing shall be removed. ~~All~~ Joint surfaces to be soldered shall be cleaned bright by manual or mechanical means. ~~A~~ Flux conforming to ASTM B 813 shall be applied to the pipe or tubing and fittings. Such flux shall be noncorrosive and nontoxic after soldering. ~~be applied.~~ Pipe or tubing shall be inserted to the base of the fitting. Excess flux shall be removed from the exterior of the joint. The assembled joint shall be supported to create a uniform capillary space around the joint. An LP gas or acetylene air /fuel torch shall be used to apply heat to the assembled joint. The heat shall be applied with the flame perpendicular to the pipe or tubing. The flame shall be moved alternately between the fitting cup and the pipe or tubing. Solder in compliance with ASTM B 32 shall be applied to the joint surfaces until capillary action draws the molten solder into the cup of the fitting. ~~The joint shall be soldered with a solder conforming to ASTM B 32.~~ The soldered joint shall not be disturbed until cool. Remaining flux residue shall be cleaned from the exterior of the joint.

705.9.4 Threaded joints. Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

705.9.5 Welded joints. ~~All~~ Welded joint surfaces shall be cleaned. The joint shall be welded with ~~an~~ *approved* filler metal.

~~**705.10 Copper tubing.** Joints between copper or copper alloy tubing or fittings shall comply with Sections 705.10.1 through 705.10.3.~~

~~**705.10.1 Brazed joints.** All joint surfaces shall be cleaned. An *approved* flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.~~

~~**705.10.2 Mechanical joints.** Mechanical joints shall be installed in accordance with the manufacturer's instructions.~~

~~**705.10.3 Soldered joints.** Solder joints shall be made in accordance with the methods of ASTM B 828. All cut tube ends shall be reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned. A flux conforming to ASTM B 813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B 32.~~

(Renumber subsequent sections)

Reason: The above language combines pipe and tubing into one section and provides the joining methods of copper and copper alloys as referenced in Table 702.4. In addition, important language from the standards has been added to aid the end user.

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

705.9-P-FEEHAN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: To be consistent with committee's action on P103-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Pennie L. Feehan, Pennie L. Feehan Consulting representing CDA – Copper Development Association, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

705.9.1 Brazed joints. All joint surfaces shall be cleaned bright by manual or mechanical means. An approved flux shall be applied where required. The joint shall be brazed with ~~a~~ filler metals having a melting point range between 1,100°F (593°C) and 1500°F (815°C) conforming to AWS A5.8.

705.9.3 Soldered joints. Solder joints shall be made in accordance with the methods of ASTM B 828. All cut tube ends shall be cut square and reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned bright by manual or mechanical means. ~~A f~~Flux conforming to ASTM B 813 shall be applied to all joint surfaces. The joint shall be soldered with a solder conforming to ASTM B 32.

705.10.1 Brazed joints. All joint surfaces shall be cleaned bright by manual or mechanical means. An approved flux shall be applied where required. The joint shall be brazed with ~~a~~ filler metals having a melting point range between 1,100°F (593°C) and 1500°F (815°C) conforming to AWS A5.8.

705.10.3 Soldered joints. Solder joints shall be made in accordance with the methods of ASTM B 828. All cut tube ends shall be cut square and reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned bright by manual or mechanical means. ~~A~~ Flux conforming to ASTM B 813 shall be applied to all joint surfaces. The joint shall be soldered with a solder conforming to ASTM B 32.

Commenter's Reason: This proposal adds language that provides clear directions to the end user and provides uniformity with the IMC.

P165-12

Final Action: AS AM AMPC____ D

P166-12
706.3, Table 706.3

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee (Sstrausbaugh@arlingtonva.us)

Delete and substitute as follows:

~~**706.3 Installation of fittings.** Fittings shall be installed to guide sewage and waste in the direction of flow. Change in direction shall be made by fittings installed in accordance with Table 706.3. Change in direction by combination fittings, side inlets or increasers shall be installed in accordance with Table 706.3 based on the pattern of flow created by the fitting. Double sanitary tee patterns shall not receive the discharge of back-to-back water closets and fixtures or appliances with pumping action discharge.~~

> ~~**Exception:** Back-to-back water closet connections to double sanitary tees shall be permitted where the horizontal developed length between the outlet of the water closet and the connection to the double sanitary tee pattern is 18 inches (457 mm) or greater.~~

706.3 Installation of fittings. Changes in the direction of flow in drainage piping shall be made by fittings installed in an orientation that directs the drainage in the direction of flow. The following are prohibited applications of fittings:

1. A cast iron quarter bend or short sweep elbow smaller than 3 inches shall not be used for a vertical-to-horizontal or horizontal-to-horizontal change in direction of flow except where conveying flow from a single fixture drain.
2. A cast iron quarter bend or short sweep elbow that is 3 inches and larger shall not be used for a horizontal-to-horizontal change in direction of flow.
3. A plastic quarter bend elbow smaller than 3 inches, other than a long sweep quarter bend elbow, shall not be used for a vertical-to-horizontal or horizontal-to-horizontal change in direction of flow except where conveying flow from a single fixture drain.
4. A plastic quarter bend elbow that is 3 inches and larger, other than a long sweep quarter bend elbow, shall not be used for a horizontal-to-horizontal change in direction of flow.
5. A heel inlet of a quarter bend elbow shall not receive the discharge from any fixture where the elbow receives the discharge of a water closet and changes the flow direction from vertical-to-horizontal .
6. A low-heel inlet of a quarter bend elbow shall not be used as a connection for a wet vent or wet vented fixture where the elbow changes the flow direction from vertical-to-horizontal.
7. The side inlet of a quarter bend elbow shall not be used as a drainage connection where the elbow changes the flow direction from horizontal to horizontal.
8. A sanitary tee shall not be used in an orientation where the run of the tee is in the horizontal plane, or an angle less than 45 degrees thereto, except where the branch of the tee serves as a dry vent.
9. A double sanitary tee shall not receive the discharge of water closets through both branches nor shall it receive pumped waste flow in either branch.

   Exception: Water closets shall be permitted to connect to both branches of a double sanitary tee where the horizontal developed length between the outlet of each water closet and the connection to the double sanitary tee is 18 inches (457 mm) or greater.

Reason: The existing section and accompanying table are unclear as to how the table is to be used and exactly what the prohibitions of fitting uses are. The problem is that the table is too limiting and does not address the materials of the fittings relative to the pattern (i.e. short sweep versus quarter bend). Also, the table doesn't address the use of a drainage fitting where a branch is used as vent connection (e.g. sanitary tee). The text proposed clearly indicates the specific prohibitions and uses in mandatory language.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

706.3-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Consistency with committee's action on P103-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Submitted.

Commenter's Reason: At the public hearings, one of the committee members incorrectly made a motion to disapprove the code change based on their decision on a previous code change, P103. This code change took language from Table 706.3 and put it into written format. The table was too limiting and did not address all of the materials of the fittings relative to the pattern (i.e. short sweep versus quarter bend). Code change P103 proposed that manufacturer's guidelines for joints became code language and had no bearing or connection to this proposed code change.

P166-12

Final Action: AS AM AMPC____ D

P167-12
707.1

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

707.1 Prohibited joints. The following types of joints and connections shall be prohibited:

1. Cement or concrete joints.
2. Mastic or hot-pour bituminous joints.
3. Joints made with fittings not *approved* for the specific installation.
4. Joints between different diameter pipes made with elastomeric rolling O-rings.
5. Solvent-cement joints between different types of plastic pipe.
6. Saddle-type fittings.
7. Where a pipe or fitting is inserted inside of another pipe.

Reason: This proposed new item intends to prevent the misapplication of fittings and pipe of all materials. The IRC already prohibits the installation of a 4 x 3 plastic closet flange into the inside of a 4 inch plastic pipe. (Section P3003.19) . The reason for this is that the internal diameter of DWV plastic pipe is not controlled during manufacturing which results in a non-uniform and sometimes wavy surface inside of the pipe. Such surface was never intended to be part of solvent welded joint. The inside surface of fitting sockets are precisely controlled during manufacturing because they are designed to be part of a solvent welded joint, but this is not for the ID of pipe. If pipe or fittings are misapplied by attempting solvent weld joints in the inside of pipe, poorly made joints will result which are mechanically weak and prone to failure or leakage in service. Leakage may not be detected during DWV testing because closet flanges are commonly installed *after* testing and also because a poorly made weak joint could survive the test and fail at a later time as the piping system expands and contracts, ages and moves from building settlement. This problem is not limited to closet flanges as installers have attempted to install other fittings such as wyes inside of pipe.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

707.1-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Chris Ismert, Sioux Chief Manufacturing, requests Disapproval.

Commenter's Reason: As stated, the proposed change would prohibit joints where pipe or fitting is inserted inside of another pipe – specifically the installation of closet flanges into 4" pipe.

This is an unnecessary change that will prohibit a widely used/accepted practice, and will increase the cost of construction.

The tools, processes and quality guidelines used by manufacturers of DWV pipe have improved greatly in recent years, and although the ID of pipe is not described explicitly in ASTM standards, the two dimensions resulting in the ID dimension (OD and wall thickness) are controlled, and have become very consistent.

Similarly, manufacturers of fittings (specifically closet flanges) consider these same ASTM standards. Closet flanges intended to be installed inside 4” pipe have a modified hub OD, with a carefully designed taper which is able compensate for the small variation possible in pipe ID.

Closet flanges designed to be installed inside 4” pipe have been widely used for decades. The simple fact that these joints have been used this long is a testament to two points: 1) they do work, and are not weak or prone to leaks and failure, and 2) they provide a solution to the potentially difficult installation of a closet flange on pre-poured slab. Prohibiting the installation of closet flanges inside 4” pipe will leave plumbing contractors with few, undesirable options. These include 1) installing the flange over 3” pipe before the slab pour – which typically results in flanges set too low (covered in concrete, poor seal between wax ring and toilet), or too high (unstable toilet); or 2) wrapping the pipe to create an annular space between the pipe and slab – which can result in a “hole” in the slab through which pests (termites, etc.) can enter the dwelling, and which does not allow for a proper glue joint to be made as the OD of the pipe cannot be applied with primer/glue. Further, both of the above alternatives will increase the difficulty and cost associated with the installation.

The proposed change seeks to unnecessarily prohibit a joint that has been used for decades by plumbing professionals, and which will greatly increase the difficulty/cost associated with the installation of flanges on concrete slabs. I urge the committee to Disapprove the code change proposal.

Public Comment 2:

Gary Kozan, CPD, Ridgeway Plumbing, requests Disapproval.

Commenter’s Reason: The primary purpose of this proposal is to outlaw the common practice of solvent welding closet flanges inside of plastic pipe. This is a solution in search of a problem.. Inside-fit flanges are the industry standard – because they work.

For a proper water closet installation, the bottom of the closet flange must be precisely flush with finished floor. Flanges set too high cause shimming and rocking; flanges set too low result in leaks at the wax seal. The correct time to set the flange is just prior to setting the toilet, after finished floor has been established. This has always been part of my company’s quality practices. Inside-fit flanges require no annular space, enabling the closet stub to be cut flush with finished floor and the flange glued inside of the pipe – the perfect height every time.

Since both the outside diameter and the wall thickness of PVC pipe are manufactured to close tolerances, the inside diameter varies only slightly. Inside-fit flanges have a mild taper to compensate for this. So long as the pipe is manufactured to ASTM spec, the flange will fit properly with no leakage. The current IRC seems to prohibit inside-fit flanges, but two wrongs don’t make a right. This will be addressed at next year’s IRC hearings.

In addition to prohibiting inside-fit closet flanges, this proposal would also ban a multitude of other popular products. Most plumbing specialty manufacturers make floor drains, cleanouts, repair flanges, trap guards, etc. specifically for inserting inside of plastic pipe. These products are used extensively in both new and existing construction. Furthermore, the poor wording of this proposal could be construed as prohibiting bell-end plastic pipe, and even the use of slip joints or Fernco adaptors, “where a pipe or fitting is inserted inside of another pipe.”

Without inside-fit flanges, the plumber is left with two unpleasant alternatives – either install the flange early (guesstimating where finished floor will be), or revert to digging out stub wrappers with hammer and chisel in order to create the annular space necessary to make a shoddy “outside” glue joint.

The proponent’s unsubstantiated claims of weak joints and failures are grossly exaggerated. Most water closets today are set on inside-fit flanges. They have a proven 40-year track record and offer the best solution on the market. On behalf of all of the plumbers who successfully use inside-fit flanges and fittings, I respectfully urge DISAPPROVAL of this unnecessary change.

P167-12

Final Action: AS AM AMPC____ D

P168-12
708

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Delete and substitute as follows:

~~**SECTION 708**~~
~~**CLEANOUTS**~~

SECTION 708
CLEANOUTS

708.1 Cleanouts required. Cleanouts shall be provided for drainage piping in accordance with Sections 708.1.1 through 708.1.11.

708.1.1 Horizontal drains and building drains. Horizontal drainage pipes in buildings shall have cleanouts located at intervals of not more than 100 feet (30 480 mm). Building drains shall have cleanouts located at intervals of not more than100 feet (30 480 mm) except where manholes are used instead of cleanouts, the manholes shall be located at intervals of not more than 400 feet (122 m). The interval length shall be measured from the cleanout or manhole opening, along the developed length of the piping to the next drainage fitting providing access for cleaning, the end of the horizontal drain or the end of the building drain.

> **Exception:** Horizontal fixture drain piping serving a nonremovable trap shall not be required to have a cleanout for the section of piping between the trap and the vent connection for such trap.

708.1.2 Building sewers. Building sewers smaller than 8 inches (203 mm) shall have cleanouts located at intervals of not more than 100 feet (30 480 mm). Building sewers 8 inches (203 mm) and larger shall have a manhole located not more than 200 feet (60 960 mm) from the junction of the building drain and building sewer and at intervals of not more than 400 feet (122 m). The interval length shall be measured from the cleanout or manhole opening, along the developed length of the piping to the next drainage fitting providing access for cleaning, a manhole or the end of the building sewer.

708.1.3 Building drain and building sewer junction. The junction of the building drain and the building sewer shall be served by a cleanout that is located at the junction or within 10 feet (3048 mm) developed length of piping upstream of the junction. For the requirements of this section, the removal of water closet shall not be required to provide cleanout access.

708.1.4 Changes of direction. Where a horizontal drainage pipe, a building drain or a building sewer has a change of horizontal direction greater than 45 degrees (0.79 rad), a cleanout shall be installed at the change of direction. Where more than one change of horizontal direction greater than 45 degrees (0.79 rad) occurs within 40 feet (12 192 mm) of developed length of piping, the cleanout installed at the first change of direction shall serve as the cleanout for all changes in direction within that 40 feet (12 192 mm) of developed length of piping.

708.1.5 Cleanout size. Cleanouts shall be the same size as the piping served by the cleanout except cleanouts for piping larger than 4 inches (102 mm) need not be larger than 4 inches (102 mm).

Exceptions:

1. A removable P- trap with slip or ground joint connections can serve as a cleanout for drain piping that is one size larger than the P-trap size.
2. Cleanouts located on stacks can be one size smaller than the stack size.
3. The size of cleanouts for cast-iron piping can be in accordance with the referenced standards for cast iron fittings as indicated in Table 702.4.

708.1.6 Cleanout plugs. Cleanout plugs shall be brass, plastic or other approved materials. Cleanout plugs for borosilicate glass piping systems shall be of borosilicate glass. Brass cleanout plugs shall conform to ASTM A74 and shall be limited for use only on metallic piping systems. Plastic cleanout plugs shall conform to the referenced standards for plastic pipe fittings as indicated in Table 702.4. Cleanout plugs shall have a raised square head, a countersunk square head or a countersunk slot head. Where a cleanout plug will have a trim cover screw installed into the plug, the plug shall be manufactured with a blind end threaded hole for such purpose.

708.1.7 Manholes. Manholes and manhole covers shall be of an approved type. Manholes located inside of a building shall have gas-tight covers that require tools for removal.

708.1.8 Installation arrangement. The installation arrangement of a cleanout shall enable cleaning of drainage piping only in the direction of drainage flow.

Exceptions:

1. Test tees serving as cleanouts.
2. A two-way cleanout installation that is approved for meeting the requirements of Section 708.1.3.

708.1.9 Required clearance. Cleanouts for 6-inch (153 mm) and smaller piping shall be provided with a clearance of not less than 18 inches (457 mm) from, and perpendicular to, the face of the opening to any obstruction. Cleanouts for 8-inch (203 mm) and larger piping shall be provided with a clearance of not less than 36 inches (914 mm) from, and perpendicular to, the face of the opening to any obstruction.

708.1.10 Cleanout access. Required cleanouts shall not be installed in concealed locations. For the purposes of this section, concealed locations include, but are not limited to, the inside of plenums, within walls, within floor/ceiling assemblies, below grade and in crawl spaces where the height from the crawl space floor to the nearest obstruction along the path from the crawl space opening to the cleanout location is less than 24 inches (610 mm). Cleanouts with openings at a finished wall shall have the face of the opening located within 1-1/2 inches (38 mm) of the finished wall surface. Cleanouts located below grade shall be extended to grade level so that the top of the cleanout plug is at or above grade. A cleanout installed in a floor or walkway that will not have a trim cover installed shall have a countersunk plug installed so the top surface of the plug is flush with the finished surface of the floor or walkway.

708.1.10.1 Cleanout plug trim covers. Trim covers and access doors for cleanout plugs shall be designed for such purposes and shall be approved. Trim cover fasteners that thread into cleanout plugs shall be corrosion resistant. Cleanout plugs shall not be covered with mortar, plaster or any other permanent material.

708.1.10.2 Floor cleanout assemblies. Where it is necessary to protect a cleanout plug from the loads of vehicular traffic, cleanout assemblies in accordance with ASME A112.36.2M shall be installed.

708.1.11 Prohibited use. The use of a threaded cleanout opening to add a fixture or extend piping shall be prohibited except where another cleanout of equal size is installed with the required access and clearance.

Reason: Section 708 is disorganized. For example, the second Section 708.2 discusses requirements for cleanout plugs. The more significant sections of the section are scattered throughout the remainder of the section in a disorganized fashion. This proposal reorganizes this section in a more logical format for ease of understanding.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

708-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed language inappropriately removes the requirement for a cleanout at the base of each stack. One hundred feet between cleanouts is too long.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Submitted.

Commenter's Reason: One of the committee's arguments for disapproving this code change was that the proposed language inappropriately removed the requirement for a cleanout at the base of each stack. The other argument was that one hundred feet between cleanouts is too long.

The language for the base of stack is covered through the horizontal drain requirement. A cleanout is required within each horizontal drain at intervals not more than 100 feet. When cleanouts are provided in the horizontal drain at this interval, there is no need for a cleanout at the base of each stack.

As far as the distance between cleanouts being too long, the 100 foot requirement has been in the IPC since the 1997 edition.

P168-12

Final Action: AS AM AMPC____ D

P170-12
712.3.2

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

712.3.2 Sump pit. The sump pit shall be not less than 18 inches (457 mm) in diameter and not less than 24 inches (610 mm) in depth, unless otherwise approved. The pit shall be accessible and located such that all drainage flows into the pit by gravity. The sump pit shall be constructed of tile, concrete, steel, plastic or other approved materials. The pit bottom shall be solid and provide permanent support for the pump. The sump pit shall be fitted with a gas-tight removable cover that is installed flush with grade or above grade. The cover shall be adequate to support anticipated loads in the area of use. The sump pit shall be vented in accordance with Chapter 9.

Reason: The cover for sump pits needs to be located at grade or above grade. Otherwise, there is nothing to prevent an installation where the cover is located below grade in a well such that in order to service the pump, someone has to stand on his head in order to just remove the sump pit cover. Requiring the cover to be at or above grade eliminates this problem.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

712.3.2-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The added text about being flush with grade appears to address sumps that are on the exterior of a building. Sumps could also be inside a building. The language doesn't address that situation.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

712.3.2 Sump pit. The sump pit shall be not less than 18 inches (457 mm) in diameter and not less than 24 inches (610 mm) in depth, unless otherwise approved. The pit shall be accessible and located such that all drainage flows into the pit by gravity. The sump pit shall be constructed of tile, concrete, steel, plastic or other approved materials. The pit bottom shall be solid and provide permanent support for the pump. The sump pit shall be fitted with a gas-tight removable cover that is installed flush with grade or floor level, or above grade or floor level. The cover shall be adequate to support anticipated loads in the area of use. The sump pit shall be vented in accordance with Chapter 9.

Commenter's Reason: The committee's reason for disapproval was that the added text did not address sump pits that could be located inside a building. For all installations the same provisions should apply. The sump pit contains electrical and mechanical components that require periodic maintenance and or replacement. The sump pit cover is the means of *access* to the sump pit so the cover must be accessible as well and not be concealed by floor coverings or any amount of earth.

P170-12
Final Action: AS AM AMPC____ D

P173-12
716 (New), Chapter 14

Proposed Change as Submitted

Proponent: Jeremy Brown, NSF International (brown@nsf.org)

Add new text as follows:

SECTION 716
CURED-IN-PLACE PIPE LINERS

716.1 Approval. Cured-in-place pipe liner materials shall conform to NSF-14.

716.2 Installation. Installation of cured-in-place pipe liners shall be in accordance with the manufacturer's instructions and ASTM F1216, ASTM F1783 or ASTM F 2019.

Add new standards to Chapter 14 as follows:

ASTM

F1216-09	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin Impregnated Tube
F1743-08	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)
F2019-11	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP).

Reason: Trenchless technology is commonly used to rehabilitate existing drain and sewer lines. This proposal establishes requirements by referring to appropriate standards for the materials and installation.

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

Analysis: A review of the standards proposed for inclusion in the code, ASTM F1216-09, ASTM F1743-08 and ASTM F2019-11 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

716 (NEW)-P-BROWN

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing and Mechanical Inspectors Assoc. (VPMIA), and VA Building Code Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: This newly proposed code section contains numerous different types of "tube" and pipe as referenced under the new standards however the pipe and tube as proposed does not appear to conform to any of the required pipe standards as contained in section 702.2 or 702.3 nor any of the fitting standards contained in 702.4. Due to the application of this material inside of the existing piping material how is the interior reduction in the pipe size taken in to account? If this is to be used on any portion of the plumbing drainage system this reduction in may create further drainage issues where the specific section of piping may be at its intended DFU limit and further would appear to conflict section 704.2 which states "The size of the drainage piping shall not be reduced in size in the direction of flow." The cured in place pipe liner material is required to conform to NSF 14 however is this a quality control standard or a material standard in regard to this specific material?

P173-12
Final Action: AS AM AMPC____ D

P177-12
802.1.1

<u>Proposed Change as Submitted</u>

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

802.1.1 Food handling. Equipment and fixtures utilized for the storage, preparation and handling of food shall discharge through an indirect waste pipe by means of an air gap. <u>Each well of a multi-compartment sink shall discharge independently to a waste receptor.</u>

Reason: An all too common practice for drain connections to a multi-compartment sink is to manifold the drain piping together and run a single indirect waste pipe to the waste receptor. If one compartment is draining and another compartment is empty or less full , the waste flow can back up into the empty or less full compartment and contaminate that compartment. Requiring each well to discharge independently to the waste receptor prevents this potential for contamination.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

802.1.1-P-STRAUSBAUGH.PMGCAC

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

Roger Harper, Jr, Louisa County, VA, representing Virginia Plumbing & Mechanical Inspectors Association(VPMIA) & Virginia Building Code Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: To require each well be separately piped would 1) Require a floor sink instead of an open site or hub type drain because of the number of drain pipes running to such, 2) Create a nuisance under the sink for cleaning purposes such as mopping of the floors 3) A trap is required if an indirect waste pipe exceeds 30"' horizontally and or 54" in total developed length and this would certainly require the trap if approved thus creating the possibility of a stoppage but only because of the trap.

P177-12
Final Action: AS AM AMPC____ D

P181-12
802.3

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Arlington County VA, representing, the Virginia Plumbing and Mechanical Inspectors Association and The Virginia Building Code Officials Association and ICC Region 7 (Sstrausbaugh@arlingtonva.us)

Revise as follows:

802.3 Waste receptors. ~~Waste receptors shall be of an approved type.~~ For other than standpipes and hub drains, a removable strainer or basket shall cover the waste outlet of waste receptors. Waste receptors shall not be installed in ~~ventilated~~ concealed spaces. Waste receptors shall not be installed in ~~bathrooms, toilet rooms~~, plenums, crawl spaces, attics, interstitial spaces above ceilings and below floors ~~or in any inaccessible or unventilated space such as a closet or storeroom~~. Ready access shall be provided to waste receptors.

Reason: This is a companion proposal with a newly added definition of waste receptor. We have attempted to identify exactly what constitutes an 'approved type" of waste receptor. The code fails to provide guidance as to what is a ventilated space, so we suggest removing the terms. This proposal takes the provisions in the direction of clear mandatory language that provides the user with terminology that clearly explains where a waste receptor is not permitted to be located. Further, there is no real problem associated with having a hub drain in a closet or storeroom where items such as water heaters and condensate producing appliances are located so that text has been removed.

Cost Impact: None

802.3-P-STRAUSBAUGH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Bathrooms and toilet rooms should not have waste receptors because of the potential for people using them as a location to urinate. A waste receptor is not intended for such use.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing VA Plumbing and Mechanical Inspectors Assoc. (VPMIA), VA Building Code Officials Association (VBCOA), and ICC Region VII, requests Approval as Submitted.

Commenter's Reason: The committee's reasoning for not allowing waste receptors in toilet rooms lacks merit as numerous other fixtures such as floor drains, not used as waste receptors, service sinks, and lavatories are located in toilet rooms. These fixtures would also be a potential for people to urinate in. Are we then supposed to limit these fixtures from being located within toilet rooms? The committee did not comment on the removal of inaccessible or unventilated spaces such as a closet or storeroom, for this change however for P182 which was a companion change the committed did state closet or storerooms are rarely visited so any backups could go undetected and create an insanitary condition. As stated in the original reason statement appliances such as water heaters and condensing appliances are typically located in closets or storerooms and this section would then not allow a waste receptor to be installed were other portions of the code may require such a waste receptor.

P181-12
Final Action: AS AM AMPC____ D

P182-12
202, 802.3, 802.3.2, 802.4

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Add new definition as follows:

WASTE RECEPTOR. A floor sink, standpipe, hub drain or a floor drain that receives the discharge of one or more indirect waste pipes.

Revise as follows:

802.3 Waste receptors. ~~Waste receptors shall be of an approved type.~~ For other than hub drains that receive only clear-water waste and standpipes, a removable strainer or basket shall cover the waste outlet of waste receptors. Waste receptors shall not be installed in ~~ventilated~~ concealed spaces. Waste receptors shall not be installed in ~~bathrooms, toilet rooms~~, plenums, crawl spaces, attics, interstitial spaces above ceilings and below floors. ~~or in any inaccessible or unventilated space such as a closet or storeroom~~. Ready access shall be provided to waste receptors.

802.3.2 ~~Open~~ Hub drains ~~waste receptors.~~ A hub drain~~Waste receptors~~ shall be ~~permitted~~ in the form of a hub or a pipe extending not less than 1 inch (25.4 mm) above a water-impervious floor. ~~and are not required to have a strainer.~~

~~802.4~~ **802.3.3 Standpipes.** Standpipes shall be individually trapped. Standpipes shall extend not less than 18 inches (457 mm) but not greater than 42 inches (1066 mm) above the trap weir. *Access* shall be provided to all standpipes and drains for rodding.

Reason: A definition for "waste receptor" is needed. The term is found in the code 24 times with no exact description. The proposed definition identifies exactly what constitutes an 'approved type" of waste receptor. The code fails to provide guidance as to what is a ventilated space so the language was changed to prevent waste receptors from being installed in a concealed space. There is no logical reason to prohibit waste receptors from being installed in a bathroom or toilet room. It is not unusual for a clothes washing machine (requiring a standpipe) to be placed in a bathroom or a toilet room in a multifamily residential occupancy. Waste receptors (typically a hub drain) are frequently needed in closets or storerooms where appliances discharge condensate or where relief valve discharge pipes are located.. The term "open hub waste receptor" is redundant and unclear and was eliminated in favor of the more common term "hub drain". As a hub drain is a waste receptor, a strainer is required except where the hub drain receives only clear water wastes. Standpipes are just another breed of waste receptors and should be included as a subsection under the waste receptor section.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

802.3-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Bathrooms and toilet rooms should not have waste receptors because of the potential for people using them as a location to urinate. Closets and storerooms are rarely visited so any backups could go undetected and create insanitary conditions.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Submitted.

Commenter's Reason: The committee's reasoning for not allowing waste receptors in toilet rooms has no merit as numerous other fixtures such as floor drains, not used as waste receptors, service sinks, and lavatories are located in toilet rooms. These fixtures would also be a potential for people to urinate in based upon this reasoning. Are we then supposed to limit these fixtures from being located within toilet rooms? As stated in the original reason statement appliances such as water heaters and condensing appliances are typically located in closets or storerooms and this section would then not allow a waste receptor to be installed were other portions of the code may require such a waste receptor.

P182-12
Final Action: AS AM AMPC____ D

P189-12
915.1

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing InSinkErator (JBEngineer@aol.com)

Revise as follows:

915.1 Type of fixtures. A combination waste and vent system shall not serve fixtures other than floor drains, sinks, lavatories and drinking fountains. Combination waste and vent systems shall not receive the discharge from a ~~food waste grinder or~~ clinical sink.

Reason: There is no technical justification for prohibiting a food waste grinder from discharging to a combination waste and vent system. A food waste grinder does not change the pressure in the piping system any differently than a sink operating without a food waste grinder. The food waste grinder will not impact the performance of the combination waste and vent system. A video was made showing the discharge from a food waste grinder. The video of the clear pipe shows the flow from a food waste grinder as being the same as the flow from the sink without a food waste grinder.

Cost Impact: This change does not increase the cost of construction.

915.1-P-BALLANCO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: If food grinders are allowed to be installed on a combination waste and vent system, then this would lead the way for showers and urinals to be added to these systems. The prohibition has been in the code for a long time and it will not hurt to be in there longer until research is completed to show that food grinder waste is not a problem for these systems.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing InSinkErator, requests Approval as Submitted.

Commenter's Reason: I would encourage the membership to overturn the motion to deny and vote to approve this change as submitted. The Committee Reason is completely inappropriate when dealing with a technical change. Furthermore, it is in error. The restriction to not allow food waste disposers on combination waste and vent systems was only added to the Code in the 2003 edition. That is not a long time. There was no technical justification provided to add this restriction to the 2003 code. The reason given was that they thought there would be a problem. However, no problem was specifically identified. It was permitted by the code from 1995 through the publication of the 2003 code. It was also permitted in the legacy plumbing codes. If there was a problem, it would have surfaced.

The other reason given was that this could lead to showers and urinals being added. First, showers are already vented by this method since shower rooms utilize floor drains, which are permitted to be installed on a combination waste and vent system. With regard to urinals, there is no change to add urinals. This should have never been included in the Reason statement.

InSinkErator has done video clips of the inside of the pipe showing the discharge of a food waste disposer. The flow in a 2 inch drain, which is the minimum permitted for a combination waste and vent, is as slow as a normal sink drain. There is no difference.

Hence, if a kitchen sink can discharge by a combination waste and vent system, then a kitchen sink with a food waste disposer should also be permitted. The discharge of the waste is the same. The video can be viewed by going to http://www.youtube.com/watch?v=5l8FeTi6Wm4.

P189-12

Final Action: AS AM AMPC____ D

P195-12

1002.4. 1002.4.1 (New), 1002.4.1.1 (New), 1002.4.1.2 (New), 1002.4.1.3 (New), 1002. 4.1.4 (New), Chapter 14

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing Sure Seal (JBEngineer@aol.com)

Revise as follows:

1002.4 Trap seals. Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm), or deeper for special designs relating to accessible fixtures. ~~Where a trap seal is subject to loss by evaporation, a trap seal primer valve shall be installed. Trap seal primer valves shall connect to the trap at a point above the level of the trap seal. A trap seal primer valve shall conform to ASSE 1018 or ASSE 1044.~~

1002.4.1 Trap seal protection. Traps seals of emergency floor drain traps and traps subject to evaporation shall be protected by one of the methods in Sections 1002.4.1.1 through 1002.4.1.4.

1002.4.1.1 Potable water supplied trap seal primer valve. A potable water supplied trap seal primer valve shall supply water to the trap. Water supplied trap seal primer valves shall conform to ASSE 1018. The discharge pipe from the trap seal primer valve shall connect to the trap above the trap seal on the inlet side of the trap. Water supplied trap seal primer valves shall discharge not more than 8 gallons of water per year.

1002.4.1.2 Reclaimed or gray water supplied trap seal primer valve. A reclaimed or gray water supplied trap seal primer valve shall supply water to the trap. Water supplied trap seal primer valves shall conform to ASSE 1018. The discharge pipe from the trap seal primer valve shall connect to the trap above the trap seal on the inlet side of the trap. The yearly discharge volume from reclaimed or gray water supplied trap seal primer valves shall not be limited.

1002.4.1.3 Waste water supplied trap primer device. A waste water supplied trap primer device shall supply water to the trap. Waste water supplied trap primer devices shall conform to ASSE 1044. The discharge pipe from the trap seal primer device shall connect to the trap above the trap seal on the inlet side of the trap.

1002.4.1.4 Barrier type trap seal protection device. A barrier-type trap seal protection device shall protect the floor drain trap seal from evaporation. Barrier type floor drain trap seal protection devices shall conform to ASSE 1072 and shall have an ASSE 1072 rating of AF-GW. The devices shall be installed in accordance with the manufacturer's instructions.

Add new standard to Chapter 14 as follows:

ASSE
1072-07 Performance Requirements for Barrier Type Floor Drain Tap Seal Protection Devices

Reason: This modification adds language to identify all of the methods available for protecting the trap seal of emergency floor drain traps or traps subject to evaporation. The four methods available are: water supplied trap seal primers, waste supplied trap primer devices, trap seal protection devices, and reclaimed water. A water supplied trap seal primer that is unrestricted can discharge 300 to 500 gallons a year to a trap. A 2" trap requires less than ½ gallon a year to maintain the trap seal. There are now devices available that limit the amount of water discharging to 8 gallons per year. The IPC currently has many water conservation measures. This is another water conservation measure.

Waste supplied trap primer devices divert water from a sink or lavatory to the trap. There is no need to limit the flow on these devices since they use waste water.

Trap seal protection devices do not require any water. They are tested for providing protection of the trap seal. By requiring a rating of AF-GW, all of the tests in ASSE 1072 become required. There were previous objections to not requiring all of the tests in the standard.

Reclaimed water can also be used to maintain the trap seal. Since the water is reclaimed, there is no need to limit the annual discharge.

Cost Impact: This change does not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ASSE 1072-07 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1002.4-P-BALLANCO

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal has design restrictive language with respect to gray water supplied trap primer valves. There is uncertainty about what type of waste water is being used in Section 1002.4.1.2. It appears that there is only one manufacturer that can meet the ASSE 1072 standard rating of AF-GW.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing Sure Seal, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1002.4.1.1 Potable water supplied trap seal primer valve. A potable water supplied trap seal primer valve shall supply water to the trap. Water supplied trap seal primer valves shall conform to ASSE 1018. The discharge pipe from the trap seal primer valve shall connect to the trap above the trap seal on the inlet side of the trap. ~~Water supplied trap seal primer valves shall discharge not more than 8 gallons of water per year.~~

1002.4.1.2 Reclaimed or gray water supplied trap seal primer valve. A reclaimed or gray water supplied trap seal primer valve shall supply water to the trap. Water supplied trap seal primer valves shall conform to ASSE 1018. The quality of reclaimed or gray water supplied to trap seal primer valves shall be in accordance with the requirements of the manufacturer of the trap seal primer valve. The discharge pipe from the trap seal primer valve shall connect to the trap above the trap seal on the inlet side of the trap. ~~The yearly discharge volume from reclaimed or gray water supplied trap seal primer valves shall not be limited.~~

1002.4.1.4 Barrier type trap seal protection device. A barrier-type trap seal protection device shall protect the floor drain trap seal from evaporation. Barrier type floor drain trap seal protection devices shall conform to ASSE 1072. ~~and shall have an ASSE 1072 rating of AF-GW.~~ The devices shall be installed in accordance with the manufacturer's instructions.

Remainder of proposal is unchanged.

Commenter's Reason: This modification responds to the issues presented by the Plumbing Code Committee. An attempt was made to add water conservation requirements for trap seal primer valves. While this is a good idea, the Committee thought this was premature. I have acquiesced and removed the water conservation provisions.

Another concern was with regard to the use of water supplied trap seal primer valves with reclaimed water. My intent all along was the use of treated reclaimed water. I have clarified this requirement in Section 1002.4.1.2. Some manufacturers have claimed that water supplied trap seal primer valves require the use of potable water. That is not correct. Reclaimed water has been used for many years. Water supply trap seal primer valves have been used to supply the reclaimed water to the trap seal. Hence, the modification merely clarifies the practice used in the field. Furthermore, it correlates with Chapter 13, which allows the use of reclaimed water for resealing the traps.

Finally, the Committee was opposed to having a rating requirement for barrier type trap seal protection devices. The reason for adding the rating requirement was in response to the previous code committee's demands. I agree with the current code committee that a rating should not be included in the code. The standard should be permitted to regulate the use and installation of these devices.

Public Comment 2:

Chuck Lott, representing JL Industries, requests Disapproval.

Commenter's Reason: I urge rejection of this proposed code change.

Section 1002.4.1.1 mandates a maximum of 8 gallons of water discharge for annual trap primer valve output. This can be done, but it can only be guaranteed with electronic valves. This mandate will unnecessarily increase the cost of construction.

Section 1002.4.1.2 allows gray water for use with ASSE 1018 valves. Grey water will clog pressure drop activated vales covered in ASSE 1018.

Section 1002.4.1.3 allows waste water for use with ASSE 1044 valves. Waste water will clog many valves listed under ASSE 1044.

P195-12

Final Action: AS AM AMPC____ D

P196– 12
1002.4, Chapter 14

Proposed Change as Submitted

Proponent: David R. Scott, AIA, representing Target Corporation.

Revise as follows:

1002.4 Trap seals. Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm), or deeper for special designs relating to accessible fixtures. Where a trap seal is subject to loss by evaporation, ~~a trap seal primer valve~~ <u>one of the following</u> shall be installed~~.~~<u>:</u> ~~Trap seal primer valves shall connect to the trap at a point above the level of the trap seal. A trap seal primer valve shall conform to ASSE 1018 or ASSE 1044.~~

1. <u>A trap seal primer valve conforming to ASSE 1018 or ASSE 1044. The discharge pipe from a trap seal primer valve shall terminate at a point that is above the level of the trap seal.</u>
2. <u>Barrier type floor drain trap seal protection device complying with ASSE 1072.</u>

Add new standard to Chapter 14 as follows:

ASSE
<u>1072-2007 Performance requirements for Barrier Type Floor Drain Trap Seal Protection Devices</u>

Reason: Some locations of floor drains and water source do not allow for proper trap seal primer valve installation. There is no easy way to verify if the trap seal primer valve has failed. A barrier-type device is much more accessible to verify proper operation and is easy to replace if needed. Water conservation measures make the barrier-type device more appealing as well.

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

Analysis: A review of the standard proposed for inclusion in the code, ASSE 1072-2007 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1002.4-P-SCOTT

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The barrier type floor drain trap seal device is needed in certain applications. There is a standard to cover these products. The ASSE 1018 devices do fail frequently and are subject to clogging. The barrier-type trap seal protection device provide a good alternative method to trap primer valves.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Disapproved and a public comment was submitted.

Public Comment 1:

David Scott, AIA, representing Target Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1002.4 Trap seals. Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm), or deeper for special designs relating to accessible fixtures. Where a trap seal is subject to loss by evaporation, one of the following shall be installed:

1. A trap seal primer valve ~~conforming to~~ complying with ASSE 1018 or ASSE 1044. The discharge pipe from a trap seal primer valve shall terminate at a point that is above the level of the trap seal.
2. Barrier type floor drain trap seal protection device complying with ASSE 1072.

Remainder of proposal is unchanged.

Commenter's Reason: Revise wording from "conforming to" to "compliance with" to reflect wording in ASSE standard. Previous statements about the barrier type seal being a mechanical device and concerns about not relying on a mechanical device are unwarranted. The plumbing industry relies heavily on mechanical devices including pumps, valves and the backflow preventers that protect our water supply. Both trap seal primers and barrier type trap seal devices are 'mechanical devices' and need to be maintained, however a barrier-type device is easier to inspect for proper operation and is easy to clean if needed. There is no simple way to verify if a trap seal primer valve is operating properly and failure of the device or excess water consumption may result. Water conservation measures make the barrier-type device a more sustainable alternative.

Public Comment 2:

Chuck Lott, representing JL Industries, requests Disapproval.

Commenter's Reason: I urge rejection of this proposed code change.

Section 1002.4 allows for barrier type floor drain trap seal protection. This is in violation of several exiting code provisions put in place to protect buildings from the harmful effects of sewer gas.

Chapter 7, Section 706.2 prohibits fittings with ledges, shoulders or reductions capable of retarding or obstructing flow. One manufacturer reduces flow diameter by 25% and more depending on drain size, while another places a horizontal support bar directly across the entire diameter of the fitting.

Chapter 10, Section 1002.3 prohibits traps that rely on moving parts to maintain the seal. All barrier type devices rely on elastomeric obstructions that must move with each discharge of the drain.

Chapter 10, Section 1002.4 requires each trap to have a liquid seal of not less 2". Utilization of these barriers in lieu of trap primer valves replacing the liquid seal lost by evaporation will insure dry traps throughout every building into which they are allowed.

P196-12 also adopts ASSE Standard 1072. The standard lists the most rigorous testing protocols as optional, and is wholly inadequate in its treatment of the elastomeric membrane testing.

P196-12

Final Action: AS AM AMPC____ D

P198-12
1003.3 (New), 1003.3.2

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing InSinkErator (JBEngineer@aol.com)

Revise as follows:

1003.3 Grease interceptors required. A grease interceptor shall be required to receive the drainage from fixtures and equipment with grease-laden waste from food service establishments, such as restaurants, hotel kitchens, bars, factory cafeterias or restaurants, school cafeterias, and clubs. The discharge from a food waste grinder shall not be classified as grease-laden waste and shall not discharge through a grease interceptor.

~~**1003.3.2 Food waste grinders.** Where food waste grinders connect to grease interceptors, a solids interceptor shall separate the discharge before connecting to the grease interceptor. Solids interceptors and grease interceptors shall be sized and rated for the discharge of the food waste grinder. Emulsifiers, chemicals, enzymes and bacteria shall not discharge into the food waste grinder.~~

(Renumber subsequent sections)

Reason: The legacy codes were much clearer in establishing when a grease interceptor is requirement. This text was extracted from the BOCA National Plumbing Code/1993. There are a few changes including the addition of "school cafeterias" to the list and the revision of the facilities to "food service establishments". The other change was the modification of the last sentence to state that the discharge from food waste grinders is not classified as grease laden waste, which was the intent of the legacy codes. The SBCCI Standard Plumbing Code had similar text. The current section 1003.1 and 1003.2 are very unclear as to when grease interceptors are necessary. This will assist the inspector with necessary language for mandating grease interceptors.

The deletion of Section 1003.3.2 will also clarify that food waste grinders are not permitted to discharge through a grease interceptor. This, again, was the intent of the legacy codes. A food waste grinder should never discharge through a grease interceptor. The purpose of a food waste grinder is to pulverize food waste to small enough particles to discharge to the sewer. If a grinder connects to a grease interceptor, the food particles will separate out, defeating the purpose of a food waste grinder. Similarly, if a food waste grinder discharges to a solids interceptor, the food particles will be separated.

Cost Impact: This change does not increase the cost of construction.

1003.3 (NEW)-P-BALLANCO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The food waste grinder discharge is going to contribute to the fats, oils and greases problem and should be directed through the grease interceptor.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing InSinkErator, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

1003.3.2 Food waste ~~grinders~~ disposers. ~~Where food waste grinders connect to grease interceptors, a solids interceptor shall separate the discharge before connecting to the grease interceptor. Solids interceptors and grease interceptors shall be sized and rated for the discharge of the food waste grinder. Emulsifiers, chemicals, enzymes and bacteria shall not discharge into the food waste grinder.~~ Food waste disposers shall not discharge through a hydromechanical grease interceptor.

Commenter's Reason: I would encourage the membership to overturn the motion to deny and vote to approve this change as modified. One of the concerns expressed and discussed after the hearing was the discharge of food waste disposers to large outdoor gravity grease interceptors. The modification of this change will restrict the discharge of food waste disposers to being allowed through gravity grease interceptors only. This is accomplished by prohibiting the discharge to hydromechanical grease interceptors.

It has been well established that the addition of food particles added to hydromechanical grease interceptors is detrimental to the performance of the interceptor. This documentation has been submitted to the Code Committee and the membership in the past. The code currently does not require food waste disposers to discharge to a grease interceptor. It merely states that, when they do, there should be a solid interceptor. The thought process is that the solids interceptor will capture the food waste particles. The problem with this thought process is that the food particles will always bypass the solids interceptor and foul up the grease interceptor. Modern food waste disposers are so efficient that the food particles are very small in size. A solid interceptor would not be capable of capturing all the food particles.

The other problem with this thought process is that it defeats the purpose of a food waste disposer. Food waste is clean waste that can be readily turned into energy at the wastewater treatment plant. If you intercept the food waste, it makes no sense to install a food waste disposer.

It is unfortunate that some of the discussion at the hearing before the Code Committee reverted to whether food waste disposers should be installed in commercial kitchens. This change has nothing to do with that. Food waste disposers are already permitted. The only point of discussion is whether they should discharge through a grease interceptor. Any professional knowledgeable on grease interceptors or food waste knows that food waste disposers should never discharge through a grease interceptor.

P198-12

Final Action: AS AM AMPC____ D

P205-12
1003.4

Proposed Change as Submitted

Proponent: Andy Neuman, Assistant Chief, Plumbing Division, Bureau of Construction Codes, Department of Licensing and Regulatory Affairs, State of Michigan representing The Bureau of Construction Codes.(konyndykr@michigan.gov)

Revise as follows:

1003.4 Oil separators required. At repair garages, car washing facilities, and at factories where oily and flammable liquid wastes are produced ~~and in hydraulic elevator pits,~~ separators shall be installed into which all oil-bearing, grease bearing or flammable wastes shall be discharged before emptying into building drainage system or other point of disposal.

> ~~**Exception:** An oil separator is not required in hydraulic elevator pits where an approved alarm system is installed~~.

Reason: This code change revision will improve the code by correcting overly restrictive text which is addressed by practical elevator preventive maintenance. Adoption of the American Society of Mechanical Engineers (ASME) A17.1 Edition 2007, Safety Code for Elevators and Escalators, 2.2.2.5, requires elevators for Firefighters Emergency Operation to have a drain or pump capacity to remove 50 gallons per minute. The removal capacity provides consideration for fire suppression discharges. The consideration assures elevator operations for life safety matters by having identified discharge capacities and operations.

The IPC Commentary discussion mistakenly only considers the subsoil water presence for drainage. Elevator pits are designed to allow a very minimal amount of subsoil water if any. Additionally elevator pits are generally required to be inspected which would identify the presence of hydraulic fluid. Requiring oil separators for an emergency fire sprinkler discharge is impractical. Further the sizing of an oil separator in this case is not clarified by code. Is it sized by potential amounts? Who can predict the number of head discharges? Is it sized by the floor area per Section 1003.4.2.2? That floor area could be the pit area only or the entire floor area divided by the number of serving elevators.

This proposed revision mirrors concerns expressed by the design community and welcomes any sizing clarification from hearing attendees.

Cost Impact: Construction cost will be reduced by the proposed revision.

1003.4-P-NEUMAN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The revised language doesn't require any provision for oil separation for the discharge from a hydraulic elevator pit.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Robert G. Konyndyk, Chief, Plumbing Division, Bureau of Construction Codes, representing Sate of Michigan, requests Approval as Submitted.

Commenter's Reason: This code change revision will improve the code by correcting overly restrictive text which is addressed by practical elevator preventive maintenance. Adoption of the American Society of Mechanical Engineers (ASME) A17.1 Edition 2007, Safety Code for Elevators and Escalators, 2.2.2.5, requires elevators for Firefighters Emergency Operation to have a drain or pump capacity to remove 50 gallons per minute. The removal capacity provides consideration for fire suppression discharges. The consideration assures elevator operations for life safety matters by having identified discharge capacities and operations.

The IPC Commentary discussion mistakenly only considers the subsoil water presence for drainage. Elevator pits are designed to allow a very minimal amount of subsoil water if any. Additionally elevator pits are generally required to be inspected which would identify the presence of hydraulic fluid. Requiring oil separators for an emergency fire sprinkler discharge is impractical. Further the sizing of an oil separator in this case is not clarified by code. Is it sized by potential amounts? Who can predict the number of head discharges? Is it sized by the floor area per Section 1003.4.2.2? That floor area could be the pit area only or the entire floor area divided by the number of serving elevators.

This proposed revision mirrors concerns expressed by the design community.

In summary oil separators should not be required for the discharge from elevator pits.

P205-12

Final Action: AS AM AMPC____ D

P206-12
1003.4

Proposed Change as Submitted

Proponent: Shawn Strausbaugh representing the ICC PMG Code Action Committee

Revise as follows:

1003.4 Oil separators required. At repair garages where floor or trench drains are provided, carwashing facilities, ~~at~~ factories where oily and flammable liquid wastes are produced and ~~in~~ hydraulic elevator pits, oil separators shall be installed into which ~~all~~ oil-bearing, greasebearing or flammable wastes shall be discharged before emptying into the building drainage system or other point of disposal.

> **Exception:** An oil separator is not required in a hydraulic elevator pit where an approved alarm system is installed.

Reason: The current text appears to assume that repair garages have floor drains, trench drains or some drains into which oily wastes are being discharged. If a repair garage has no such drains, what is the purpose of an oil separator? The requirement for a separator should be triggered by the presence of fixtures that are a source of oily waste. A repair garage with only a toilet facility has no need for a separator.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

1003.4-P-STRAUSBAUGH.PMGCAC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gilbert Gonzales, Murray City, representing Utah Chapter of ICC, requests Disapproval.

Commenter's Reason: The current language does not need to be changed. The question should not be whether a floor or trench drain is installed, but whether an oil separator is required.

Where is the accidental spill discharging too if no floor drains or an oil separator is installed? The purpose of an oil separator is to catch an accidental spill of fuel, oil or grease and prevent it from discharging into the drainage system.

It is not the intent of the code to require an oil separator to serve all plumbing fixtures in a repair garage only to those serving areas where oily, grease bearing and flammable wastes are present e.g. the repair areas.

P206-12
Final Action: AS AM AMPC____ D

P209-12
202, 1101.2

Proposed Change as Submitted

Proponent: Karen Hobbs, Natural Resources Defense Council, representing herself (khobbs@nrdc.org); Eddie Van Giesen, BRAE Rainwater Technologies, representing himself (vangig@watts.com); Harry Misuriello, American Council for an Energy-Efficient Economy, representing self (misuriello@verizon.net)

Add new definitions as follows:

RAINWATER: Precipitation on any public or private parcel that has not entered an offsite storm drain system or channel, a flood control channel, or any other stream channel, and has not previously been put to beneficial use.

RAINWATER CAPTURE SYSTEM: A system designed to capture and store rainwater flowing off of a building, parking lot, or any other manmade, impervious surface for the purposes of using the rainwater for beneficial onsite use.

STORMWATER. Precipitation that has contacted a surface at grade or below grade and has not been put to beneficial use.

Revise as follows:

1101.2 Where required. *Rainwater* from ~~all~~ roofs, paved areas, yards, courts and courtyards shall drain onto open, unpaved areas for infiltration or evapotranspiration where such drainage will not cause or contribute to health, geotechnical or other hazards; or rainwater shall drain to a *rainwater capture system*. Where drainage onto open unpaved areas is not possible and a *rainwater capture system* would not provide beneficial use for the building, *rainwater* from ~~all~~ roofs, paved areas, yards, courts and courtyards shall drain into a separate storm *sewer* system, a combined *sewer* system or to an *approved* place of discharge. ~~For one- and two-family dwellings, and where approved,~~ *Storm water* is permitted to discharge onto flat areas, such as streets or lawns, provided that the storm water flows away from the building.

Reason:

1. The costs to repair and replace our nation's aging water infrastructure are enormous, with investment needs of $298 billion or more over the next 20 years, according to the U.S. Environmental Protection Agency (USEPA, 2008; http://water.epa.gov/scitech/datait/databases/cwns/upload/cwns2008rtc.pdf). In 2009, the American Society of Civil Engineers gave the nation's wastewater facilities a grade of D-minus due to their condition (American Society of Civil Engineers, 2009; http://www.infrastructurereportcard.org/sites/default/files/RC2009_full_report.pdf).
2. As NRDC recently documented in its "Rooftops to Rivers II" report (available at http://www.nrdc.org/water/pollution/rooftopsii/files/rooftopstoriversII.pdf), many cities recognize the unnecessary stress to their wastewater systems caused by having roofs and other paved areas draining directly into the sewer system, when other options exist, such as having those same surfaces drain to open, unpaved areas or captured for reuse through a rainwater harvesting system. Cities often require that roofs and paved areas drain into open, unpaved areas where the rainwater can either be infiltrated into the ground, evapotranspirated, or captured for later reuse. Many cities also have mandatory downspout disconnection programs for existing construction and many are considering mandatory downspout disconnections for new construction.
3. There are also a range of benefits that communities accrue when rainwater is either captured or reused. In a study conducted by NRDC and the University of California, Santa Barbara, *A Clear Blue Future (*http://www.nrdc.org/water/lid) found that implementing practices that emphasize on-site infiltration or capture and reuse had the potential to increase local water supplies by up to 405,000 acre-feet per year by 2030 at new and redeveloped residential and commercial properties in Southern California and the San Francisco Bay area. This represents roughly two-thirds of the volume of water used by the entire city of Los Angeles each year. These water savings translate into electricity savings of up to 1,225,500 megawatt-hours—which would decrease the release of carbon dioxide (CO_2) into the atmosphere by as much as 535,500 metric tons per year—because more plentiful local water reduces the need for energy-intensive imported water. And, perhaps most importantly, these benefits would increase every year.

Cost Impact: There is no cost impact to this proposal.

1101.2-P-HOBBS

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This type of guidance should be in an appendix to the code. This doesn't belong in the IPC as it is already in the IgCC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Karen Hobbs, Natural Resources Defense Council, representing self (khobbsnrdc.org); Eddie Van Giesen, BRAE Rainwater Technologies, representing self; Maureen Traxler, representing City of Seattle Dept of Planning & Development; Dave Cantrell, Public Health-Seattle and King County; Harry Misuriello. American Council for an Energy-Efficient Economy, representing self, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

Add new definitions as follows:

RAINWATER. Water from natural precipitation.

STORMWATER: Natural precipitation, including snowmelt, that has contacted a surface at grade or below grade.

Revise as follows:

1101.2 ~~Where required.~~ Disposal. ~~All~~ Rainwater from roofs, and stormwater from paved areas, yards, courts and courtyards shall drain ~~into a separate storm *sewer* system, or a combined *sewer* system, or~~ to an *approved* place of disposal. For one- and two-family dwellings, and where *approved*, storm water is permitted to discharge onto flat areas, such as streets or lawns, provided that the storm water flows away from the building.

Commenter's Reason:

1. We respectfully disagree with the committee's reason for disapproval, which was that, "This type of guidance should be in an appendix to the code. This doesn't belong in the IPC as it is already in the IgCC." The current IPC language requires that ALL downspouts be connected to a separate storm sewer system or a combined sewer system, ignoring the fact that many jurisdictions either actively discourage connecting downspouts to the sewer system, or, in some cases, even make those connections illegal (see below for a summary of example jurisdictions). The suggested change does not mandate the use of rainwater, it simply recognizes that many municipalities and states are actively encouraging its use. Thus, the proposed change will make it easier for local adoption.
2. Many municipalities and states recognize the beneficial use of rainwater. For example:

   - The State of Georgia, in 2009, after experiencing extreme drought conditions in 2007 and 2008, amended its state plumbing codes and issued detailed rainwater harvesting guidelines to authorize the use of captured rooftop rainwater for both indoor and outdoor non-potable applications.
   - The State of Texas established a Rainwater Harvesting Evaluation Committee in 2005 and directed the state's Water Development Board and other agencies to formulate recommendations for minimum water quality standards for potable and non-potable indoor use and ways in which the state can further promote rainwater harvesting.
   - The City of Portland, Oregon allows the use of rainwater for indoor and outdoor non-potable applications, and, when properly treated, to replace potable water supply.
   - The City of Tuscon, Arizona, in 2010, put into effect a rainwater harvesting ordinance that requires new developments to meet 50 percent of their landscaping water requirements by harvesting rainwater.
   - The states of Virginia, Oregon, and Washington have all also adopted guidelines for design and use of rainwater harvesting systems, and an estimated 30,000 to 60,000 people in the state of Hawaii (up to nearly 5 percent of the state's population) rely on rainwater to meet their water supply needs.

This information is contained in a report the Natural Resources Defense Council (NRDC) issued last year, “Capturing Rainwater from Rooftops,” which is available here: http://www.nrdc.org/water/rooftoprainwatercapture.asp.

3. The costs to repair and replace our nation’s aging water infrastructure are enormous, with investment needs of $298 billion or more over the next 20 years, according to the U.S. Environmental Protection Agency (USEPA, 2008; http://water.epa.gov/scitech/datait/databases/cwns/upload/cwns2008rtc.pdf). In 2009, the American Society of Civil Engineers gave the nation’s wastewater facilities a grade of D-minus due to their condition (American Society of Civil Engineers, 2009; http://www.infrastructurereportcard.org/sites/default/files/RC2009_full_report.pdf).
2. As NRDC recently documented in its “*Rooftops to Rivers II*” report (available at http://www.nrdc.org/water/pollution/rooftopsii/files/rooftopstoriversII.pdf), many cities recognize the unnecessary stress to their wastewater systems caused by having roofs and other paved areas draining directly into the sewer system, when other options exist, such as having those same surfaces drain to open, unpaved areas or captured for use through a rainwater harvesting system. Cities often require that roofs and paved areas drain into open, unpaved areas where the rainwater can either be infiltrated into the ground, evapotranspirated, or captured for later use. Many cities also have mandatory downspout disconnection programs for existing construction and many are considering mandatory downspout disconnections for new construction.
3. There are also a range of benefits that communities accrue from rainwater. In a study conducted by NRDC and the University of California, Santa Barbara, *A Clear Blue Future (*http://www.nrdc.org/water/lid), found that implementing practices that emphasize on-site infiltration or capture had the potential to increase local water supplies by up to 405,000 acre-feet per year by 2030 at new and redeveloped residential and commercial properties in Southern California and the San Francisco Bay area. This represents roughly two-thirds of the volume of water used by the entire city of Los Angeles each year. These water savings translate into electricity savings of up to 1,225,500 megawatt-hours—which would decrease the release of carbon dioxide (CO2) into the atmosphere by as much as 535,500 metric tons per year—because more plentiful local water reduces the need for energy-intensive imported water. And, perhaps most importantly, these benefits would increase every year.

P209-12
Final Action: AS AM AMPC____ D

P211-12
1101.7

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self (JBEngineer@aol.com)

Revise as follows:

1101.7 Roof design. Roofs shall be designed for the maximum possible depth of water that will pond thereon as determined by the relative levels of roof deck and overflow weirs, scuppers, edges or serviceable drains in combination with the deflected structural elements. In determining the maximum possible depth of water, all primary roof drainage means shall be assumed to be blocked. The maximum possible depth of water on the roof shall include the height of the water required above the inlet of the secondary roof drainage means to achieve the required flow rate of the secondary drainage means to accommodate the design rainfall rate as required by Section 1106.

Reason: Quite often, structural engineers are using the lower edge of a secondary roof drain to be the determining factor for establishing the maximum depth of water that can pond on the roof. However, the drain requires a certain head height to achieve a particular flow rate. That additional head height of water adds to the structural load. This change merely clarifies the intent of the current requirement. This change is consistent with the load requirements in the Building Code.

Cost Impact: This change does not increase the cost of construction.

1101.7-P-BALLANCO

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Roger Harper, Jr, Louisa County, VA, representing Virginia Plumbing & Mechanical Inspectors Association(VPMIA) & Virginia Building Code Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: This requirement, language, intent, design criteria (however the wording) is already found in the 2012 IBC Section 1611 with more precise language and calculations. This is a structural design issue, IBC 1611 covers this structural design, and this language is not necessary in plumbing code for it to be applicable, designable, and enforceable.

P211-12
Final Action: AS AM AMPC____ D

P218-12
1105.2 (New)

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., CPD, FASPE, JB Engineering and Code Consulting, P.C. representing self (JBEngineer@aol.com)

Add new text as follows:

1105.2 Roof drain flow rate. The published roof drain flow rate based upon the head of water above the roof drain shall be used to size the storm drainage system in accordance with Section 1106. The flow rate used for sizing the storm drainage piping shall be based on the maximum anticipated ponding at the roof drain.

(Renumber subsequent sections)

Reason: The code currently requires the storm drainage system to be sized based on the roof area. The sizing never considered the flow rate through a roof drain, nor the ponding around the roof drain required to achieve that flow rate. A study by the ASPE Research Foundation discovered that the flow rates through roof drain vary based on the design of the roof drain. The study also found that for certain roof drains, there were different flow rates depending on which strainer was installed. As a result, some smaller drains are allowing more water through the drain than the pipe is designed to handle under open channel flow.

The only proper way to size a storm drainage system is to apply the known flow rates through the roof drain such that the piping is properly sized. Without knowledge of the flow rate through a roof drain, a storm drainage system can be either undersized or oversized.

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

1105.2 (NEW)-P-BALLANCO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The report is not yet complete and the final data needs to be put in public comment for the final action.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Approval as Submitted.

Commenter's Reason: The Committee had a valid concern when they stated that the research report had not been issued regarding storm drainage. All attempts were made to have the report completed prior to the first hearing, but to no avail. As this Public Comment is being prepared, the ASPE Research Foundation, Storm Drainage System Research Project, Flow Rate Through Roof Drains report is in the final week of peer review. The report will be published shortly after the completion of the peer review. The report is over 180 pages in length in Word format. It will be typeset for publication, probably resulting in fewer pages.
With the issuance of this research report, it is imperative that the International Plumbing Code be updated for sizing storm drainage systems. The report points out that storm drainage systems have been sized incorrectly for the last 80 years. The new sizing method will result in properly designed storm drainage systems. The proposed code change is consistent with the recommendations in the ASPE RF report.

I will make this report available to anyone wishing to review it. Please contact me at JBEngineer@aol.com. I will also have a copy of the report available for review at the Annual Conference.

P218-12

Final Action: AS AM AMPC____ D

P219-12

1106.2, Table 1106.2 (New), Table 1106.2(1), Table 1106.2(2), 1106.3, Table 1106.3 (New), 1106.6, Table 1106.6

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., CPD, FASPE, JB Engineering and Code Consulting, P.C. representing himself (JBEngineer@aol.com)

Revise as follows:

~~**1106.2 Vertical conductors and leaders.** Vertical conductors and leaders shall be sized for the maximum projected roof area, in accordance with Table 1106.2(1) and Table 1106.2(2).~~

~~**TABLE 1106.2(1)**~~
~~**SIZE OF CIRCULAR VERTICAL CONDUCTORS AND LEADERS**~~

~~**TABLE 1106.2(2)**~~
~~**SIZE OF RECTANGULAR VERTICAL CONDUCTORS AND LEADERS**~~

~~**1106.3 Building storm drains and sewers.** The size of the building *storm drain*, building storm *sewer* and their horizontal branches having a slope of one-half unit or less vertical in 12 units horizontal (4-percent slope) shall be based on the maximum projected roof area in accordance with Table 1106.3. The slope of horizontal branches shall be not less than one-eighth unit vertical in 12 units horizontal (1-percent slope) unless otherwise *approved*.~~

~~**TABLE 1106.3**~~
~~**SIZE OF HORIZONTAL STORM DRAINGE PIPING**~~

1106.2 Size of storm drain piping. Vertical and horizontal storm drain piping shall be sized based on the flow rate through the roof drain. The flow rate in storm drain piping shall not exceed that specified in Table 1106.2.

TABLE 1106.2
STORM DRAIN PIPE SIZING

PIPE SIZE (inches)	CAPACITY (gpm)				
	VERTICAL DRAIN	SLOPE OF HORIZONTAL DRAIN			
		1/16 inch per ft	1/8 inch per ft	¼ inch per ft	½ inch per ft
2	34	15	22	31	44
3	87	39	55	79	111
4	180	81	115	163	231
5	311	117	165	234	331
6	538	243	344	487	689
8	1,117	505	714	1,010	1,429
10	2,050	927	1,311	1,855	2,623
12	3,272	1,480	2,093	2,960	4,187
15	5,543	2,508	3,546	5,016	7,093

1106.3 Vertical leader sizing. Vertical leaders shall be sized based on the flow rate from horizontal gutters or the maximum flow rate through roof drains. The flow rate through vertical leaders shall not exceed that specified in Table 1106.3.

TABLE 1106.3
VERTICAL LEADER SIZING

SIZE OF LEADER (inches)	CAPACITY (gpm)
2	30
2 × 2	30
1½ × 2½	30
2½	54
2½ × 2½	54
3	92
2 × 4	92
2½×3	92
4	192
3 × 4¼	192
3½×4	192
5	360
4 × 5	360
4½ × 4½	360
6	563
5 × 6	563
5½ × 5½	563
8	1208
6 × 8	1208

1106.6 Size of roof gutters. ~~The size of semicircular gutters shall be based on the maximum projected roof area in accordance with Table 1106.6.~~ Horizontal gutters shall be sized based on the flow rate from the roof surface. The flow rate in horizontal gutters shall not exceed that specified in Table 1106.6.

~~**TABLE 1106.6**~~
~~**SIZE OF SEMICIRCULAR ROOF GUTTERS**~~

TABLE 1106.6
HORIZONTAL GUTTER SIZING

GUTTER DIMENSIONS[a] (inches)	SLOPE (inch/foot)	CAPACITY (gpm)
1½ × 2½	1/4	26
1½ × 2½	1/2	40
4	1/8	39
2¼ × 3	1/4	55
2¼ × 3	1/2	87
5	1/8	74

GUTTER DIMENSIONS[a] (inches)	SLOPE (inch/foot)	CAPACITY (gpm)
4 × 2½	1/4	106
3 × 3½	1/2	156
6	1/8	110
3 × 5	1/4	157
3 × 5	1/2	225
8	1/16	172
8	1/8	247
4½ × 6	1/4	348
4½ × 6	1/2	494
10	1/16	331
10	1/8	472
5 × 8	1/4	651
4 × 10	1/2	1055

a. Dimensions are width by depth for rectangular shapes.
Single dimensions are diameters of a semicircle.

Reason: The ASPE Research Foundation completed a research project on the flow rates through roof drains. What was uncovered was the fact that storm drainage systems have been improperly designed since the code requirements inception. The code requirements date back to the original National Plumbing Code recommendations from the National Bureau of Standards published in 1940. The current code assumes that the water will gradually flow to a roof drain and flow into the piping, never to exceed the amount of flow permitted in the drain.

What is occurring is the rain water flows at different rates depending on the pitch of the roof. The more ponding of water at the roof drain, the greater the quantity of flow through the roof drain. The research discovered that for smaller roof drains, the roof drain often allowed a much greater quantity of water to flow in the drain than is permitted by pipe sizing. The end result is the storm drain becomes a pressurized piping system. There are many occurrences of pipe failures resulting from storm drainage piping blowing apart inside the building. This can be attributed to improper sizing of the storm drainage system. Either a smaller roof drain was required, or a larger storm drain pipe.

By changing the method of sizing, the flow through the roof drain is finally considered when sizing the piping system. This is no different than sizing a sanitary drainage system whereby the system is sized based on the flow rate from a given fixture drain.

There is no need to indicate roof areas since the slope and shape of the roof will impact the sizing of the storm drainage system. An engineer will have to evaluate the amount of ponding around the roof drain during a 100 year storm of one hour duration. Once the ponding is known, the drain can be selected based on the flow rate of that particular drain. The piping is then sized based on the flow through the roof drain.

The sizing for all of the tables was taken from the ASPE Sizing Tables Application. Schedule 40 PVC was used for the pipe sizes, with the exception of 5 inch. Cast iron was used to develop the 5 inch numbers. The flow rates are maximum flows using one third full for the stacks and full flow for the horizontal drains. One third full stacks was identified by the National Bureau of Standards as a flow amount that will assure open channel flow in the piping system.

Gutter sizing was also taken from the ASPE Sizing Table Application.

The ASPE Research Foundation report has not been published as of the date of code change submittal deadline. However, the testing has been completed. The flow rate through roof drains varies with manufacturer, type of strainer, and head height. There is no one size fits all result from the testing. An engineer must know the flow through the roof drain they select in order to properly size the system.

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

1106.2-P-BALLANCO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The report is not yet complete and the final data needs to be put in public comment for the final action and consistency with the committee's action on P218-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Approval as Submitted.

Commenter's Reason: The Committee had a valid concern when they stated that the research report had not been issued regarding storm drainage. All attempts were made to have the report completed prior to the first hearing, but to no avail. As this Public Comment is being prepared, the ASPE Research Foundation, Storm Drainage System Research Project, Flow Rate Through Roof Drains report is in the final week of peer review. The report will be published shortly after the completion of the peer review. The report is over 180 pages in length in Word format. It will be typeset for publication, probably resulting in fewer pages.

With the issuance of this research report, it is imperative that the International Plumbing Code be updated for sizing storm drainage systems. The report points out that storm drainage systems have been sized incorrectly for the last 80 years. The new sizing method will result in properly designed storm drainage systems. The proposed code change is consistent with the recommendations in the ASPE RF report.

I will make this report available to anyone wishing to review it. Please contact me at JBEngineer@aol.com. I will also have a copy of the report available for review at the Annual Conference. I will make this report available to anyone wishing to review it. Please contact me at JBEngineer@aol.com. I will also have a copy of the report available for review at the Annual Conference.

P219-12
Final Action: AS AM AMPC____ D

P221-12
1108.3

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., CPD, FASPE, JB Engineering and Code Consulting, P.C. representing self (JBEngineer@aol.com)

Revise as follows:

1108.3 Sizing of secondary drains. Secondary (emergency) roof drain systems shall be sized in accordance with Section 1106 based on the rainfall rate for which the primary system is sized ~~in Tables 1106.2(1), 1106.2(2), 1106.3 and 1106.6~~. Scuppers shall be sized to prevent the depth of ponding water from exceeding that for which the roof was designed as determined by Section 1101.7. Scuppers shall have an opening dimension of not less than 4 inches (102 mm). The flow through the primary system shall not be considered when sizing the secondary roof drain system.

Reason: This is a companion change to the change to Section 1106. There is no need to reference the tables in Section 1106. By merely referencing the section, the code adequately identifies the requirements for sizing the secondary drainage system.

1108.3-P-BALLANCO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The report is not yet complete and the final data needs to be put in public comment for the final action and consistency with the committee's action on P218-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Approval as Submitted.

Commenter's Reason: The Committee had a valid concern when they stated that the research report had not been issued regarding storm drainage. All attempts were made to have the report completed prior to the first hearing, but to no avail. As this Public Comment is being prepared, the ASPE Research Foundation, Storm Drainage System Research Project, Flow Rate Through Roof Drains report is in the final week of peer review. The report will be published shortly after the completion of the peer review. The report is over 180 pages in length in Word format. It will be typeset for publication, probably resulting in fewer pages.

With the issuance of this research report, it is imperative that the International Plumbing Code be updated for sizing storm drainage systems. The report points out that storm drainage systems have been sized incorrectly for the last 80 years. The new sizing method will result in properly designed storm drainage systems. The proposed code change is consistent with the recommendations in the ASPE RF report.

I will make this report available to anyone wishing to review it. Please contact me at JBEngineer@aol.com. I will also have a copy of the report available for review at the Annual Conference.

P221-12
Final Action: AS AM AMPC____ D

P222-12
1110, 1110.1

Proposed Change as Submitted

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C. representing self (JBEngineer@aol.com)

Delete without substitution:

~~**SECTION 1110**~~
~~**VALUES FOR CONTINUOUS FLOW**~~

~~**1110.1 Equivalent roof area.** Where there is a continuous or semicontinuous discharge into the building *storm rain* or building storm *sewer*, such as from a pump, ejector, air conditioning plant or similar device, each gallon per minute (L/m) of such discharge shall be computed as being equivalent to 96 square feet (9 m2) of roof area, based on a rainfall rate of 1 inch (25.4 mm) per hour.~~

Reason: This is a companion change to the change in sizing in Section 1106. Since the new sizing method uses gpm for sizing, there is no need to convert numbers for adding values for continuous flow. The gpm is simply added to the rainfall gpm.

Cost Impact: This change does not increase the cost of construction.

1110-P-BALLANCO

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The report is not yet complete and the final data needs to be put in public comment for the final action and consistency with the committee's action on P218-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing self, requests Approval as Submitted.

Commenter's Reason: The Committee had a valid concern when they stated that the research report had not been issued regarding storm drainage. All attempts were made to have the report completed prior to the first hearing, but to no avail. As this Public Comment is being prepared, the ASPE Research Foundation, Storm Drainage System Research Project, Flow Rate Through Roof Drains report is in the final week of peer review. The report will be published shortly after the completion of the peer review. The report is over 180 pages in length in Word format. It will be typeset for publication, probably resulting in fewer pages.

With the issuance of this research report, it is imperative that the International Plumbing Code be updated for sizing storm drainage systems. The report points out that storm drainage systems have been sized incorrectly for the last 80 years. The new sizing method will result in properly designed storm drainage systems. The proposed code change is consistent with the recommendations in the ASPE RF report.

I will make this report available to anyone wishing to review it. Please contact me at JBEngineer@aol.com. I will also have a copy of the report available for review at the Annual Conference.

P222-12
Final Action: AS AM AMPC____ D

P223-12
1302.2, Chapter 14

Proposed Change as Submitted

Proponent: Jeremy Brown, NSF International (Jeremy@nsf.org)

Revise as follows:

1302.2 Disinfection and treatment. ~~Gray water shall be disinfected by an approved method that employs one or more disinfectants such as chlorine, iodine or ozone that are recommended for use with the pipes, fittings and equipment by the manufacturer of the pipes, fittings and equipment.~~ Gray water shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350.

Add new standard to Chapter 14 as follows:

NSF
350-2011 Onsite Residential and Commercial Water Reuse Treatment Systems

Reason: In addition to microbiological contaminants that need disinfection, gray water contains organic compounds, suspended solids, turbidity, surfactants, and other contaminants that have the potential to accumulate and negatively impact the functioning of water closets and urinals if not treated properly. NSF/ANSI-350 *Onsite Residential and Commercial Water Reuse Treatment Systems* establishes the minimum materials, design and construction, and performance requirements for systems that disinfect and treat gray water for non-potable reuse applications, including flushing water for closets and urinals. Rigorous testing with gray water as defined by the standard ensures the treatment systems meet strict effluent quality requirements suitable for reuse applications, along with providing protection of public health and the environment. NSF 350 is currently referenced in the IGCC and IAPMO Green Supplement. Copies of this document may be obtained from the proponent.

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

Analysis: A review of the standard proposed for inclusion in the code, NSF 350-2011, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1302.2-P-BROWN

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Disapproval.

Commenter's Reason: If proposal P11 is approved at the final action hearing, then this proposal would need to be disapproved because the section that this proposal revises will no longer exist.

P223-12
Final Action: AS AM AMPC____ D

P225-12
1308.1.1 (New), Chapter 14

Proposed Change as Submitted

Proponent: Lorri Grainawi, STI/SPFA Representing the Steel Tank Institute / Steel Plate Fabricators Association (lgrainawi@steeltank.com)

Add new text as follows:

1308.1.1 Design and construction. Reservoirs shall be designed and constructed in accordance with Chapters 16 through 22 of the International Building Code and in accordance with the following standards as appropriate for the material of the reservoir: AWWA D100, AWWA D115, AWWA D120, UL 58, UL 1746, UL 1316, UL 142, API 12F or API 12D.

Add new standards to Chapter 14 as follows:

American Petroleum Institute
1220 L Street, NW
Washington, DC 20005

API

API 12F-2008	Specification for Shop Welded Tanks for Storage of Production Liquids, effective April 1, 2009
API 12D-2008	Specification for Field Welded Tanks for Storage of Production Liquids, effective April 1, 2009

AWWA

D100-05	AWWA Standard for Welded Carbon Steel Tanks for Water Storage
D115-06	AWWA Standard for Tendon Prestressed-Concrete Water Tanks
D120-09	AWWA Standard for Thermosetting Fiberglass-Reinforced Plastic Tanks

UL

UL 58-1996	Steel Underground Tanks for Flammable and Combustible Liquids with revisions through July 27, 1998
UL 1746-2007	External Corrosion Protection Systems for Steel Underground Storage Tanks
UL 1316-1994	Glass-Fiber Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol Gasoline Mixtures with revisions through May 12, 2006
UL 142-2006	Steel Aboveground Tanks for Flammable and Combustible Liquids with revisions through February 12, 2010

Reason: The Steel Tank Institute is proposing the above language in response to the fact that there are no specific references to allow the designer the ability to directly reference the appropriate provisions for the design and construction of reservoirs.

In addition, we would note that the graywater and rainwater reservoir market today is unregulated. We have experienced this through the number of communications to the Institute, were it has been found that the inquiries were citing an inconsistent application for the design and construction of reservoirs.

Our position is that some form of structural provisions needs to be incorporated in order to ensure that this subject is, at the very least, addressed. These provisions are not intended, nor do they, favor one or more materials or types of constructions of reservoirs. We simply feel that basic structural and foundation provisions of the International Building Code should be used to provide for the safe storage and installation of reservoirs holding gray water and rainwater.

With respect to the listing of standards, STI has simply employed those standards used in other applications, such as automatic fire suppression reservoirs and fuel tank reservoirs. Unfortunately, until either these standards are enhanced, or new standards are created, to handle gray water and rain water applications we felt these the most appropriate since they do cover the structural design of a reservoir.

Cost Impact: We do not anticipate significant additional costs.

Analysis: A review of the standards proposed for inclusion in the code, API 12F-2008, API 12D-2008, AWWA D100-05, AWWA

D115-06, AWWA D120-09, UL 58-1996, UL 1746-2007, UL 1316-1994 and UL 142-2006, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1308.1.1-P-GRAINAWI

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the proponent's written reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Roger Harper, Jr, Louisa County, VA, representing Virginia Plumbing & Mechanical Inspectors Association (VPMIA) & Virginia Building Code Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: Some of the referenced standards for the storage tanks are for flammable and combustible liquids, alcohol and alcohol/gasoline mixture which subsurface water is not. These types of tanks could cost more than a standard underground water storage tank and as such I believe this needs to be cleaned up before becoming code.

P225-12
Final Action: AS AM AMPC____ D

P229-12
PSD 505.8.2

Proposed Change as Submitted

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting representing The Copper Development Association (penniefeehan@me.com)

Revise as follows:

505.8.2 Soldered joints. Solder joints between copper pipe or tubing and fittings shall be made in accordance with the methods of ASTM B 828 with the following sequence of joint preparation and operation: measuring and cutting, reaming, cleaning, fluxing, assembly and support, heating, applying the solder, cooling and cleaning. ~~All cut~~ The ends of pipe or tub~~e~~ing shall be cut square and shall be reamed to the full inside diameter of the pipe or tubeing. ~~end.~~ Burrs on the outside end of the pipe or tubing shall be removed. ~~All~~ Joint surfaces to be soldered shall be cleaned bright by manual or mechanical means. ~~A~~ Flux conforming to ASTM B 813 shall be applied to the pipe or tubing and fittings. Such flux shall be noncorrosive and nontoxic after soldering. ~~be applied.~~ Pipe or tubing shall be inserted to the base of the fitting. Excess flux shall be removed from the exterior of the joint. The assembled joint shall be supported to create a uniform capillary space around the joint. An LP gas or acetylene air /fuel torch shall be used to apply heat to the assembled joint. The heat shall be applied with the flame perpendicular to the pipe or tubing. The flame shall be moved alternately between the fitting cup and the pipe or tubing. Solder in compliance with ASTM B 32 shall be applied to the joint surfaces until capillary action draws the molten solder into the cup of the fitting. ~~The joint shall be soldered with a solder conforming to ASTM B 32.~~ The soldered joint shall not be disturbed until cool. Remaining flux residue shall be cleaned from the exterior of the joint.

Reason: The above proposal provides important language from the standards to aid the end user.

Cost Impact: None

505.8.2-P-FEEHAN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: To be consistent with the committee's actions on P103-12 and P165-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Pennie L. Feehan, Pennie L. Feehan Consulting representing CDA – Copper Development Association, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

505.8.2 Soldered joints. Solder joints shall be made in accordance with the methods of ASTM B 828. All cut ends shall be cut square and reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned bright by manual or mechanical means. ~~A~~ Flux conforming to ASTM B 813 shall be applied to all joint surfaces. The joint shall be soldered with a solder conforming to ASTM B 32.

Commenter's Reason: This proposal adds language that provides clear directions to the end user and provides uniformity with the IPC & IMC.

P229-12

Final Action: AS AM AMPC____ D

P231-12
202

Proposed Change as Submitted

Proponent: Bob Gulick, representing Mazzetti Nash Lipsey Burch (bobg@mazzetti.com)

Revise as follows:

SECTION 202
GENERAL DEFINITIONS

TEMPERED WATER. Water having a temperature range between ~~85°F (29°C)~~ <u>70°F (21°C)</u> and 110°F (43°C).

Add new text as follows:

<u>**422.11 Tempered water for hand washing.** It is acceptable to serve sinks and lavatories used primarily for hand washing with a single pipe supply of tempered water at a temperature between 70°F (21°C) and 85°F (29°C).</u>

Reason: To allow tempered water systems at lower than 85°F (29°C) for hand washing in health care facilities – see second code change proposal

To reduce exposure to infection by mitigating the propagation of Legionella with lower temperature; to reduce water consumption; to reduce energy consumption and greenhouse gas emissions; and to reduce first costs. A single reduced temperature hand washing tempered water system will reduce water consumption by eliminating “warm up” time. Energy will be saved, reducing green house gas emissions, via less tempered water use and lower standby losses at lower temperatures.

Cost Impact: No direct cost impact, but indirectly facilitates cost savings. The code change proposal will not increase the cost of construction. A single pipe low temperature tempered water system with point of use heating for higher temperatures will reduce piping and insulation, which will more than offset the cost of point of use heating.

422.11 (NEW)-P-GULICK

Public Hearing Results

This code change proposal was contained in the <u>Updates to the 2012 Proposed Changes</u> posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/12-13-ProposedChanges-A.aspx

Committee Action: **Disapproved**

Committee Reason: Tempered water is already required in the code and there is no data given for reducing the tempered water low end temperature.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gary Klein, Affiliated International Management, LLC representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

TEMPERED WATER. Water having a temperature that is ~~range between~~ ~~85°F (29°C)~~ 70°F (21°C) or greater and less than 110°F (43°C).

422.11 Tempered water for hand washing. Where sinks used primarily for hand washing and lavatories are served by only a single pipe supplying tempered water, the tempered water temperature shall not exceed 80°F (27°C).

Commenter's Reason:

The committee disapproved the original proposal because no data was provided to support lowering the temperature threshold for tempered water. This comment provides information to support lowering the threshold.

The reason for lowering the temperature to 70F is because this temperature is essentially room temperature and is used by most hospital staff to wash their hands in now. Since the temperature of cold water entering a building is 50F or less in many parts of the country for much of the year, it will be necessary to heat the water to bring it up to the 70-80F range.

Why don't' people in healthcare facilities use hotter water now? Having asked healthcare professionals and facilities engineers from around the country about this topic, the reason seems to be that their hot water systems contain too large a volume between the source and the sinks to provide hot water on most occasions, even though health care workers have been trained to scrub their hands for at least 20 seconds (not the 5 seconds most of us spend when in public restrooms). The Center for Disease Control and others have found that scrubbing with soap for 20 seconds is more effective at removing bacteria and dirt than shorter times and tempered water of 105-110F.

I spoke with the proponents before submitting this comment and they agreed that the upper temperature should be limited to 80F instead of the 85F in the original proposal. The reason for limiting the upper temperature of a single pipe tempered water system for hand washing to 80F is so that the temperature remains low enough so that the growth rate of Legionella colonies will be very low. Please remember that Legionella comes into the building in the cold water supply and the colonies grow slowly until they approach body temperature.

The original proposal was made by representatives from the health care industry for use their facilities. This comment should be approved because it provides a workable alternative to the current practice of heating the water to a high temperature (at least 140F) and then mixing it with cold water to arrive at an acceptable temperature for hand washing.

Thank you for considering this comment.

P231-12

Final Action: AS AM AMPC____ D

M3-12
202

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

EXTRA-HEAVY-DUTY COOKING APPLIANCE. Extra-heavy-duty cooking appliances are those ~~include appliances~~ utilizing open flame combustion of solid fuel at any time. ~~such as wood, charcoal and briquettes. and mesquite to provide all or part of the heat source for cooking.~~

HEAVY-DUTY COOKING APPLIANCE. Heavy-duty cooking *appliances* include electric under-fired broilers, electric chain (conveyor) broilers, gas under-fired broilers, gas chain (conveyor) broilers, gas open-burner ranges (with or without oven), electric and gas wok ranges, smokers, smoker ovens, and electric and gas over-fired (upright) broilers and salamanders.

Reason: The definition of Extra-heavy-duty appliances does not appear to address smokers and smoker grills. The wood is not burned to contribute heat for cooking in these appliances, so these appliances seem to fall through the crack. Smokers would appear to require hoods based on Section 507.2.4. By defining smokers as "Heavy-duty" instead of "Extra-heavy-duty," they can be placed under a Type I hood with other heavy-, medium- and light-duty appliances. There is no apparent reason for them to be under an independent exhaust system as is required for appliances that have open flame combustion. As revised, the definition distinguishes between appliances that produce only smoke and those that actually combust the solid fuel for heat.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

202-HEAVY DUTY COOKING APPLIANCES (NEW)-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Modify the proposal as follows:

EXTRA-HEAVY-DUTY COOKING APPLIANCE. Extra-heavy-duty cooking appliances are those utilizing open flame combustion of solid fuel at any time.

HEAVY-DUTY COOKING APPLIANCE. Heavy-duty cooking *appliances* include electric under-fired broilers, electric chain (conveyor) broilers, gas under-fired broilers, gas chain (conveyor) broilers, gas open-burner ranges (with or without oven), electric and gas wok ranges, ~~smokers, smoker ovens,~~ and electric and gas over-fired (upright) broilers and salamanders.

Commenter's Reason: By adding "smokers" and "smoker ovens" to the Heavy-duty cooking appliance definition, two things happen. First, this definition is now conflicting with the definition of Extra-heavy-duty cooking appliance. The process of initiating the "smoking" in one of these appliances will require that the cooking appliance utilize "open flame combustion of solid fuel" to begin this process ("at any time"). Second, all solid fuel (wood or coal) cooking appliances, including smokers and smoker ovens, have one thing in common that should mandate more stringent code requirements (such as independent, Type I hood exhaust systems and higher exhaust flow rates). They all create highly combustible creosote ! Electric and gas fired cooking appliances do not produce this product. By allowing smokers and smoker ovens to be defined as Heavy-duty cooking appliances, safe-guard provisions provided by the IMC for open flame combustion of solid fuel in cooking appliances is compromised.

M3-12
Final Action: AS AM AMPC____ D

M16-12
Table 305.4

Proposed Change as Submitted

Proponent: Larry Gill, P. Eng., IPEX USA LLC (larry.gill@ipexna.com)

Revise as follows:

TABLE 305.4
PIPING SUPPORT SPACING[a]

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
PE-RT ≤ 1”	2 ⅔ (32 inches)	4
PE-RT ≥ 1¼	4	4

Reason: Add support dimensions for polyethylene of raised temperature (PE-RT). PE-RT is already in the International Codes and adding the support spacing will provide additional information for installation. All other dimensions in the table remain unchanged.

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

T305.4-M-GILL.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent’s published reason.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Larry Gill, IPEX USA LLC requests Approval as Modified by this Public Comment.

TABLE 305.4
PIPING SUPPORT SPACING

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
PE-RT ≤ 1"	2 ⅔ (32 inches)	4- 10[c]
PE-RT ≥1 ¼	4	4- 10[c]

Commenter’s Reason: The value of 4 feet for the vertical spacing was submitted in error. The format of the horizontal value should match the current table.

M16-12
Final Action: AS AM AMPC____ D

M23-12
307.2.3

Proposed Change as Submitted

Proponent: Richard Grace, Fairfax County, Virginia Plumbing and Mechanical Inspectors Association, Virginia Building Code Officials Association

Revise as follows:

307.2.3 Auxiliary and secondary drain systems. In addition to the requirements of Section 307.2.1, where damage to any building components could occur as a result of overflow from the *equipment* primary condensate removal system, one of the following auxiliary protection methods shall be provided for each cooling coil or fuel-fired *appliance* that produces condensate:

(1. thru 3. No change)

4. A water level detection device conforming to UL 508 shall be provided that will shut off the equipment served in the event that the primary drain is blocked. The device shall be installed in ~~the primary drain line,~~ the overflow drain line~~,~~ or in the equipment-supplied drain pan, located at a point higher than the primary drain line connection and below the overflow rim of such pan.

Reason: When these devices are installed in the primary drain line, they are not typically installed where the primary line connects to the equipment supplied drain pan. They are typically installed in the uppermost vertical level above the P-trap (approximately 6 or so inches horizontal of the unit itself). If a blockage occurs at the connection point of the primary line to the equipment supplied drain pan, or within the 6" piece of horizontal pipe between the unit and the detection device, the pan will fill and overflow without detection.

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

307.2.3-M-GRACE.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Vickie Lovell, InterCode Incorporated, representing Rectorseal Corporation, requests Disapproval

Commenter's Reason: The reason for this public comment is overturn the committee's recommendation for the original code change proposal to be approved as submitted. The original code change eliminated the option to install a water level detection device in the primary drain line. The code section states that the water level detection device will shut off the equipment when the **primary** drain is blocked. The logical way to monitor the primary drain line is to install a water level detection device in the primary drain line.

The original reason statement is flawed logically. It states that if blockage occurs at the connection point of the primary line to the equipment supply drain pan then the water level detection device will not trigger and pan will fill and overflow.

The flaw in the logic is that if the overflow drain line is blocked between the water level detection device and the pan, the pan will fill and overflow anyway. Arbitrarily removing the water level detection device in the primary drain line but not the overflow drain line is not logical. Properly installing a water level detection device in either a primary drain or an overflow drain line would be sufficient and the choice should be permitted. There is no technical merit for allowing a device to be installed in one drain line and not the other.

M23-12

Final Action: AS AM AMPC____ D

M26-12
202 (NEW), Section 307.2.3.1

<u>Proposed Change as Submitted</u>

Proponent: Timothy Burgos, InterCode Incorporated, representing Rectorseal Corporation and Ken Sagan, NRG Code Advocates, representing self
(ken@nrgcodeadvocates.com)

Add new definition as follows:

<u>**DUCTLESS MINI-SPLIT SYSTEM.** A heating and cooling system that is comprised of one or multiple indoor evaporator/air handler units and an outdoor condensing unit that is connected by refrigerant piping and electrical wiring. A ductless mini-split system is capable of cooling or heating one or more rooms without the use of a traditional ductwork system.</u>

Revise as follows:

307.2.3.1 Water-level monitoring devices <u>and condensate pumps</u>. On down-flow units and all other coils that do not have a secondary drain or provisions to install a secondary or auxiliary drain pan, a water-level monitoring device shall be installed inside the primary drain pan. This device shall shut off the *equipment* served in the event that the primary drain becomes restricted. Devices installed in the drain line shall not be permitted. <u>For ductless mini-split equipment that is not able to drain condensate from the unit by gravity, a condensate pump shall be installed to remove water from the *equipment.* The condensate pump shall be powered by the same power supply that powers the *equipment* being served and shall be capable of shutting off the equipment served in the event of failure of the pump to remove condensate.</u>

Reason: Ductless mini-split systems have existed for more than 50 years and have been available for more than 30 years in the United States HVAC residential and/or light commercial markets. Most American consumers, however, are unaware of these products. A ductless mini-split system is not a window unit; it is a permanently installed mechanical system used in new construction, additions, multi-family (condo/apartment) housing, and to improve comfort in poorly conditioned spaces.

Ductless Mini-split equipment must follow the same code requirements as other condensate producing equipment due to the potential damage and health risk associated with uncontrolled condensation. Ductless mini-split units also do not have provisions for a secondary drain, or auxiliary drain pans to prevent condensation from overflowing the primary drain pan. Currently it is unclear in the code if ductless mini-split units require water-level monitoring devices. In installations where gravity drains condensation removal is impossible, a condensate pump must be installed that communicates with the ductless mini-split to stop the equipment if there is a failure of the condensate removal system. Power for the condensate pump should be provided from the mini-split equipment and not from a separate power source. The danger of using a separate power supply is that if the circuit that supplies power to the condensate pump fails, but the circuit providing power to the mini split equipment remains active, the pump will not operate and the equipment will produce excessive condensation without shutting down. This code change addresses the condensate requirement and allows simplicity in code compliance.

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

202-DUCTLESS MINI SPLIT SYSTEM (NEW) #2-M-BURGOS-SAGAN.DOC

<u>Public Hearing Results</u>

Committee Action: **Approved as Modified**

Modify proposal as follows:

DUCTLESS MINI-SPLIT SYSTEM. A heating and cooling system that is comprised of one or multiple indoor evaporator/air handler units and an outdoor condensing unit that is connected by refrigerant piping and electrical wiring. A ductless mini-split system is capable of cooling or heating one or more rooms without the use of a traditional ductwork system.

Revise as follows:

307.2.3.1 Water-level monitoring devices ~~and condensate pumps~~. On down-flow units and all other coils that do not have a secondary drain or provisions to install a secondary or auxiliary drain pan, a water-level monitoring device shall be installed inside the primary drain pan. This device shall shut off the *equipment* served in the event that the primary drain becomes restricted. Devices installed in the drain line shall not be permitted~~. For ductless mini-split equipment that is not able to drain condensate from the unit by gravity, a condensate pump shall be installed to remove water from the *equipment.* The condensate pump shall be powered by the same power supply that powers the *equipment* being served and shall be capable of shutting off the equipment served in the event of failure of the pump to remove condensate.~~

Committee Reason: Approval is based upon the proponent's published reason. The modification deletes proposed text that is redundant with the manufacturer's instructions.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Vickie Lovell, InterCode Incorporated, representing Rectorseal Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

307.2.5 Ductless mini split system water-level monitoring devices and condensate pumps. A water-level monitoring device shall be installed inside of the main drain pan of ductless mini split system *equipment*. Such device shall shut off the *equipment* served in the event that the primary drain becomes restricted. For ductless mini split equipment that cannot drain condensation from the unit by gravity, a separate condensate pump shall be installed to remove water from the *equipment.* The condensate pump shall be capable of shutting off the equipment in the event that the condensate removal system has failed and shall be connected to the same electrical branch circuit as the *equipment* being served.

(Portions of proposal not shown are unaffected by this Public Comment.)

Commenter's Reason: The committee recommended approved as modified for this code change proposal. The committee modified the proposal to accept the definition for ductless mini-split system but not the remaining text. They stated that the text is redundant with the manufacturer's instructions. Respectively, we disagree with the committee's reason statement. The blanket statement of "follow the manufacturer's instructions" could be used for any product and the code would not be necessary. However, the code is necessary and language for ductless mini split system water-level monitoring devices and condensate pumps should be included.

The reason for this public comment is to separate water-level monitoring devices and condensate pumps requirements for ductless mini split systems from other types of cooling systems.

Because of the unique design of ductless mini split systems and the limited capacity condensate pan, a water-level monitoring device is essential to help ensure the ductless mini split system will not be damaged if condensate cannot be properly drained.

Additionally, the ductless mini split system needs to be shut down if the condensate pump fails.

M26-12
Final Action: AS AM AMPC____ D

M29-12
202, 307.2.4.1

Proposed Change as Submitted

Proponent: Timothy Burgos, InterCode Incorporated, representing Rectorseal Corporation and Ken Sagan, NRG Code Advocates, representing self

Add new definition as follows:

DUCTLESS MINI-SPLIT SYSTEM. A heating and cooling system that is comprised of one or multiple indoor evaporator/air handler units and an outdoor condensing unit that is connected by refrigerant piping and electrical wiring. A ductless mini-split system is capable of cooling or heating one or more rooms without the use of a traditional ductwork system.

Add new text as follows:

307.2.4.1 Ductless Mini-Split Traps. Ductless mini split equipment that produces condensation shall be provided with an inline check valve located in the drain line instead of a trap.

Reason: Ductless mini-split condensate lines are direct openings for unconditioned outside air, contaminants, insects and other undesirable materials to enter the conditioned space and should be trapped using an inline check valve as a preventative measure.

Ductless mini-split systems have existed for more than 50 years and have been available for more than 30 years in the United States HVAC residential and/or light commercial markets. Most American consumers, however, are unaware of these products. A ductless-mini split system is not a window unit; it is a permanently installed mechanical system used in new construction, additions, multi-family (condo/apartment) housing, and to improve comfort in poorly conditioned spaces. Since mini-splits require no ducts and indoor components are mounted directly on interior ceiling, walls, or on the floor, they avoid the energy losses associated with ductwork of central forced air systems. Duct losses can account for more than 30% of energy consumption for space conditioning, especially if the ducts are in an unconditioned space such as an attic.

Ductless mini-split heating and cooling systems are highly efficient products that deliver warm or cool air directly into different zones in a building instead of through ducts. They are also called mini-split, multi-split, or variable refrigerant flow (VRF) heat pump systems. They are an increasingly popular and cost-effective solution to replace inefficient baseboard electric heating and window air conditioners in existing homes.

Ductless mini-split systems have numerous potential applications in residential, commercial, and institutional buildings. The most common applications are in multifamily housing or as retrofit add-ons in houses with "non-ducted" heating systems, such as hydronic (hot water heat), radiant (electric resistance), and space heaters (wood, kerosene, propane). They can also be a good choice for room additions and small apartments where extending or installing distribution ductwork (for a central air-conditioner or heating systems) is not feasible or where existing equipment cannot handle the additional load.

A ductless mini-split system is comprised of an indoor unit called the evaporator and an outdoor unit called the condenser. The evaporator is connected to the condensing unit by copper tubing and electrical wiring which is passed through a 2 ½" – 4" hole. Basically, it is a small central air unit with the flexibility of cooling or heating one or more room.

The advantages of installing a ductless mini-split over a central air system.

The main advantages of a ductless mini-split are their small size and flexibility for zoning or heating and cooling individual rooms. Models can have as many as four indoor air handling units (for four zones or rooms) connected to one outdoor unit. The number of units is determined by how much heating or cooling is required for the building or each zone (which in turn is affected by the properties of the building envelope). Since each of the zones has its own thermostat, the space can be conditioned only when occupied saving energy and money.

1. With Central Air, an entire home must be cooled when only one room may be occupied. Ductless mini-splits cool only the areas that require conditioning.
2. 18,000 BTU is a typical minimum central air unit: ductless mini-splits are available beginning at 9,000 or 12,000 BTUs.
3. Typical homes requiring 3-ton HVAC units may not be zoned or require complex zoning systems that are very expensive for the homeowner. With ductless mini-splits, multiple evaporators make zoning as simple as setting a remote control.
4. Energy wasted in long lengths of uninsulated ductwork means higher energy bills. Less than 5% cooling loss occurs in insulated refrigerant lines compared with up to 25% through ducts.
5. Retrofitting existing homes with whole house air conditioning requires cutting holes in walls, floors, ceilings or decreasing closet space with ducts.
6. Ductless mini-splits require just a 2 ½ or 4" diameter hole in the outside wall meaningless mess and better home aesthetics.

Most systems now incorporate inverter-driven compressors, which allow for system ramp-up until the desired set temperature is met, then permit the system to modulate its operation so that a comfortable temperature is maintained. This operation avoids the abrupt and energy-consuming start and stop exhibited by traditional HVAC systems.

Ductless mini-split systems are also often easier to install than other types of space conditioning systems. For example, the hook-up between the outdoor and indoor units generally requires only a three inch (~8 centimeter [cm]) hole through a wall for the conduit. Also, most manufacturers of this type of system can provide a variety of lengths of connecting conduits. So, if necessary, you can locate the outdoor unit as far away as 50 feet (~15 meters [m]) from the indoor evaporator. This makes it possible to cool rooms on the front side of a building with the compressor in a more appropriate or inconspicuous place on the outside of the building.

Indoor air handlers can be suspended from a ceiling, flush-mounted in a drop ceiling, or hung on a wall. Floor-standing models are also available. Many offer a remote control to make control of high mounted units easier. Split systems can also contribute to the security of a building by eliminating the need for larger openings required for through-the-wall units or unsecured windows housing window-mounted units –openings that can provide easy access for intruders

Ductless mini-split equipment must follow the same code requirements as other condensate producing equipment due to the potential damage and health risk associated with uncontrolled condensation. Ductless mini-split units also do not have provisions for a secondary drain, or auxiliary drain pans to prevent condensation from overflowing the primary drain pan. Currently it is unclear in the code if ductless mini-split units require water-level monitoring devices. In installations where gravity drains condensation removal is impossible, a condensate pump must be installed that communicates with the ductless mini-split to stop the equipment if there is a failure of the condensate removal system. Power for the condensate pump should be provided from the mini-split equipment and not from a separate power source. The danger of using a separate power supply is that if the circuit that supplies power to the condensate pump fails, but the circuit providing power to the mini split equipment remains active, the pump will not operate and the equipment will produce excessive condensation without shutting down.

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

202-DUCTLESS MINI SPLIT SYSTEM (NEW)-M-BURGOS.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: There is no need to mandate a check valve as the only means. Manufacturers vary and this should be left to the manufacturers to decide.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Vickie Lovell, InterCode Incorporated, representing Rectorseal Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

307.2.4.1 Ductless Mini Split System Traps. Ductless mini split equipment that produces condensation shall be provided with an inline check valve located in the drain line ~~instead of~~ or a trap.

(Portions not shown are unaffected by this Public Comment.)

Commenter's Reason: The committee had an issue with the original proposal because it was too limiting for what could be used as trap. We agree with their reason. The reason for this public comment is to give an option of either using an inline check valve or a traditional trap when installing a ductless mini split system.

One of the advantages of a ductless mini split system is the ability to install a cooling system in a limited space. However, if the space is limited, a traditional trap may not be practical and an inline check should be used.

M29-12

Final Action: AS AM AMPC____ D

M32-12
307.2.5 (New)

<u>Proposed Change as Submitted</u>

Proponent: Andrew Scott Jones, President, A Better Deal Heating and Air Conditioning, Inc., a Texas Corporation, representing self (tfkolter@gmail.com/tom.kolter@yahoo.com)

Add new text as follows:

<u>**307.2.5 Cleanouts.** Condensate drains shall be provided with a means to allow cleaning of the drain and clearing of blockages without having to cut or disassemble the piping.</u>

Reason: Drain line stoppages in evaporative coils drain pan drain lines are unavoidable and common occurrences requiring clearing the drain line. Clearing these lines almost always involves cutting the drain line itself, causing water to leak into the attic or closet where the drain is located, possible collected in a bucket or soaked up with rags or paper towels. Then the technician blows compressed air through the drain line in both directions from the cut. The cut must be repaired by resealing the drain line with a PVC coupling and solvent.

This process exposes the surrounding area to water leakage and spilling with the risk of damage, mold, spilling, as well as the extra time and effort of carrying extra equipment, parts and flammable solvent. The process takes extra time and costs the homeowner more money.

With a device that permits the introduction of compressed air or nitrogen directly into the drain system permitting clearing in both directions, there is no spillage of water, no cost for the couplings or solvent and no risk of water damage or mold. The entire process requires less than five minutes.

Typically the cost of clearing a drain equipped with such a device is at least 50% less to the homeowner than the cost of clearing a blockage through the common method of cutting the pipe, attempting to collect the condensate water and repairing the cut in the drain line.

Each time a drain line is cleared though the cutting/repair process, the repair could be accomplished by installing a $15.00 line clearing device rather than a simple coupling.

Also, if clearing the drain lines were part of regular maintenance, line blockages could largely be prevented in the first place.

Cost Impact: The code change will increase the cost of construction, totaling an estimated $15.00 per unit.

307.2.3-M-JONES.DOC

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The words “a means” are not defined. It may not be safe to pressurize drains with nitrogen. The proposed text may preclude the use of unions to allow disassembly.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

Andrew S. Jones, State of Texas, representing A Better Deal Heating and Air Conditioning, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**307.2.5 Cleanouts.** Condensate drains shall be provided with a means to allow cleaning of the drain and clearing of blockages without having to cut or disassemble the piping.~~

307.2.5 Cleanouts. Condensate drain lines shall be configured to permit the clearing of blockages and performance of maintenance without requiring the drain line to be cut.

Commenter's Reason: Stoppages in drain lines from evaporative coil drain pans are a common problem, often causing substantial damage to structures and property.

M32-12

Final Action: AS AM AMPC____ D

M38-12, Part I
401.2, 401.3 (New), IBC 1203.1

<u>Proposed Change as Submitted</u>

Proponent: Craig Conner, representing self.

BOTH PARTS I AND II OF THIS CODE CHANGE WILL BE HEARD BY THE IMC COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Part I – IMC

Revise as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. ~~Where the air infiltration in a *dwelling unit* is less than 5 air changes per hour when tested with a blower door with a pressure of 0.2 inc W.C. (50 Pa) in accordance with Section 402.4.1.2~~ <u>Where a dwelling unit complies with the air tightness requirements in Section C402.4.1 or R402.4.1.2</u> of the *International Energy Conservation Code*, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403.

Add new text as follows:

<u>**401.3 Backdrafting elimination**. Dwelling units that comply with the air tightness requirements in Section C402.4.1 or R402.4.1.2 of the *International Energy Conservation Code*, shall comply with at least one of the following options:</u>

1) <u>Space heating appliances, boilers, water heating appliances, wood stoves, and fireplaces in the conditioned space of the dwelling unit shall be of the direct-vent, induced-draft, or power-vented type.</u>
2) <u>Mechanical ventilation for the conditioned space, exhaust systems, clothes dryers and central vacuum systems shall not contribute to depressurization. Systems that provide *makeup air* at a rate approximately equal to or greater than the *exhaust air* rate, that are equipped with a means of closure, and that are automatically controlled to start and operate simultaneously with the exhaust system shall not be deemed to contribute to depressurization.</u>
3) <u>Testing demonstrates compliance with the CAN/CGSB 51.71-2005 depressurization test. Where required by the *code official,* testing shall be performed by an *approved* third party.</u>
4) <u>The *registered design professional* demonstrates in an approved manner that backdrafting will not occur.</u>

Reason: Backdrafting combustion appliances can lead to serious health consequences, occasionally including death. This change is designed to greatly reduce the likelihood of backdrafting. This change is also intended to remove the apparent requirement to apply a residential air tightness test to commercial spaces, and remove redundancy in the IBC and IMC.

The 2012 I-codes and common practices are increasing the potential for backdrafting in dwelling units. Back drafting is most likely if three things are true- construction is airtight, exhaust-only ventilation is used, and atmospherically vented (natural draft) combustion appliances are in conditioned spaces. New construction is required by the 2012 IECC to be much more airtight (C402.4.1 for commercial, R402.4.1.2 for residential). Mechanical ventilation is required by the 2012 I-codes in dwelling units, with the least expensive form of mechanical ventilation being the exhaust-only ventilation fans already in common use. The energy code no longer encourages more efficient condensing furnaces by recognizing their high energy efficiency; thereby, removing some of the motivation for condensing furnaces. The trend towards large exhaust fans, such as kitchen hoods, also contributes to the problem. This combination is a recipe for back drafting problems.

The proposed change gives several options. The first two options prevent back drafting by eliminating at least one of major contributor, either the natural draft (atmospherically vented) combustion appliances, or exhaust-only ventilation. The third option is a "Depressurization Test" (standard CAN/CGSB 51.71-2005), which tests for excessive depressurization levels in dwelling units. If a vented combustion appliance using combustion air from the conditioned space experiences strong enough depressurization, the flue gases will spill into the home. Anything more than a brief reverse flow can be serious. The fourth option could be used in situations where the registered design professional can show backdrafting is not a problem without doing a full depressurization test.

Confusion on when the 2012 IBC and IMC require mechanical ventilation in dwelling units is corrected by this change. The IBC and IMC partially, but not completely, repeat air tightness requirements from the IECC. The existing IBC and IMC can be read to require the residential criteria be applied to portions of commercial buildings, whereas the commercial portion of the IECC has its own air tightness criteria. Does a new dwelling unit in a commercial building that meets the 2012 IECC commercial air tightness requirements also require mechanical ventilation? In the 2012 IBC and IMC the answer is unclear unless the residential test is also performed, a test which may be difficult for some commercial buildings. Dwelling units which meet the relatively air tight 2012 IECC commercial criteria should require mechanical ventilation. This proposed change clarifies the IBC and IMC by simply referencing the IECC for air tightness requirements.

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

Analysis: A review of the standard proposed for inclusion in the code, [CAN/CGSB 51.71-2005] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

401.2-M-CONNER.DOC

Public Hearing Results

PART I – IMC
Committee Action: Disapproved

Committee Reason: The proposed text is too prescriptive and all methods may not be viable. Item 4 of proposed Section 401.3 is redundant with Section 105.2. The new section 401.3 belongs in Section 403.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Craig Conner, Building Quality, representing self, and Mike Moore, Newport Ventures, representing Broan NuTone, request Approval as Modified by this Public Comment.

Part I – IMC

Modify the proposal as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. ~~Where a dwelling unit complies with the air tightness requirements in Section C402.4.1 or R402.4.1.2 of the *International Energy Conservation Code*, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403.~~ Group R-2, R-3, and R-4 occupancies three stories or less in height above grade plane shall be ventilated by mechanical means in accordance with Section 403.

401.3 ~~Backdrafting elimination~~ Appliance venting. Dwelling units ~~that comply with the air tightness requirements in Section C402.4.1 or R402.4.1.2 of the *International Energy Conservation Code*,~~ in Group R-2, R-3, and R-4 occupancies three stories or less in height above grade plane shall comply with at least one of the following ~~options~~.

1 Space heating appliances, ~~boilers,~~ and water heating appliances~~, wood stoves, and fireplaces~~ located within ~~in the conditioned space of the~~ a dwelling unit's air barrier shall be of the direct-vent type. ~~induced-draft, or power-vented type~~.
2 Space heating appliances and water heating appliances located within a dwelling unit's air barrier shall be of the direct-vent or mechanical draft type. Makeup air shall be provided for each of the dwelling unit's three largest exhaust systems at a rate approximately equal to or greater than the exhaust rate and shall be permitted to be a combination of outdoor air and transfer air. Makeup air systems shall be equipped with a means of closure, and shall be automatically controlled to start and operate simultaneously with the exhaust systems.
3 Space heating appliances and water heating appliances shall not be located within a dwelling unit's air barrier.
~~2 Mechanical ventilation for the conditioned space, exhaust systems, clothes dryers and central vacuum systems shall not contribute to depressurization. Systems that provide makeup air at a rate approximately equal to or greater than the exhaust air rate, that are equipped with a means of closure, and that are automatically controlled to start and operate simultaneously with the exhaust system shall not be deemed to contribute to depressurization.~~
~~3~~ 4 ~~Testing demonstrates compliance with the CAN/CGSB 51.71-2005 depressurization test. Where required by the *code official,* testing shall be performed by an *approved* third party.~~ Tested depressurization shall be within the limits specified by an approved test.

~~4 The registered design professional demonstrates in an approved manner that backdrafting will not occur.~~

Exception: This section shall not apply to the replacement of appliances in existing buildings.

Commenter's Reason: Several changes were made to M38 based on discussions with other stakeholders and the committee direction. Promoting combustion safety by reducing the potential for back drafting remains the goal of M38.

Two committee comments were integrated into the modified change. Per the committee request, the description of the buildings covered was aligned with M39 to cover "Group R-2, R-3, and R-4 occupancies three stories or less in height …" Per the committee request, item 4 of proposed Section 401.3 is redundant with Section 105.2 and was removed.

The options in the first three items were clarified to be 1) use only direct-vent systems, or 2) use only direct-vent or mechanically vented with makeup air for the three largest exhausts, or 3) locate combustion appliances outside the dwelling unit's air barrier. Item 3 would permit a mechanical room separated by an air barrier from the conditioned space to include any type of combustion device otherwise permitted by the code.

The use of makeup air was clarified. Makeup air was clarified to include transfer air as a method of indirectly bringing in outdoor air, as is approved by Section 403.4.

The referenced standard was changed to be any approved depressurization testing. A variety of testing procedures are in use in different jurisdictions.

M38-12, Part I

Final Action: AS AM AMPC____ D

M38-12, Part II
401.2, 401.3 (New), IBC 1203.1

Proposed Change as Submitted

Proponent: Craig Conner, representing self.

BOTH PARTS I AND II OF THIS CODE CHANGE WILL BE HEARD BY THE IMC COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Part II – IBC-GENERAL

Revise as follows:

1203.1 General. Buildings shall be provided with natural ventilation in accordance with Section 1203.4, or mechanical ventilation in accordance with the *International Mechanical Code*.

Dwelling units that comply with the air tightness requirements in Section C402.4.1 or R402.4.1.2 of the *International Energy Conservation Code*, ~~Where the air infiltration in a *dwelling unit* is less than 5 air changes per hour when tested with a blower door with a pressure of 0.2 inc W.C. (50 Pa) in accordance with Section 402.4.1.2 of the *International Energy Conservation Code*, the dwelling unit~~ shall be ventilated by mechanical means in accordance with Section 403 of the *International Mechanical Code.*

Add new standard to Chapter 15 as follows:

CAN/CGSB 51.71-2005 Depressurization Test

Reason: Backdrafting combustion appliances can lead to serious health consequences, occasionally including death. This change is designed to greatly reduce the likelihood of backdrafting. This change is also intended to remove the apparent requirement to apply a residential air tightness test to commercial spaces, and remove redundancy in the IBC and IMC.

The 2012 I-codes and common practices are increasing the potential for backdrafting in dwelling units. Back drafting is most likely if three things are true- construction is airtight, exhaust-only ventilation is used, and atmospherically vented (natural draft) combustion appliances are in conditioned spaces. New construction is required by the 2012 IECC to be much more airtight (C402.4.1 for commercial, R402.4.1.2 for residential). Mechanical ventilation is required by the 2012 I-codes in dwelling units, with the least expensive form of mechanical ventilation being the exhaust-only ventilation fans already in common use. The energy code no longer encourages more efficient condensing furnaces by recognizing their high energy efficiency; thereby, removing some of the motivation for condensing furnaces. The trend towards large exhaust fans, such as kitchen hoods, also contributes to the problem. This combination is a recipe for back drafting problems.

The proposed change gives several options. The first two options prevent back drafting by eliminating at least one of major contributor, either the natural draft (atmospherically vented) combustion appliances, or exhaust-only ventilation. The third option is a "Depressurization Test" (standard CAN/CGSB 51.71-2005), which tests for excessive depressurization levels in dwelling units. If a vented combustion appliance using combustion air from the conditioned space experiences strong enough depressurization, the flue gases will spill into the home. Anything more than a brief reverse flow can be serious. The fourth option could be used in situations where the registered design professional can show backdrafting is not a problem without doing a full depressurization test.

Confusion on when the 2012 IBC and IMC require mechanical ventilation in dwelling units is corrected by this change. The IBC and IMC partially, but not completely, repeat air tightness requirements from the IECC. The existing IBC and IMC can be read to require the residential criteria be applied to portions of commercial buildings, whereas the commercial portion of the IECC has its own air tightness criteria. Does a new dwelling unit in a commercial building that meets the 2012 IECC commercial air tightness requirements also require mechanical ventilation? In the 2012 IBC and IMC the answer is unclear unless the residential test is also performed, a test which may be difficult for some commercial buildings. Dwelling units which meet the relatively air tight 2012 IECC commercial criteria should require mechanical ventilation. This proposed change clarifies the IBC and IMC by simply referencing the IECC for air tightness requirements.

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

Analysis: A review of the standard proposed for inclusion in the code, [CAN/CGSB 51.71-2005] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

401.2-M-CONNER.DOC

Public Hearing Results

PART II – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: M39-12 is the preferred approach.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Craig Conner, Building Quality, representing self, and Mike Moore, Newport Ventures, representing Broan NuTone, requests Approval as Modified by this Public Comment.

PART II – IBC GENERAL

Modify the proposal as follows:

1203.1 General. Buildings shall be provided with natural ventilation in accordance with Section 1203.4, or mechanical ventilation in accordance with the *International Mechanical Code.*

~~Dwelling units that comply with the air tightness requirements in Section C402.4.1 or R402.4.1.2 of the *International Energy Conservation Code*~~ Group R-2, R-3, and R-4 occupancies three stories or less in height above grade plane shall be ventilated by mechanical means in accordance with Section 403 of the *International Mechanical Code.*

Commenter's Reason: This change is to ensure consistency with the IECC, which requires mechanical ventilation for these occupancies. Per the committee request, the description of the buildings covered was aligned with M39 to cover "Group R-2, R-3, and R-4 occupancies three stories or less in height above grade plane."

M38-12, Part II
Final Action: AS AM AMPC____ D

M39-12, Part I
401.2, IBC 1203.1

Proposed Change as Submitted

Proponent: Mike Moore, Newport Ventures, representing Broan NuTone (mmoore@newportpartnersllc.com)

THIS IS A 2 PART CODE CHANGE, BOTH PARTS WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THIS COMMITTEE

PART I – IMC

Revise as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. ~~Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2-inch water column (50 Pa) in accordance with Section 402.4.1.2 of the International Energy Conservation Code, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403~~. Group R-2, R-3, and R-4 buildings three stories or less in height above grade plane shall be ventilated by mechanical means in accordance with Section 403.

Cost Impact: There is no expected increase to the cost of construction, as this is simply a clarification of existing requirements.

401.2-M-MOORE.DOC

Public Hearing Results

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

Committee Reason: Natural ventilation should not be precluded.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mike Moore, Newport Ventures, representing Broan NuTone, requests Approved as Submitted.

Commenter's Reason: This change ensures consistency across the IMC and IECC. The IECC requires that ALL R-2, R-3, and R-4 buildings that are three stories or less in height above grade plane be provided with mechanical ventilation. This is shown as follows:

1. Definition of Residential Building in the 2012 IECC: "***RESIDENTIAL BUILDING****. For this code, includes detached one- and two-family dwellings and multiple single family dwellings (townhouses) as well as Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane.*"
2. Requirement for Mandatory Mechanical Ventilation in Section R403.5, which applies to Residential Buildings, as defined above: "***R403.5 Mechanical ventilation (Mandatory)****. The building shall be provided with ventilation that meets the*

requirements of the International Residential Code or International Mechanical Code, as applicable, or with other approved means of ventilation…"

Based on this rationale, the IECC obviously requires mechanical ventilation for all R-2, R-3, and R-4 buildings that are three stories or less in height above grade plane. This proposal short cuts the burdensome cross reference that currently exists in the IMC and IBC and ensures consistency across I-codes.

Cost Impact: Because the requirement for mechanical ventilation already exists for these buildings, this change will not increase the cost of construction.

M39-12, Part I
Final Action: AS AM AMPC____ D

M39-12, Part II
401.2, IBC 1203.1

Proposed Change as Submitted

Proponent: Mike Moore, Newport Ventures, representing Broan NuTone (mmoore@newportpartnersllc.com)

THIS IS A 2 PART CODE CHANGE, BOTH PARTS WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THIS COMMITTEE

PART II – IBC GENERAL

Revise as follows:

1203.1 General. Buildings shall be provided with natural ventilation in accordance with Section 1203.4, or mechanical ventilation in accordance with the *International Mechanical Code*. ~~Where the air infiltration rate in a *dwelling unit* is less than 5 air changes per hour when tested with a blower door at a pressure 0.2 inch w.c. (50 Pa) in accordance with Section 402.4.1.2 of the *International Energy Conservation Code*, the *dwelling unit* shall be ventilated by mechanical means in accordance with Section 403 of the *International Mechanical Code.*~~ <u>Group R-2, R-3, and R-4 buildings three stories or less in height above grade plane shall be ventilated by mechanical means in accordance with Section 403 of the *International Mechanical Code.*</u>

Reason: To identify the mechanical ventilation requirements of dwelling units, designers are now required to cross reference the 2012 IECC, determine if the dwelling unit is within a building that is covered within the scope of Chapter 4 or Chapter 5 of the IECC, and then determine if the air tightness level of the unit is sufficiently tight to require mechanical ventilation per Section 401.2 of the IMC.

This proposal short cuts this burdensome circuit by clearly stating what the designer would find if he or she were to go through this exercise – that mechanical ventilation is required by the overlap of the 2012 IECC and 2012 IMC for R-2, R-3, and R-4 buildings. The reason for this is as follows:

1. The 2012 IMC 401.2 requires dwelling units with an air infiltration rate less than 5 ACH 50 (air changes per hour at 50 Pa, as confirmed by a blower door test in accordance with 2012 IECC Section 402.4.1.2) to be provided with mechanical ventilation.
2. The scope of Chapter 4 of the 2012 IECC overlaps with that of the IMC for R-2, R-3, and R-4 buildings three stories or less above grade plane (see the definition of Residential within Chapter 2 of the IECC).
3. 2012 IECC 402.4.1.2 requires that the air leakage rate for all buildings or dwelling units within its scope be less than or equal to 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch water column (50 Pa).
4. The net result is that R-2, R-3, and R-4 buildings three stories or less in height above grade plane are required to be ventilated by mechanical means in accordance with Section 403 of the IMC.
5. Additionally, 2012 IECC 403.5 reads: "Mechanical Ventilation (Mandatory). The building shall be provided with ventilation that meets the requirements of the International Residential Code or International Mechanical Code, as applicable, or with other approved means of ventilation."

Combined, the overlap of the two codes requires that mechanical ventilation should be provided in accordance with Section 403. This proposal is needed to clarify this requirement and remove ambiguity in the code. Note that there is a companion code change proposed for Section 1203.1 of the IBC.

Cost Impact: There is no expected increase to the cost of construction, as this is simply a clarification of existing requirements.

401.2-M-MOORE.DOC

Public Hearing Results

PART II – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: Natural ventilation should not be precluded.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mike Moore, Newport Ventures, representing Broan NuTone, requests Approval as Submitted.

Commenter's Reason: This change ensures consistency across the IMC and IECC. The IECC requires that ALL R-2, R-3, and R-4 buildings that are three stories or less in height above grade plane be provided with mechanical ventilation. This is shown as follows:

1. Definition of Residential Building in the 2012 IECC: "***RESIDENTIAL BUILDING****. For this code, includes detached one- and two-family dwellings and multiple single family dwellings (townhouses) as well as Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane.*"
2. Requirement for Mandatory Mechanical Ventilation in Section R403.5, which applies to Residential Buildings, as defined above: "***R403.5 Mechanical ventilation (Mandatory)****. The building shall be provided with ventilation that meets the requirements of the International Residential Code or International Mechanical Code, as applicable, or with other approved means of ventilation…"*

Based on this rationale, the IECC obviously requires mechanical ventilation for all R-2, R-3, and R-4 buildings that are three stories or less in height above grade plane. This proposal short cuts the burdensome cross reference that currently exists in the IMC and IBC and ensures consistency across I-codes.

Cost Impact: Because the requirement for mechanical ventilation already exists for these buildings, this change will not increase the cost of construction.

M39-12, Part II
Final Action: AS AM AMPC____ D

M40-12
401.2.1 New

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Add new text as follows:

401.2 .1 Dwelling unit mechanical ventilation. The mechanical ventilation required for dwelling units by Section 401.2 shall be provided by means of one or more supply or exhaust fans or one or more local supply or exhaust fans. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply ventilation where utilized in conjunction with exhaust fans.

Reason: Section 401.2 requires mechanical ventilation in dwelling units under specified conditions, but unlike the IRC, it does not provide any guidance as to how this is to be accomplished. The proposed text is borrowed from the IRC.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

401.2.1-M-STRAUSBAUGH-PMGCAC.DOC

Public Hearing Results

M40-12

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

James L. Aycock, representing Field Controls LLC, requests Disapproval.

Commenter's Reason: M40 appears to eliminate a common and useful method of ventilation. "O*utdoor air ducts connected to the return side of an air handler*" [second sentence of M40] are also known as Central-Fan-Integrated Ventilation (CFIV) systems. M40 requires the CFIV be "utilized in conjunction with exhaust fans", apparently requiring the CFIV be directly linked or under a common set of controls with exhaust fans.

The M40 reason statement says "*the proposed text is borrowed from the IRC*". However, the IRC does not have the requirement to link the CFIV with exhaust fans. Other standards, such as ASHRAE 62.2-2010, also recognize CFIV to provide ventilation, but do not require the CFIV to be directly linked to exhaust fans.

Several companies, including my company, produce Central-Fan-Integrated Ventilation systems. CFIV systems are an existing, common, and cost-effective method of whole house ventilation that should not be eliminated by M40.

Public Comment 2:

Craig Conner, Building Quality, representing self, requests Disapproval.

Commenter's Reason: The language and requirements of M40 are unclear. The first sentence has 5 "or"s in it. In the second sentence "utilized in conjunction" is unclear. Does "utilized in conjunction" mean used in the same building? Or maybe "utilized in conjunction" means interconnected through some kind of common control system that makes all the fans operate together? To be "utilized in conjunction" do the volumes of the supply and exhaust fans have to be controlled to be equal? Although the M40 reason says the requirements are taken from the IRC (mostly section M1507.3.1) there are important differences between M40 and the IRC

M40-12

Final Action: AS AM AMPC____ D

M42-12

403, 403.3 (NEW), 403.3.1 (New), 403.3.2 (New), 403.3.2.1 (New), 403.3.2.1.1 (New), 403.3.2.2 (New), 403.3.2.3 (New), 403.3.2.4 (New)

Proposed Change as Submitted

Proponent: Mike Moore, Newport Ventures, representing Broan NuTone (mmoore@newportpartnersllc.com)

Revise as follows:

403.1 Ventilation system. Except as required by Section 403.1.1, mechanical ventilation shall be provided by a method of supply air and return or exhaust air. The amount of supply air shall be approximately equal to the amount of return and exhaust air. The system shall not be prohibited from producing negative or positive pressure. The system to convey ventilation air shall be designed and installed in accordance with Chapter 6.

403.1.1 R-2, R-3 and R-4 occupancies. Mechanical ventilation air requirements for R-2, R-3, and R-4 buildings three stories or less in height above grade plane shall be provided by an exhaust system, supply system, or combination thereof.

403.2 Outdoor air required. The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. ~~Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space.~~

> **Exception:** Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

403.2.1 Recirculation of air. The outdoor air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling to another or to dissimilar occupancies.
2. Supply air to a swimming pool and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces.
3. Where mechanical exhaust is required by Note b in Table 403.3.1.1, recirculation of air from such spaces shall be prohibited. All air supplied to such spaces shall be exhausted, including any air in excess of that required by Table 403.3.1.1.
4. Where mechanical exhaust is required by Note g in Table 403.3.1.1, mechanical exhaust is required and recirculation is prohibited where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces.

403.2.2 Transfer air. Except where recirculation from such spaces is prohibited by Table 403.3.1.1, air transferred from occupiable spaces is not prohibited from serving as makeup air for required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and smoking lounges. The amount of transfer air and exhaust air shall be sufficient to provide the flow rates as specified in Section 403.3.1.1. The required outdoor airflow rates specified in Table 403.3.1.1 shall be introduced directly into such spaces or into the occupied spaces from which air is transferred or a combination of both.

In R-2, R-3, and R-4 occupancies three stories or less in height, measures shall be taken to minimize air movement across envelope components separating dwelling units including sealing penetrations in the common walls, ceilings, and floors of each unit, and by sealing vertical chases adjacent to the units. Doors between dwelling units and common hallways shall be gasketed or otherwise made airtight.

403.3 Outdoor air and local exhaust airflow rates. R-2, R-3, and R-4 buildings three stories or less in height above grade plane shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. All other buildings intended to be occupied shall be provided with outdoor air and local exhaust, in accordance with Section 403.3.1.

403.3.1 Other buildings intended to be occupied. The design of local exhaust systems and ventilation systems for outdoor air for occupancies other than R-2, R-3 and R-4 three stories are less above grade plane, shall comply with this section.

~~403.3~~403.3.1.1 Outdoor airflow rate. Ventilation systems shall be designed to have the capacity to supply the minimum outdoor airflow rate, determined in accordance with this section. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space. The occupant load utilized for design of the ventilation system shall not be less than the number determined from the estimated maximum occupant load rate indicated in Table 403.3.1.1. Ventilation rates for occupancies not represented in Table 403.3.1.1 shall be those for a listed occupancy classification that is most similar in terms of occupant density, activities and building construction; or shall be determined by an approved engineering analysis. The ventilation system shall be designed to supply the required rate of ventilation air continuously during the period the building is occupied, except as otherwise stated in other provisions of the code.

With the exception of smoking lounges, the ventilation rates in Table 403.3.1.1 are based on the absence of smoking in occupiable spaces. Where smoking is anticipated in a space other than a smoking lounge, the ventilation system serving the space shall be designed to provide ventilation over and above that required by Table 403.3.1.1 in accordance with accepted engineering practice.

> **Exception:** The occupant load is not required to be determined based on the estimated maximum occupant load rate indicated in Table 403.3.1.1 where approved statistical data document the accuracy of an alternate anticipated occupant density.

(Renumber current sections as indicated in table)

Old Section Numbering	New Section Numbering	Section Heading
403.3	403.3.1.1	Outdoor airflow rate
403.3.1	403.3.1.1.1	Zone outdoor airflow
403.3.1.1	403.3.1.1.1.1	Breathing zone outdoor airflow
403.3.1.2	403.3.1.1.1.2	Zone air distribution effectiveness
403.3.1.3	403.3.1.1.1.3	Zone outdoor airflow
403.3.2	403.3.1.1.2	System outdoor airflow
403.3.2.1	403.3.1.1.2.1	Single zone systems
403.3.2.2	403.3.1.1.2.2	100-percent outdoor air systems
403.3.2.3	403.3.1.1.2.3	Multiple zone recirculating systems
403.3.2.3.1	403.3.1.1.2.3.1	Primary outdoor air fraction
403.3.2.3.2	403.3.1.1.2.3.2	System ventilation efficiency
403.3.2.3.3	403.3.1.1.2.3.3	Uncorrected outdoor air intake
403.3.2.3.4	403.3.1.1.2.3.4	Outdoor air intake flow rate
403.4	403.3.1.2	Exhaust ventilation
403.5	403.3.1.3	System operation
403.6	403.3.1.4	Variable air volume system control
403.7	403.3.1.5	Balancing

403.3.2 R-2, R-3, and R-4 buildings three stories or less in height above grade plane. The design of local exhaust systems and ventilation systems for outdoor air in R-2, R-3, and R-4 occupancies three stories and less in height above grade plane shall comply with sections 403.3.2.1 through 403.3.2.4.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system, or combination thereof shall be installed for each dwelling unit. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate is specified in Equation 4-1.

$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1)$ (**Equation 4-1**)
where
Q_{OA} = outdoor airflow rate, cfm
A_{floor} = floor area, ft^2
N_{br} = number of bedrooms; not to be less than one

> **Exception:** The outdoor air ventilation system shall be permitted to be designed to operate intermittently where the system has controls that enable operation for not less than 25-percent of each 4-hour segment and the outdoor airflow rate prescribed by Equation 4-1 is multiplied by the factor determined in accordance with Table 403.3.2.1. This factor shall be applied after the outdoor airflow rate is adjusted for occupant density in accordance with Section 403.3.2.1.1.

TABLE 403.3.2.1
INTERMITTENT OUTDOOR AIR RATE FACTORS[a,b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

403.3.2.1.1 Occupant density. Equation 4-1 assumes that there are two occupants in a studio or one-bedroom dwelling unit and an additional occupant for each additional bedroom. Where higher occupant densities are known, the outdoor airflow rate shall be increased by 7.5 cfm for each additional occupant. Lower occupant densities shall not be used except where approved by the code official.

403.3.2.2 Outdoor air for other spaces. Corridors and other common areas within the conditioned space shall be provided with outdoor air at a rate of not less than 0.06 cfm per ft^2 of floor area.

403.3.2.3 Local exhaust. Local exhaust systems shall be provided in kitchens, bathrooms, and toilet rooms, and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.3.

TABLE 403.3.2.3
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR R-2, R-3, AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	50 cfm intermittent or 20 cfm continuous

403.3.2.4. System controls. Local exhaust systems and ventilation systems for outdoor air shall be provided with controls that enable manual override.

Reason: Historically, the basis of the mechanical ventilation requirements for all buildings within the scope of the IMC has been ASHRAE Standard 62.1, Ventilation for Acceptable Indoor Air Quality. However, the scope of ASHRAE Standard 62.1 does not address R-2, R-3, and R-4 buildings with a height of three stories or less above grade plane. Instead, mechanical ventilation requirements for these buildings fall under the scope of ASHRAE Standard 62.2, *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*. This proposal seeks to align the mechanical ventilation requirements for R-2, R-3, and R-4 buildings of three stories or less above grade plane with the latest requirements of ASHRAE 62.2, while retaining common elements with the 2012 IRC mechanical ventilation requirements in Section M1507 wherever possible (e.g., Table 403.3.2.3 is the same as M1507.4; Table 403.3.2.1 is the same as M1507.3.3(2)).

This proposal makes no changes to the mechanical ventilation requirements of buildings other than R-2, R-3, and R-4 buildings of three stories or less above grade plane (note that the text removed from 403.2 has simply been reinserted in 403.3.1.1).

The effect of this proposal will be to simplify and clarify mechanical ventilation requirements for R-2, R-3, and R-4 buildings with a height of three stories or less above grade plane, ensuring that the IMC requirements are aligned with the latest ASHRAE standard that addresses these building types. Note that the latest ASHRAE 62.2 requirements addressing R-2, R-3, and R-4 buildings are found in addendum j to the 2010 edition. To receive a complimentary copy of addendum j, contact ASHRAE at (404) 636-8400.

Cost Impact: There is no expected increase to the cost of construction.

403.1-M-MOORE.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: There would be a significant cost impact if such text was approved. Proposed Section 403.3.2.1.1 makes assumptions. Enforcement of the proposed text would be difficult. ASHRAE 62.2 has no history of implementation on which to judge its acceptability. M40-12 was approved and approval of M42-12 would cause a clash between Sections 401.2.1 and 403.3.2.1, respectively.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Mike Moore, Newport Ventures, representing Broan NuTone, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

403.1 Ventilation system. ~~Except as required by Section 403.1.1,~~ Mechanical ventilation shall be provided by a method of supply air and return or exhaust air <u>except that mechanical ventilation air requirements for Group R-2, R-3, and R-4 occupancies three stories or less in height above grade plane shall be provided by an exhaust system, supply system, or combination thereof.</u> The amount of supply air shall be approximately equal to the amount of return and exhaust air. The system shall not be prohibited from producing negative or positive pressure. The system to convey ventilation air shall be designed and installed in accordance with Chapter 6.

~~**403.1.1 R-2, R-3 and R-4 occupancies.** Mechanical ventilation air requirements for R-2, R-3, and R-4 buildings three stories or less in height above grade plane shall be provided by an exhaust system, supply system, or combination thereof.~~

403.2 Outdoor air required. The minimum outdoor airflow rate shall be determined in accordance with Section 403.3.

> **Exception:** Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

403.2.1 Recirculation of air. The outdoor air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling to another or to dissimilar occupancies.
2. Supply air to a swimming pool and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces.
3. Where mechanical exhaust is required by Note b in Table 403.3.1.1, recirculation of air from such spaces shall be prohibited. All air supplied to such spaces shall be exhausted, including any air in excess of that required by Table 403.3.1.1.
4. Where mechanical exhaust is required by Note g in Table 403.3.1.1, mechanical exhaust is required and recirculation is prohibited where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces.

403.2.2 Transfer air. Except where recirculation from such spaces is prohibited by Table 403.3.1.1, air transferred from occupiable spaces is not prohibited from serving as makeup air for required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and smoking lounges. The amount of transfer air and exhaust air shall be sufficient to provide the flow rates as specified in Section 403.3.1.1. The required outdoor airflow rates specified in Table 403.3.1.1 shall be introduced directly into such spaces or into the occupied spaces from which air is transferred or a combination of both.

~~In R-2, R-3, and R-4 occupancies three stories or less in height, measures shall be taken to minimize air movement across envelope components separating dwelling units including sealing penetrations in the common walls, ceilings, and floors of each unit, and by sealing vertical chases adjacent to the units. Doors between dwelling units and common hallways shall be gasketed or otherwise made airtight.~~

403.3 Outdoor air and local exhaust airflow rates. Group R-2, R-3, and R-4 occupancies three stories or less in height above grade plane shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. All other buildings intended to be occupied shall be provided with outdoor air and local exhaust, in accordance with Section 403.3.1.

403.3.1 Other buildings intended to be occupied. The design of local exhaust systems and ventilation systems for outdoor air for occupancies other than R-2, R-3 and R-4 three stories are less above grade plane, shall comply with this section.

403.3.1.1 Outdoor airflow rate. Ventilation systems shall be designed to have the capacity to supply the minimum outdoor airflow rate determined in accordance with this section ~~Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow~~ to the breathing zone within each occupiable space. The occupant load utilized for design of the ventilation system shall not be less than the number determined from the estimated maximum occupant load rate indicated in Table 403.3.1.1. Ventilation rates for occupancies not represented in Table 403.3.1.1 shall be those for a listed occupancy classification that is most similar in terms of occupant density, activities and building construction; or shall be determined by an approved engineering analysis. The ventilation system shall be designed to supply the required rate of ventilation air continuously during the period the building is occupied, except as otherwise stated in other provisions of the code.

With the exception of smoking lounges, the ventilation rates in Table 403.3.1.1 are based on the absence of smoking in occupiable spaces. Where smoking is anticipated in a space other than a smoking lounge, the ventilation system serving the space shall be designed to provide ventilation over and above that required by Table 403.3.1.1 in accordance with accepted engineering practice.

Exception: The occupant load is not required to be determined based on the estimated maximum occupant load rate indicated in Table 403.3.1.1 where approved statistical data document the accuracy of an alternate anticipated occupant density.

(Renumber current sections as indicated in table)

Old Section Numbering	New Section Numbering	Section Heading
403.3	403.3.1.1	Outdoor airflow rate
403.3.1	403.3.1.1.1	Zone outdoor airflow
403.3.1.1	403.3.1.1.1.1	Breathing zone outdoor airflow
403.3.1.2	403.3.1.1.1.2	Zone air distribution effectiveness
403.3.1.3	403.3.1.1.1.3	Zone outdoor airflow
403.3.2	403.3.1.1.2	System outdoor airflow
403.3.2.1	403.3.1.1.2.1	Single zone systems
403.3.2.2	403.3.1.1.2.2	100-percent outdoor air systems
403.3.2.3	403.3.1.1.2.3	Multiple zone recirculating systems
403.3.2.3.1	403.3.1.1.2.3.1	Primary outdoor air fraction
403.3.2.3.2	403.3.1.1.2.3.2	System ventilation efficiency
403.3.2.3.3	403.3.1.1.2.3.3	Uncorrected outdoor air intake
403.3.2.3.4	403.3.1.1.2.3.4	Outdoor air intake flow rate
403.4	403.3.1.2	Exhaust ventilation
403.5	403.3.1.3	System operation
403.6	403.3.1.4	Variable air volume system control
403.7	403.3.1.5	Balancing

403.3.2 R-2, R-3, and R-4 buildings three stories or less in height above grade plane. The design of local exhaust systems and ventilation systems for outdoor air in R-2, R-3, and R-4 occupancies three stories and less in height above grade plane shall comply with sections 403.3.2.1 through 403.3.2.4.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system, or combination thereof shall be installed for each dwelling unit. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate is specified in Equation 4-1.

$Q_{OA} = 0.0\cancel{3}1A_{floor} + 7.5(N_{br} + 1)$ (**Equation 4-1**)
where
Q_{OA} = outdoor airflow rate, cfm
A_{floor} = floor area, ft^2
N_{br} = number of bedrooms; not to be less than one

> **Exception:** The outdoor air ventilation system shall be permitted to be designed to operate intermittently where the system has controls that enable operation for not less than ~~25-percent~~ 1 hour of each 4-hour ~~segment and~~ period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-1 ~~is multiplied by the factor determined in accordance with Table 403.3.2.1. This factor shall be applied after the outdoor airflow rate is adjusted for occupant density in accordance with Section 403.3.2.1.1.~~

~~TABLE 403.3.2.1~~
~~INTERMITTENT OUTDOOR AIR RATE FACTORS[a,b]~~

~~RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT~~	~~25%~~	~~33%~~	~~50%~~	~~66%~~	~~75%~~	~~100%~~
~~Factor[a]~~	~~4~~	~~3~~	~~2~~	~~1.5~~	~~1.3~~	~~1.0~~

~~**403.3.2.1.1 Occupant density.** Equation 4-1 assumes that there are two occupants in a studio or one-bedroom dwelling unit and an additional occupant for each additional bedroom. Where higher occupant densities are known, the outdoor airflow rate shall be increased by 7.5 cfm for each additional occupant. Lower occupant densities shall not be used except where approved by the code official.~~

403.3.2.2 Outdoor air for other spaces. Corridors and other common areas within the conditioned space shall be provided with outdoor air at a rate of not less than 0.06 cfm per ft^2 of floor area.

403.3.2.3 Local exhaust. Local exhaust systems shall be provided in kitchens, bathrooms, and toilet rooms, and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.3.

TABLE 403.3.2.3
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR GROUP R-2, R-3, AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	50 cfm intermittent or 20 cfm continuous

~~**403.3.2.4. System controls.** Local exhaust systems and ventilation systems for outdoor air shall be provided with controls that enable manual override.~~

Commenter's Reason: The comment and proposal are intended to clarify and simplify the mechanical ventilation compliance path for R-2, R-3, and R-4 buildings three stories or less in height above grade plane to be consistent with those in the 2012 IRC and ASHRAE 62.2 as much as possible. The reason for this is that these buildings more closely match the scope of ASHRAE 62.2 than ASHRAE 62.1, and so they should not be subject to the rigor of the design calculations of ASHRAE 62.1/IMC Section 403 (Note that ASHRAE 62.1 serves as the precedent for IMC Section 403, and the requirements are very similar). One big advantage gained by aligning the mechanical ventilation path for these buildings with ASHRAE 62.2 and the 2012 IRC Section M1507 is that only one equation is necessary in the proposed comment instead of the eight equations that a designer could have to solve if she were to follow the prescriptive requirements of Section 403, which applies to all commercial buildings. Further, the proposed text does not reference ASHRAE 62.2, so the path is simplified by not requiring the user to reference any external standards or codes.

Significant changes in the comment that provide improvements to the original proposal include:

- Outdoor air flow rates are now in accordance with ASHRAE 62.2-2010 and 2012 IRC M1507
- Removed requirement for manual override control (doesn't really make sense for hotels)
- Removed requirement to adjust flow rate when future occupancy rates are known (this is rarely the case and is unenforceable)
- Removed language to require air sealing of individual units (unenforceable in its proposed format; also this is already covered within the IECC)
- Removed the intermittent ventilation table while retaining the option to provide intermittent outdoor air (simplified and consistent with 2012 IRC M1507.3.3)

Addressing the committee objections:

1. Committee: There would be a significant cost impact if such text was approved. ANSWER: Not true, since the IECC already requires mechanical ventilation for these occupancies. Further, these systems are typically provided with an upgraded bathroom exhaust fan, so the marginal cost of a system is typically $100-$150 versus an entry level bath fan.
2. Committee: Proposed Section 403.3.2.1.1 makes assumptions. Enforcement of the proposed text would be difficult. ANSWER: I agree, and have removed this text.
3. Committee: The latest ASHRAE 62.2 addenda on which part of this proposal was based has no history of implementation on which to judge its acceptability. ANSWER: I agree, and have removed the parts of the proposal that were based on requirements in the addenda.

4. Committee: M40-12 was approved and approval of M42-12 would cause a clash between Sections 401.2.1 and 403.3.2.1, respectively. ANSWER: There is no clash between the two sections. Rather, Section 403.3.2.1 provides greater clarification for code officials and designers on what a compliant system looks like, to remove confusion that could otherwise result from just having M40-12 and no complementary text.

Cost impact: This proposal will not increase the cost of construction. If anything, it will reduce the cost of construction by simplifying system design.

M42-12
Final Action: AS AM AMPC____ D

M50-12
403

Proposed Change as Submitted

Proponent: Steve Ferguson representing the American Society of Heating, Refrigerating, and Air-Conditioning Engineers

Revise as follows:

403.3.1.1 Breathing zone outdoor airflow. The outdoor airflow rate required in the *breathing zone* (Vbz) of the occupiable space or spaces in a zone shall be not less than the value determined in accordance with Equation 4-1.

$Vbz = RpPz + RaAz$ (Equation 4-1)

Where:

Az = zone floor area: the net occupiable floor area of the space or spaces in the zone.
Pz = zone population: the number of people in the space or spaces in the zone as determined by Section 403.3.1.4.
Rp = people outdoor air rate: the outdoor airflow rate required per person from Table 403.3
Ra = area outdoor air rate: the outdoor airflow rate required per unit area from Table 403.3

403.3.1.2 Zone air distribution effectiveness. The *zone air distribution effectiveness* (*Ez*) shall be not greater than the value determined using Table 403.3.1.2.

403.3.1.4 Design Zone Population. Design *zone population (Pz)* shall equal the largest (peak) number of people expected to occupy the *ventilation zone* during typical usage.

Exceptions:

1. Where the number of people expected to occupy the *ventilation zone* fluctuates, a *zone population* equal to the average number of people shall be permitted to be used,
2. Where the largest or average number of people expected to occupy the *ventilation zone* cannot be established for a specific design, an estimated value for *zone population* shall be permitted to be used, provided that such value is the product of the *net occupiable area* of the *ventilation zone* and the occupant density listed in Table 403.3.

403.3.2 System outdoor airflow. The outdoor air required to be supplied by each ventilation system shall be determined in accordance with Section 403.3.2.1 through 403.2.3 as a function of system type and zone outdoor airflow rates.

403.3.2.1 Single zone systems. ~~When~~ For *ventilation* systems wherein one or more air handler supplies a mixture of outdoor air and recirculated return air to only one zone, the system *outdoor air intake flow rate* (*Vot*) shall be determined in accordance with Equation 4-3.

$Vot = Voz$ (Equation 4-3)

403.3.2.2 100% outdoor air systems. ~~When~~ For *ventilation* systems wherein one or more air handler supplies only outdoor air to one or more zones, the system *outdoor air intake flow* rate (*Vot*) shall be determined using Equation 4-4.

$Vot = \Sigma all\ zones Voz$ (Equation 4-4)

403.3.2.3 Multiple zone recirculating systems. Where one air handler supplies a mixture of outdoor air and recirculated return air to more than one zone, the system outdoor air intake flow rate (*Vot*) shall be determined in accordance with Sections 403.3.2.3.1 through 403.3.2.3.4.

$Z_p = Voz/ Vpz$ (Equation 4-5)

Where

Vpz = Primary airflow: The airflow rate supplied to the zone from the air-handling unit at which the outdoor air intake is located. It includes outdoor intake air and recirculated air from that air-handling unit but does not include air transferred or air recirculated to the zone by other means. For design purposes, *Vpz* shall be the zone design primary airflow rate, except for zones with variable air volume supply and *Vpz* shall be the lowest expected primary airflow rate to the zone when it is fully occupied.

TABLE 403.3
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Correctional facilities				
Cells without plumbing fixtures	25	~~5~~10	0.12	—
with plumbing fixtures[g]	25	~~5~~10	0.12	1.0
Dining halls (see food and beverage service)	—	—	—	—
Guard stations	15	5	0.06	—
Day room	30	5	0.06	—
Booking/waiting	50	7.5	0.06	—
Dry cleaners, laundries				
Coin-operated dry cleaner	20	15	—	—
Coin-operated laundries	20	7.5	~~0.06~~0.12	—
Commercial dry cleaner	30	30	—	—
Commercial laundry	10	25	—	—
Storage, pick up	30	7.5	0.12	—
Education				
Auditoriums	150	5	0.06	—
Corridors (see public spaces)	—	—	~~—~~0.06	—
Media center	25	10	0.12	—
Sports locker rooms[g]	—	—	—	0.5
Music/theater/dance	35	10	0.06	—
Smoking lounges[b]	70	60		—
Day care (through age 4)	25	10	0.18	—
Classrooms (ages 5-8)	25	10	0.12	—

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Classrooms (age 9 plus)	35	10	0.12	—
Lecture classroom	65	7.5	0.06	—
Lecture hall (fixed seats)	150	7.5	0.06	—
Art classroom[g]	20	10	0.18	0.7
Science laboratories[g]	25	10	0.18	1.0
Wood/metal shops[g]	20	10	0.18	0.5
Computer lab	25	10	0.12	—
Multiuse assembly	100	7.5	0.06	—
Locker/dressing rooms[g]	—	—	—	0.25
Food and beverage service				
Bars, cocktail lounges	100	7.5	0.18	—
Cafeteria, fast food	100	7.5	0.18	—
Dining rooms	70	7.5	0.18	—
Kitchens (cooking)[b]	—20	—7.5	—0.12	0.7
Hospitals, nursing and convalescent homes				
Autopsy rooms[b]	—	—	—	0.5
Medical procedure rooms	20	15	—	—
Operating rooms	20	30	—	—
Patient rooms	10	25	—	—
Physical therapy	20	15	—	—
Recovery and ICU	20	15	—	—

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Hotels, motels, resorts and dormitories				
Multipurpose assembly	120	5	0.06	—
Bathrooms/toilet—private[g]		—	—	25/50[f]
Bedroom/living room	10	5	0.06	—
Conference/meeting	50	5	0.06	—
Dormitory sleeping areas		5	0.06	—
Gambling casinos	120	7.5	0.18	—
Lobbies/prefunction	120	7.5	0.06	—
Offices				
Conference rooms	50	5	0.06	—
Office spaces	5	5	0.06	—
Reception areas	30	5	0.06	—
Telephone/data entry	60	5	0.06	—

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Main entry lobbies	10	5	0.06	—
Private dwellings, single and multiple				
Garages, common for multiple units[b]	—	—	—	0.75
Garages, separate for each dwelling[b]	—	—	—	100 cfm per car
Kitchens[b]	—	—	—	25/100[f]
Living areas[c]	Based upon number of bedrooms. First bedroom, 2; each additional bedroom, 1	0.35 ACH but not less than 15 cfm/person	—	—
Toilet rooms and bathrooms[g]	—	—	—	20/50[f]
Public spaces				
Corridors	—	—	0.06	—
Elevator car	—	—	—	1.0
Shower room (per shower head)[g]	—	—	—	50/20[f]
Smoking lounges[b]	70	60	—	—
Toilet rooms — public[g]	—	—	—	50/70[e]
Places of religious worship	120	5	0.06	—
Courtrooms	70	5	0.06	—
Legislative chambers	50	5	0.06	—
Libraries	10	5	0.12	—
Museums (children's)	40	7.5	0.12	—
Museums/galleries	40	7.5	0.06	—
Retail stores, sales floors and showroom floors				
Sales (except as below)	15	7.5	0.12	—
Dressing rooms	—	—	—	0.25
Mall common areas	40	7.5	0.06	—
Shipping and receiving	—2	—10	0.12	—
Smoking lounges[b]	70	60	—	—
Storage rooms	—	—	0.12	—
Warehouses (see storage)	—	—10	—0.06	—

TABLE 403.3—continued
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^{2} [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^{2} [a]	EXHAUST AIRFLOW RATE CFM/FT^{2} [a]
Specialty shops				
Automotive motor-fuel dispensing stations[b]	—	—	—	1.5
Barber	25	7.5	0.06	0.5
Beauty salons[b]	25	20	0.12	0.6
Nail salons[b,h]	25	20	0.12	0.6
Embalming room[b]	—	—	—	2.0
Pet shops (animal areas)[b]	10	7.5	0.18	0.9
Supermarkets	8	7.5	0.06	—
Sports and amusement				
Disco/dance floors	100	20	0.06	—
Bowling alleys (seating areas)	40	10	0.12	—
Game arcades	20	7.5	0.18	—
Ice arenas without combustion engines	—	—	0.30	0.5
Gym, stadium, arena (play area)	—	—	0.30	—
Spectator areas	150	7.5	0.06	—
Swimming pools (pool and deck area)	—	—	0.48	—
Health club/aerobics room	40	20	0.06	—
Health club/weight room	10	20	0.06	—
Storage				
Repair garages, enclosed parking garages[b,d]	—	—	—	0.75
Warehouses	—	—10	0.06	—
Theaters				
Auditoriums (see education)	—	—	—	—
Lobbies	150	5	0.06	—
Stages, studios	70	10	0.06	—
Ticket booths	60	5	0.06	—
Transportation				
Platforms	100	7.5	0.06	—
Transportation waiting	100	7.5	0.06	—
Workrooms				
Bank vaults/safe deposit	5	5	0.06	—
Darkrooms	—	—	—	1.0

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Copy, printing rooms	4	5	0.06	0.5
Meat processing[c]	10	15	—	—
Pharmacy (prep. area)	10	5	0.18	—
Photo studios	10	5	0.12	—
Computer (without printing)	4	5	0.06	—

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 $m^3/(s \cdot m^2)$, °C = [(°F) -32]/1.8, 1 square foot = 0.0929 m^2.

a. Based upon *net occupiable floor area*.
b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited (see Section 403.2.1, Item 3).
c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.
d. Ventilation systems in enclosed parking garages shall comply with Section 404.
e. Rates are per water closet or urinal. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.
f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.
g. Mechanical exhaust is required and recirculation is prohibited except that recirculation shall be permitted where the resulting supply airstream consists of not more than 10 percent air recirculated from these spaces (see Section 403.2.1, Items 2 and 4).
h. For nail salons, each nail station shall be provided with a *source capture system* capable of exhausting not less than 50 cfm per station.

Reason: The current ventilation criteria in the IMC are essentially based on ASHRAE Standard 62-2007. Research has been conducted since then our knowledge of indoor air quality and ventilation has evolved. In response to these actions ASHRAE has enhanced Standard 62.1, upon which the IMC is based. This code change would make the IMC consistent with ventilation rate procedures defined in ANSI/ASHRAE Standard 62.1-2010.

Substantiation: ANSI/ASHRAE Standard 62.1-2010 is a consensus national standard. Standard 62.1 ventilation rate calculation procedure has been substantially updated in the 2010 version to reflect the latest research on building indoor air quality. The procedure now requires designers to account for pollutant sources other than occupants, such as building materials and furnishings, and to account for the efficiency of the ventilation system to deliver outdoor air to the breathing zone. Ventilation systems designed using the new procedures will result in slightly lower outdoor rates for most occupancies compared to the current code, reducing first costs and energy costs.

Cost Impact: The code change proposal will not increase the cost of construction, and in some instances will reduce the first cost of construction. Engineering design effort and jurisdictional plan review processes will not be materially affected due to the availability and greater specificity of compliance tools.

403.3.1.1-M-FERGUSON.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed text in Section 403.3.1.4 is subjective and unenforceable.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Steve Ferguson representing the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**403.3.1.4 Design Zone Population.** Design *zone population (Pz)* shall equal the largest (peak) number of people expected to occupy the *ventilation zone* during typical usage.~~

~~**Exceptions:**~~

1. ~~Where the number of people expected to occupy the *ventilation zone* fluctuates, a *zone population* equal to the average number of people shall be permitted to be used,~~
2. ~~Where the largest or average number of people expected to occupy the *ventilation zone* cannot be established for a specific design, an estimated value for *zone population* shall be permitted to be used, provided that such value is the product of the *net occupiable area* of the *ventilation zone* and the occupant density listed in Table 403.3.~~

TABLE 403.3
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^{2} [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^{2} [a]	EXHAUST AIRFLOW RATE CFM/FT^{2} [a]
Correctional facilities				
Cells without plumbing fixtures	25	5~~10~~	0.12	—
with plumbing fixtures[g]	25	5~~10~~	0.12	1.0
Hotels, motels, resorts and dormitories				
Lobbies/prefunction	~~120~~30	7.5	0.06	—

(Portions of proposal not shown are unaffected by this Public Comment.)

Commenter's Reason: The remainder of the changes from the proposal are not included as this comment does not intend to modify them. The intent of this modification is only to make the ventilation rates in Table 403.3 consistent with the current published version of ASHRAE Standard 62.1-2010. The proposed new requirements for Zone Population are being removed in response to objections raised during the code hearings. All other modifications from the original proposal are not shown and remain unchanged by this public comment.

M50-12

Final Action: AS AM AMPC____ D

M52-12
403.4

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

403.4 Exhaust ventilation. Exhaust airflow rate shall be provided in accordance with the requirements in Table 403.3. Where Table 403.3 specifies a people outdoor airflow rate, an area outdoor airflow rate, or both for an occupancy that also has an exhaust airflow rate specified by Table 403.3, the space served by the required exhaust airflow shall be supplied with outdoor air at a rate not less than that determined in accordance with Section 403.3 and such outdoor air shall be either a component of the makeup air for the required exhaust airflow or it shall be otherwise relieved or exhausted. Exhaust *makeup air* shall be permitted to be any combination of outdoor air, recirculated air and transfer air provided that the outdoor air requirements of Table 403.3 are satisfied ~~except as limited in accordance with Section 403.2~~.

Reason: Consistent with the intent of ASHRAE 62.1, the exhaust rate prescribed by the last (far right) column of Table 403.3 is NOT applied in addition to the rate determined from the other columns. Note that the exhaust column rate will almost always be greater than the rate determined from the other columns, therefore, the exhaust rate column rules. For example, see table entries for cells with plumbing, wood shops, science labs, barber shops, ice arenas and copy rooms. This raises the question of why are there numbers in the first 3 columns if they are overridden by the exhaust column. According to ASHRAE, the reason is to make sure that at least that much outdoor air is introduced into the space as makeup air for the exhaust system, with the rest of the makeup air being transfer air from other spaces. For example, assume a standalone barber shop of 1000 sq ft with a single zone and assume a zone effectiveness (E_z) of 1. So, 0.5 times 1000 = 500 CFM for the exhaust column. For the other columns, 7.5 times 25 occupants = 188CFM and 0.06 times 1000 = 60 CFM; 60 plus 188 = 248 CFM which is less than 500. The intent is that 500CFM is the required ventilation rate for the shop and the makeup air has to be composed of at least 248 CFM of outdoor air and the remainder of 252 CFM can be transfer air or outdoor air. Now that it can be seen how this is supposed to work, it is apparent that Section 403.4 fails to explain this. The code user would have no idea based on current text.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

403.4-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mike Moore, Newport Ventures, representing Broan NuTone, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

403.4 Exhaust ventilation. Exhaust airflow rate shall be provided in accordance with the requirements in Table 403.3. Outdoor air introduced into a space by an exhaust system shall be considered as contributing to the outdoor airflow required by Table 403.3. ~~Where Table 403.3 specifies a people outdoor airflow rate, an area outdoor airflow rate, or both for an occupancy that also has an exhaust airflow rate specified by Table 403.3, the space served by the required exhaust airflow shall be supplied with outdoor air at a rate not less than that determined in accordance with Section 403.3 and such outdoor air shall be either a component of the makeup air for the required exhaust airflow or it shall be otherwise relieved or exhausted. Exhaust *makeup air* shall be permitted to be any combination of outdoor air, recirculated air and transfer air provided that the outdoor air requirements of Table 403.3 are satisfied.~~

AIR, MAKEUP. ~~Air that is provided to replace air being exhausted~~ Any combination of outdoor and transfer air intended to replace exhaust air and exfiltration

AIR, OUTDOOR ~~AIR~~. ~~Air taken from the outdoors, and therefore not previously circulated through the system.~~ Ambient air that enters a building through a ventilation system, through intentional openings for natural ventilation, or by infiltration

AIR, TRANSFER. Air moved from one indoor space to another

INFILTRATION. Uncontrolled inward air leakage to conditioned spaces through unintentional openings in ceilings, floors, and walls from unconditioned spaces or the outdoors caused by pressure differences across these openings due to wind, inside-outside temperature differences (stack effect), and imbalances between supply and exhaust airflow rates.

EXFILTRATION. Uncontrolled outward air leakage from conditioned spaces through unintentional openings in ceilings, floors, and walls to unconditioned spaces or the outdoors caused by pressure differences across these openings due to wind, inside-outside temperature differences (stack effect), and imbalances between supply and exhaust airflow rates.

TABLE 403.3.1.2
ZONE AIR DISTRIBUTION EFFECTIVENESS[a,b,c,d,e]

Air Distribution Configuration	**Ez**
Ceiling or floor supply of cool air	1.0f
Ceiling or floor supply of warm air and floor return	1.0
Ceiling supply of warm air and ceiling return	0.8g
Floor supply of warm air and ceiling return	0.7
Makeup air drawn in on the opposite side of the room from the exhaust and/or return	0.8
Makeup air drawn in near to the exhaust and/or return location	0.5

a. "Cool air" is air cooler than space temperature.
b. "Warm air" is air warmer than space temperature.
c. "Ceiling" includes any point above the breathing zone.
d. "Floor" includes any point below the breathing zone.
~~e. "Makeup air" is air supplied or transferred to a zone to replace air removed from the zone by exhaust or return systems.~~
f. Zone air distribution effectiveness of 1.2 shall be permitted for systems with a floor supply of cool air and ceiling return, provided that low velocity displacement ventilation achieves unidirectional flow and thermal stratification.
g. Zone air distribution effectiveness of 1.0 shall be permitted for systems with a ceiling supply of warm air, provided that supply air temperature is less than 15°F above space temperature and provided that the 150 foot-per-minute supply air jet reaches to within 41/2 feet of floor level.

501.4 Pressure equalization. Mechanical exhaust systems shall be sized to remove the quantity of air required by this chapter to be exhausted. The system shall operate when air is required to be exhausted. Where mechanical exhaust is required in a room or space in other than occupancies in R-3 and dwelling units in R-2, such space shall be maintained with a neutral or negative pressure. If a greater quantity of air is supplied by a mechanical ventilating supply system than is removed by a mechanical exhaust for a room, adequate means shall be provided for the natural or mechanical exhaust of the excess air supplied. If only a mechanical exhaust system is installed for a room or if a greater quantity of air is removed by a mechanical exhaust system than is supplied by a mechanical ventilating supply system for a room, adequate makeup air ~~consisting of supply air, transfer air or outdoor air~~ shall be provided to satisfy the deficiency. The calculated building infiltration rate shall not be used to satisfy the requirements of this section.

Commenter's Reason: Overview: The intention of M52, which was approved as submitted, was to clarify the relationship between exhaust air, outdoor air, transfer air, and makeup air. This comment proposes to further simplify and clarify this section by updating key definitions to be consistent with ASHRAE 62.1 and then deleting redundant/outdated text in Sections 403.4, Table 403.3.1.2, and 501.4. If approved, this change should reduce a great deal of confusion that exists over these terms and their application.

Detailed Explanation: M52 added the second sentence of Section 403.4 to describe the physical relationship between exhaust air, makeup air, outdoor air, and transfer air. It sought to clarify that exhaust air can result in outdoor air provided to a space. This clarification is helpful because the current IMC definition of outdoor air ("*air from the outdoors, and therefore not previously circulated through the system"*) does not provide any information on how outdoor air can be provided by an exhaust system. By updating the definition of outdoor air to the same definition used in ASHRAE 62.1 (the standard upon which this section was originally based), this is clarified (i.e., exhaust systems provide outdoor air through infiltration). Section 403.4 also seeks to clarify the origin/composition of makeup air. This is currently necessary because the current IMC definition of makeup air is inadequate. By updating the definition of makeup air to that used in ASHRAE 62.1 (i.e., "…any combination of outdoor air and transfer air"), this is corrected, and there is no longer a need to explain the origin/composition of makeup air in Section 403.4.

Table 403.3.1.2, based on ASHRAE 62.1 Table 6-2, has a definition of makeup air that should be removed for two reasons. First, definitions belong in chapter 2. Second, ASHRAE 62.1 Table 6-2 does not support this definition. For consistency, there should only be one definition of makeup air within the IMC and it should correlate with ASHRAE 62.1.

Regarding Section 501.4, with makeup air now defined to include outdoor air and transfer air, it is no longer necessary to have the explanation of makeup air in this section, only the reference. Also, proposal M61 (approved as submitted by the IMC committee in Dallas) removed the last sentence of this section. Hence, this sentence has been stricken in keeping with the committee's action.

Three new definitions are added for Transfer Air, Infiltration, and Exfiltration. Transfer Air (Section 403.2.2) and Infiltration (Section 401.2) are currently referenced within the IMC but not defined within the IMC. All three of these terms are also referenced within the ASHRAE 62.1 definitions of makeup air and outdoor air that are proposed within this comment, and so should be defined here for clarity.

M52-12

Final Action: AS AM AMPC____ D

M56-12
202, 428 (New)

Proposed Change as Submitted

Proponent: Karen Hobbs, Natural Resources Defense Council, representing self (khobbs@nrdc.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing himself (misuriello@verizon.net)

Add new definition as follows:

EVAPORATIVE COOLING SYSTEM. A system for cooling the air in a building or space by removing heat from the outdoor air by means of the evaporation of water. The system forces air through wet porous pads, causing the latent heat of evaporation to cool the air. Water is continuously circulated over the pads to replenish the evaporated water. Where the cooled air is sent directly into the building, the system is referred to as "direct evaporative cooling". Where the cooled air is sent through heat exchangers re-circulating indoor air, the system is referred to as "indirect evaporative cooling".

Add new text as follows:

SECTION 428
EVAPORATIVE COOLING SYSTEMS

428.1 Evaporative Cooling. Evaporative cooling systems shall utilize use less than 4 gallons of water per ton-hour of cooling when system controls are set to maximum water use. Water use, expressed in maximum water use per ton-hour of cooling, shall be marked on the device and included in product user manuals, product information literature and installation instructions. Water use information shall be readily available at the time of code compliance inspection.

428.1.1 Overflow Alarm. The evaporative cooling system shall be equipped with an overflow alarm to alert building owners, tenants or maintenance personnel when the water refill valve continues to allow water to flow into the reservoir when the reservoir is full. The alarm shall have a minimum sound pressure level rating of 85 dB measured at a distance of ten feet.

428.1.2 Automatic Pump Shut-off. The evaporative cooling system shall automatically cease pumping water to the evaporation pads when there is no demand for sensible heat reduction.

428.1.3 Cooler Reservoir Discharge. A water quality management system is required utilizing a timer or water quality sensor. Where timers are used, the time interval between periods of discharging of water from the reservoir shall be set for six hours or greater of cooler operation. Continuous discharge and continuous bleed systems are prohibited.

428.1.3.1 Discharge Water Reuse. Where a nonpotable water source system exists on site, evaporative cooler discharge water shall be collected and discharged to such collection system.

> **Exception:** Where the reservoir water will adversely affect the quality of the nonpotable water supply making the nonpotable water unusable for its intended purposes.

428.1.3.2 Discharge Water to Drain. Where discharge water is not required to be recovered for reuse, the sump overflow drain line shall discharge to an approved location. Drain lines shall not be directly connected to any drainage system. Where the discharge water is discharged into a sanitary drain, an air gap of not less than 6 inches is required between the termination of the discharge line and the drain opening. The drain line shall terminate in a location that is readily visible to the building owner, tenants or maintenance personnel.

Reason:

1. This proposal was approved by the IGCC in May, 2011, as submitted by the Alliance for Water Efficiency (AWE) and Natural Resources Defense Council (NRDC).
2. Evaporative coolers can waste large quantities of water. There is great variance in water efficiencies of different makes and models. Limiting systems to use less than 4 gallons of water per hour is a relatively low standard and should be easily met by most systems.
3. NRDC estimates that nationwide adoption of the revised values in this proposal, effective 2016, can be expected to save:

- 19 million gallons of water per day by 2030;
- 9.3 million kilowatt hours per year by 2030; and
- Consumers will realize more than $27 million dollars in reduced electricity and water costs.

4. Faulty float valves can cause reservoirs to overflow, sending thousands of gallons of water into the wastewater line without the problem detected. Alarms are needed to alert the operator of this waste.
5. The discharge water is nonpotable, but of sufficient quality to be reused for other applications.
6. There are no known water use standards for these systems by AHRI or any other known organization.

Cost Impact: None

428 (NEW)-P-HOBBS.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed text would cause a significant cost increase. Product user manuals (Section 428.1) are not enforceable. This proposal is not coordinated with current Section 928.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Karen Hobbs, Natural Resources Defense Council, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**EVAPORATIVE COOLING SYSTEM**. A system for cooling the air in a building or space by removing heat from the outdoor air by means of the evaporation of water. The system forces air through wet porous pads, causing the latent heat of evaporation to cool the air. Water is continuously circulated over the pads to replenish the evaporated water. Where the cooled air is sent directly into the building, the system is referred to as "direct evaporative cooling". Where the cooled air is sent through heat exchangers recirculating indoor air, the system is referred to as "indirect evaporative cooling".~~

SECTION 928
EVAPORATIVE COOLING SYSTEMS

928.1 Evaporative Cooling. Evaporative cooling systems shall utilize use less than ~~4~~ 5 gallons of water per ton-hour of cooling when system controls are set to maximum water use. Water use, expressed in maximum water use per ton-hour of cooling, shall be marked on the device. ~~and included in product user manuals, product information literature and installation instructions. Water use information shall be readily available at the time of code compliance inspection~~.

928.1.1 Overflow Alarm. The evaporative cooling system shall be equipped with an overflow alarm to alert building owners, tenants or maintenance personnel when the water refill valve continues to allow water to flow into the reservoir when the reservoir is full. The alarm shall have a minimum sound pressure level rating of 85 dB measured at a distance of ten feet.

928.1.2 Automatic Pump Shut-off. The evaporative cooling system shall automatically cease pumping water to the evaporation pads when ~~there is no demand for sensible~~ heat reduction is not needed.

~~**928.1.3 Cooler Reservoir Discharge**. A water quality management system is required utilizing a timer or water quality sensor. Where timers are used, the time interval between periods of discharging of water from the reservoir shall be set for six hours or greater of cooler operation. Continuous discharge and continuous bleed systems are prohibited.~~

~~**928.1.3.1 Discharge Water Reuse**. Where a nonpotable water source system exists on site.~~
~~evaporative cooler discharge water shall be collected and discharged to such collection system.~~
~~Exception: Where the reservoir water will adversely affect the quality of the nonpotable water suøply making the nonpotable water unusable for its intended purposes.~~

928.1.3. Discharge Water to Drain. ~~Where discharge water is not required to be recovered for reuse,~~ The sump overflow ~~drain~~ line shall ~~discharge to an approved location. Drain lines shall~~ not be directly connected to <u>a wastewater drain</u>.~~any drainage system~~. Where ~~the~~ discharge water is <u>not required to be recovered for reuse, the discharge line shall terminate at a conspicuous point of disposal.</u> .~~discharged into a sanitary drain, an air gap of not less than 6 inches is required between the termination of the discharge line and the drain opening. The drain line shall terminate in a location that is readily visible to the building owner, tenants or maintenance personnel~~.

Commenter's Reason:

1. The Committee disapproved this proposal for three reasons, "The proposed text would cause a significant cost increase. Product user manuals (Section 928.1) are not enforceable. This proposal is not coordinated with current Section 928." Each of these reasons is addressed below and in the revised proposal:

   1a. "The proposed text would cause a significant cost increase." This is simply not true. Manufacturers surveyed are currently making products, in various price ranges, that would meet the proposed gallons of water per ton-hour of cooling. We did revise the number from 4 gallons of water per ton-hour of cooling to 5 to include more manufacturers. This limit is still needed as evaporative coolers can waste large quantities of water. There is great variance in water efficiencies of different makes and models. Limiting systems to use less than 5 gallons of water per hour is a relatively low standard and should be easily met by most systems.

   NRDC estimates that nationwide adoption of the revised values in this proposal, effective 2016, can be expected to save:

   - 19 million gallons of water per day by 2030;
   - 9.3 million kilowatt hours per year by 2030; and
   - Consumers will realize more than $27 million dollars in reduced electricity and water costs.

   1b."Product user manuals are not enforceable." That reference has been deleted from this proposal.

   1c. "This proposal is not coordinated with the current Section 928." This proposal does not need to be coordinated, as Section 928 addresses different subjects than this proposal. The current section 928 in the IMC will simply become Section 929. Note that this proposal was published as Section 428 in error, as it should have been Section 928.

   The definition was deleted because a definition for "Evaporative Cooling System" exists in the IMC.
2. Faulty float valves can cause reservoirs to overflow, sending thousands of gallons of water into the wastewater line without the problem detected. Alarms are needed to alert the operator of this waste.
3. There are no known water use standards for these systems by AHRI or any other known organization.

M56-12

Final Action:	AS	AM	AMPC____	D

M58-12
501.3.1

Proposed Change as Submitted

Proponent: Umesh Kumar Bhargava, PE, Bhargava International Inc., representing self.

Revise as follows:

501.3.1 Location of exhaust outlets. The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

3. For all *environmental air* exhaust: ~~3~~ 1 feet) from property lines; ~~3~~ 1 feet from operable openings into buildings for all occupancies other than Group U and ~~10~~ 5 feet from mechanical air intakes. Such exhaust shall not be considered to be hazardous or noxious.

(Portions not shown remain unchanged)

Reason: Local exhaust is more effective than central exhaust. Therefore, in dwelling unit's side wall exhaust is gaining more popularity amongst engineers. However due to limited exterior wall space availability and clearances requirements from openings, the proposed change is suggested based on following reasons:

a. Environmental air is discharged to outside the dwelling and therefore is diluted instantly and does not have impact on indoor air quality.
b. Products of combustion from Direct Vent appliances are permitted to terminate with 1 foot.
c. IMC permits to recirculate kitchen exhaust air. It indicates that environmental air is acceptable to be recirculating with carbon filter. Dilution of environmental air by mixing with atmospheric air should more effective than carbon filter, which depend on user behavior.
d. Velocity at exterior termination is approximately 5 miles per hour (600 feet per minute, 50 CFM thru 4 inch diameter duct)
e. High discharge velocity also results in mixing outside atmospheric air instantaneous dilution.

Cost Impact: None

501.2.1-M-BHARGAVA.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: No justification given for changing the distances. The revisions could result in exhaust re-entering the building. This section is not limited to dwelling units.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mike Moore, Newport Ventures, representing Broan NuTone, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

501.3.1 Location of exhaust outlets. The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

3. For all *environmental air* exhaust: 3 ~~1~~ feet) from property lines; 3 ~~1~~ feet from operable openings into buildings for all occupancies other than Group U and 10 ~~5~~ feet from mechanical air intakes. Such exhaust shall not be considered to be hazardous or noxious.

   Dwelling unit air intake and exhaust terminals that are concentric or adjacent need not be separated by such distances where the environmental air exhaust is not from kitchens, clothes dryers, or garages, and where the manufacturer of such terminals specifies that there is less than 5% cross contamination between the exhaust and intake air streams.

(Portions not shown remain unchanged)

Commenter's Reason: This comment is intended to remove the requirement for a 10 foot separation distance between environmental exhaust air outlets and mechanical air intakes when an integrated exhaust-supply termination specifically designed for this purpose and verified by the manufacturer to provide a minimum acceptable level of cross contamination. The most common example of this type of system is an integrated supply-exhaust termination that is used for HRVs or ERVs (typically referred to as "dual hood" devices). There are multiple manufacturers that make these products, and where cross contamination values are reported, they are typically less than 5%.

The IMC defines Environmental Air as, "Air that is conveyed to or from occupied areas through ducts which are not part of the heating or air-conditioning system, such as ventilation for human usage, domestic kitchen range exhaust, bathroom exhaust, domestic clothes dryer exhaust and parking garage exhaust." This comment does not permit integrated supply-exhaust terminations where exhaust air could potentially contain products of combustion (such as air exhausted from kitchens, garages, and clothes dryers).

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

M58-12

Final Action: AS AM AMPC____ D

M66-12
504.4, 504.6.2

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

504.4 Exhaust installation. Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination~~. Ducts shall not be connected or installed with sheet metal screws or other fasteners that will obstruct the exhaust flow.~~ Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or *chimney*. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums.

504.6.2 Duct installation. Exhaust ducts shall be supported at 4-foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Ducts shall ~~not~~ be joined with <u>nominal ¼ inch long by 1/8 inch diameter rivets</u> ~~screws~~ or <u>other</u> fasteners that <u>do not</u> protrude into the inside of the duct <u>more than such rivets.</u>

Reason: Sections 504.4 and 504.6.2 both discuss duct fasteners, but, state different requirements and the IRC says something different yet. The IRC allows duct fasteners that protrude into the duct a limited distance. It is not logical for the IRC and IMC to differ on this subject. If duct fasteners are not allowed, there would be no method of securing duct joints other than duct tape. Tapes are sealing methods, not duct joining methods, and will eventually allow the duct joints to separate in concealed locations.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

504.4-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason:. Lint will collect on the protrusions. Deletion of text in Section 504.4 will lose coverage for commercial ducts. The rivet diameter is not relevant.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

504.4 Exhaust installation. Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Ducts shall not be connected or installed with sheet metal screws or other fasteners that will obstruct the exhaust flow. Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or *chimney*. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums.

504.6.2 Duct installation. Exhaust ducts shall be supported at 4-foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. ~~Ducts shall be joined with nominal ¼ inch long by 1/8 inch diameter rivets or other fasteners that do not protrude into the inside of the duct more than such rivets.~~
Ducts shall not be joined with screws or similar fasteners that protrude more than 1/8 inch (3.2mm) into the inside of the duct.

Commenter's Reason: The above new language is extracted from the 2012 IRC. This language does not reference rivets diameter which was stated to be irrelevant by the committee. The allowed 1/8" protrusion into the duct will only permit a minimal amount of lint to collect on the protrusion which was a concern of the committee. The small amount of lint is trivial in comparison to the duct separating from the lack of fastening and allowing combustion by products and lint to fill building cavities, crawl space, attics, or any other concealed or other areas were these exhaust systems are located. The original section 504.4 is restored to current 2012 code text..

M66-12

Final Action: AS AM AMPC____ D

M73-12
504.8, 505.3 (NEW)

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM representing Aon Fire Protection Engineering (al.godwin@aon.com)

Revise as follows:

504.8 Common exhaust systems for clothes dryers located in multistory structures. Where a common multistory duct system is designed and installed to convey exhaust from multiple clothes dryers, the construction of the system shall be in accordance with all of the following:

(Items 1 through 12 remain unchanged)

13. Dryer ducts shall have a cleanout located near the shaft penetration to permit cleaning of the 22" subduct required by Section 607.5.5, exception 2. The subduct length shall be considered in the calculation of allowable duct length.

505.3 Common exhaust systems for domestic kitchens located in multistory structures. Where a common multistory duct system is designed and installed to convey exhaust from multiple domestic kitchen exhaust systems, the construction of the system shall be in accordance with all of the following:

1. The shaft in which the duct is installed shall be constructed and fire-resistance rated as required by the *International Building Code*.
2. Dampers shall be prohibited in the exhaust duct, except as specified in Section 505.1. Penetrations of the shaft and ductwork shall be protected in accordance with Section 607.5.5, exception 2.
3. Rigid metal ductwork shall be installed within the shaft to convey the exhaust. The ductwork shall be constructed of sheet steel having a minimum thickness of 0.0187 inch (0.4712 mm) (No. 26 gage) and in accordance with SMACNA *Duct Construction Standards*.
4. The ductwork within the shaft shall be designed and installed without offsets.
5. The exhaust fan motor design shall be in accordance with Section 503.2.
6. The exhaust fan motor shall be located outside of the airstream.
7. The exhaust fan shall run continuously, and shall be connected to a standby power source.
8. Exhaust fan operation shall be monitored in an *approved* location and shall initiate an audible or visual signal when the fan is not in operation.
9. Makeup air shall be provided for the exhaust system.
10. A cleanup opening shall be located at the base of the shaft to provide access to the duct to allow for cleanout and inspection. The finished openings shall be not less than 12 inches by 12 inches (305 mm by 305 mm).
11. Screens shall not be installed at the termination.
12. The common multistory duct system shall serve only kitchen exhaust and shall be independent of other exhaust systems.

Reason: Since exception 2 has been installed in the IBC, it has been incomplete. The IMC has done a good job of updating the provisions for common ducts with clothes dryers but nothing has been done for domestic kitchens. Designers would not go to the expense of installing a shaft for domestic kitchen exhaust if there was not a smoke issue. When expensive condo's install super domestic kitchens, there is going to be smoke.

Also, IMC Section 505.1 specifically requires systems with downdraft exhaust to discharge to the exterior. How is that going to be done in a multi-story building? And, where there is smoke, there is grease. Thus, provisions are needed for kitchen exhaust and such exhaust needs to be separate from bathroom/toilet exhaust. The designer should take some responsibility for controlling grease discharge, but specifics are left to his/her discretion. Long dryer ducts have to install a 90 degree riser at the very end of their discharge, the weakest point. A cleanout is appropriate. Perhaps someone has a better idea, but this should be a start.

Cost Impact: This code proposal will not increase the cost of construction since this is the method it should be designed to and it is less expensive than installation of a Type I hood.

504.8-M-GODWIN.DOC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

504.8 Common exhaust systems for clothes dryers located in multistory structures. Where a common multistory duct system is designed and installed to convey exhaust from multiple clothes dryers, the construction of the system shall be in accordance with all of the following:

(Items 1 through 12 remain unchanged)

~~13. Dryer ducts shall have a cleanout located near the shaft penetration to permit cleaning of the 22" subduct required by Section 607.5.5, exception 2. The subduct length shall be considered in the calculation of allowable duct length.~~

505.3 Common exhaust systems for domestic kitchens located in multistory structures. Where a common multistory duct system is designed and installed to convey exhaust from multiple domestic kitchen exhaust systems, the construction of the system shall be in accordance with all of the following:

1. The shaft in which the duct is installed shall be constructed and fire-resistance rated as required by the *International Building Code*.
2 Dampers shall be prohibited in the exhaust duct, except as specified in Section 505.1. Penetrations of the shaft and ductwork shall be protected in accordance with Section 607.5.5, exception 2.
3. Rigid metal ductwork shall be installed within the shaft to convey the exhaust. The ductwork shall be constructed of sheet steel having a minimum thickness of 0.0187 inch (0.4712 mm) (No. 26 gage) and in accordance with SMACNA *Duct Construction Standards*.
4. The ductwork within the shaft shall be designed and installed without offsets.
5. The exhaust fan motor design shall be in accordance with Section 503.2.
6. The exhaust fan motor shall be located outside of the airstream.
7. The exhaust fan shall run continuously, and shall be connected to a standby power source.
8. Exhaust fan operation shall be monitored in an *approved* location and shall initiate an audible or visual signal when the fan is not in operation.
9. <u>Where the exhaust rate for an individual kitchen exceeds 400 cfm (0.19 m3/s)</u> makeup air shall be provided ~~for the exhaust system~~ <u>in accordance with Section 505.2.</u>
10. A cleanup opening shall be located at the base of the shaft to provide access to the duct to allow for cleanout and inspection. The finished openings shall be not less than 12 inches by 12 inches (305 mm by 305 mm).
11. Screens shall not be installed at the termination.
12. The common multistory duct system shall serve only kitchen exhaust and shall be independent of other exhaust systems.

Committee Reason: Approval is based upon the proponent's published reason. The modifications correlate with the action taken on FS110-12 and serve to coordinate with current Section 505.2.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Commenter's Reason: As a result of the modification, no makeup air will be required for systems serving hood fans under 400 cfm. If no fan exceeds 400 cfm, nothing is triggered. In a multi-story system serving dwelling units, it is extremely unlikely that any fan would be over 400 cfm. If a multi-story system had 50 kitchen hoods connected to it, and each hood was 200 cfm, no make air would be required to enter the shaft to balance the airflow for the exhaust fan on the roof. This text has nothing to do with the makeup air needed for the individual hood fans in the dwelling units, rather it is related to makeup air for the shaft main exhaust fan, yet this modification attempted to link these unrelated subjects. The subject of this proposal has nothing to do with Section 505.2 and the modification has completely changed the intent of the original text. Without makeup air for the shaft exhaust fan, air would be pulled through all of the hoods served, continuously 24/7 whether the hoods are on or off. This would result in energy waste except where the dwellings were mechanically ventilated via the kitchen and bath exhaust.

M73-12

Final Action: AS AM AMPC____ D

M74-12
504.8, Chapter 15

Proposed Change as Submitted

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

Revise as follows:

504.8 Common exhaust systems for clothes dryers located in multistory structures. Where a common multistory duct system is designed and installed to convey exhaust from multiple clothes dryers, the construction of the system shall be in accordance with all of the following:

1. The shaft in which the duct is installed shall be constructed and fire-resistance rated as required by the *International Building Code*. As an alternative to a fire-resistance-rated shaft, the duct shall be enclosed in a duct enclosure system tested and *listed* to have not less than a 2-hour fire-resistance rating in accordance with ASTM E2816-11.

(Portions not shown remain unchanged)

Add new Referenced Standard to Chapter 15 as follows:

ASTM E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.

Reason: This proposal would allow an additional tested method of protection for duct enclosures systems to be used. The enclosures or ductwork would be permitted to be used if it were protected by a tested and listed assembly conforming to the new *ASTM E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems* evaluated for the specific purpose. This test is now also referenced as part of ICC-ES AC179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies. The purpose of these acceptance criteria is to establish requirements for fire protection enclosure systems applied to metallic HVAC ducts, which provides an alternate to required fire-resistance-rated shafts or an alternate to required fire dampers in specific locations. This criterion provides an alternate to shaft enclosures for vertical ducts.

The new ASTM Standard evaluates the HVAC duct systems for surface burning characteristics, non-combustibility, fire resistance, durability, and fire engulfment with horizontal and vertical through-penetration firestops. The Standard evaluates the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, with or without openings. These test methods evaluate the ability of a HVAC duct system to resist the spread of fire from one compartment to another compartment when subjected to the standard time-temperature curve of ASTM E119.

Cost Impact: This change will potentially reduce the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [ASTM E2816-11] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

504.8-M-CRIMI.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This revision could have a ripple effect on the other items in the list. Will the new text fit with the items that discuss duct offsets, cleanouts in a shaft, etc. The IBC fire safety committee disapproved similar proposed text.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council requests Approval as Submitted.

Modify the proposal as follows:

Commenter's Reason: The Committee Reason for rejecting this proposal was based on concerns around whether or not the revision could have a ripple effect on the other items in the list. They were concerned about ensuring that the text fit with the items that discuss duct offsets, cleanouts in a shaft, etc.

In fact, having had the opportunity to review this in more depth, it is clear that the text fits very well within the Article. The original proposal also stated that the other items 2 through 12 remain unchanged. For clarity, Item 4 requires that the ducts be designed and installed without offsets, a requirement that will not change based upon this proposal The ASTM E2816 Standard evaluates the fire performance of HVAC ducts for both supply (pressurization) and exhaust air, in the vertical and horizontal orientation, with or without openings. Cleanouts can be evaluated as part of the tested systems, but in any case, Ducts C and D are actually evaluated with unprotected openings.

As a point of information, testimony and Committee discussions also questioned the potential that a lint fire would exceed the 2-hour fire test requirements of ASTM E2816 that uses the ASTM E119 time-temperature curve. Based on calculations, the amount of lint required to be inside the duct to equal the ASTM E2816 fire exposure would be sufficient to cover the surface area of 1.5 football fields to a depth of one inch, which represents more than 75,000 sf. Therefore, the fire exposure conditions in the test standard are appropriate for the clothes dryer exhaust application.

ASTM E2816 evaluates the ability of a HVAC duct system to resist the spread of fire from one compartment to another compartment separated by fire resistance rated construction when the HVAC duct system is exposed to fire from the outside of the horizontal or vertical HVAC duct system, or from the outside with hot gases entering the inside of the HVAC duct system from unprotected openings, when subjected to the standard time-temperature curve of ASTM E119. This test is now also referenced as part of ICC-ES AC179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies. The purpose of that acceptance criteria is specifically to establish requirements for fire protection enclosure systems applied to metallic HVAC ducts, which provides an alternate to required fire-resistance-rated shafts or an alternate to required fire dampers in specific locations. This proposal is consistent with AC 179 criterion providing an alternate to fire dampers in horizontal ducts (penetrating fire barriers, fire partitions, and or smoke barriers) and vertical ducts. This is applicable to Item 2, which explicitly prohibits the use of dampers.

M74-12

Final Action: AS AM AMPC____ D

M76-12
505.1, 505.3 (New), 507.2.3

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

SECTION 505
DOMESTIC KITCHEN EXHAUST EQUIPMENT

505.1 Domestic systems. Where domestic range hoods and domestic appliances equipped with downdraft exhaust are ~~located within dwelling units~~ provided, such hoods and appliances shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be air tight, shall be equipped with a backdraft damper, and shall be independent of all other exhaust systems.

Exceptions:

1. In other than Group I-1 and I-2, where installed in accordance with the manufacturer's installation instructions and where mechanical or *natural ventilation* is otherwise provided in accordance with Chapter 4, *listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors.
2. Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
   - 2.1. The duct shall be installed under a concrete slab poured on grade.
   - 2.2. The under floor trench in which the duct is installed shall be completely backfilled with sand or gravel.
   - 2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.
   - 2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of the building.
   - 2.5. The PVC ducts shall be solvent cemented.

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cfm (0.19 m^3/s) shall be provided with *makeup air* at a rate approximately equal to the *exhaust air* rate. Such *makeup air* systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

505.3 Other than Group R. In other than Group R occupancies, where domestic cooking appliances are utilized for domestic purposes, such appliances shall be provided with domestic range hoods. Hoods and exhaust systems shall be in accordance with Sections 505.1 and 505.2.

SECTION 507
COMMERCIAL KITCHEN HOODS

507.2.3 Domestic cooking appliances used for commercial purposes. Domestic cooking appliances utilized for commercial purposes shall be provided with Type I or Type II hoods as required for the type of appliances and processes in accordance with Sections 507.2, 507.2.1 and 507.2.2. Domestic cooking appliances utilized for domestic purposes shall comply with Section 505.

Reason: The intent of this proposal is to clarify requirements and address new situations as Assisted Living and Nursing Home designs change.

Current requirements for domestic appliances used for domestic purposes are geared towards Group R facilities. When a stove is located in another use group, often a requirement for commercial hoods is misapplied. In a residential dwelling unit, often a range hood is not required if there is enough ventilation. Given the different types of facilities, this proposal would always require a hood when a range was provided in another use group.

As the style of assisted living facilities and nursing homes attempts to produce a more residential atmosphere, domestic ranges are provided either within the unit (some assisted living) or in common use areas (assisted living or nursing home residential 'suites'). Residents use this equipment for light cooking duties (few people and only occasional meals) or special cooking (i.e., cookies, cakes). If this equipment is used for cooking for a large number of residents on a regular basis, it is being used for commercial purposes, and it would fall under 507.2.3.

Hospitals or outpatient rehab facilities sometimes have domestic ranges in occupational therapy and dietician areas. The goal being to provide residents with training on good eating habits when they are at home.

Changes to 505.1 would allow residential and areas such as business break rooms to allow for recirculation if the mechanical system is designed for it.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: Reduction

505-M-BALDASSARRA-CTC.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based upon the proponent's published reason. The code needs to address the evolving lifestyles for aging populations.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Richard Grace, Fairfax County, representing the Virginia, Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and the Virginia Building Code and Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: Although we understand the proponents reason statement for the use of domestic cooking appliances in other Groups, we don't believe that the code language for such an allowance should provide a blanket statement that will allow such a use without going through the rigorous evaluation process from the design professional and the authority having jurisdiction as provided for in IMC 105.1. The change made to 505.1, Exception 1 indicates that there is certainly a difference in use between a Group I and a Group R when relating to domestic cooking appliances by not allowing the use of a ductless range hood in a Group I environment. As written, this code section will allow for domestic cooking appliances to be installed in public areas of nursing homes, firehouses, churches, and the like without the protection of a Type I hood and without the use of the evaluation process provided by IMC 105.1. These are all unique situations that cannot be grouped together into one all-encompassing code requirement.

M76-12

Final Action: AS AM AMPC____ D

M79-12
505.2

<u>Proposed Change as Submitted</u>

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cfm shall be <u>mechanically</u> provided with *makeup air* at a rate approximately equal to the *exhaust air* rate. Such *makeup air* systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

Reason: Section 505.2 does not state whether the makeup air system is required to be mechanical or gravity. Current text certainly suggests that mechanical is required. Should a simple louvered opening with a damper be permitted to provide makeup air by gravity? If so, how much pressure loss is allowed across the louvered opening? This loss must be known in order to calculate the opening and louver size. The code is silent on this. The intent is to prevent negative pressures from being developed by the kitchen exhaust that would affect other exhaust systems, chimneys, fireplaces, appliances and appliance vents. A small gravity opening to the outdoors would allow makeup air to enter the kitchen, but how negative must the space go to cause the necessary airflow rate to pass through such opening? Mechanical makeup air can be matched to the exhaust rate with no pressurization of the space.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: This could increase the cost of construction depending on how current text is interpreted.

505.2-M-STRAUSBAUGH.PMGCAC.DOC

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: Natural makeup air should be a design option. It could be confused whether the text means fan powered makeup air supply or a mechanical damper with gravity supply air. No evidence that a problem exists.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment 1:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cfm shall be mechanically <u>or naturally</u> provided with *makeup air* at a rate approximately equal to the *exhaust air* rate. Such *makeup air* systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

Commenter's Reason: Referring to a required makeup air flow rate and referring to automatic starting and operation seem to imply that the makeup air must be provided mechanically, so, the original proposed code change put forth by the PMG CAC was intended to clarify that. However, many of those who spoke against the original proposed code language felt that makeup air should also be allowed to be provided naturally. Adding “or naturally” clears up the language and allows for natural makeup air to be a design option.

Public Comment 2:

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

Modify the proposal as follows:

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of ~~400~~ <u>600</u> cfm (0.19 m3/s) shall be ~~mechanically~~ provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with a<u>n</u> <u>electrically operated</u> means of closure and shall be automatically controlled to ~~start and~~ operate simultaneously with the exhaust system.

Commenter’s Reason: Raising the cfm threshold will provide a little more relief as the majority of hoods being installed seem to be falling in this range. It’s not intended to provide makeup air using fans, gravity works well provided that the damper is electrically activated. Gravity dampers are not a positive means of closure because they are subject to pressure differentials and normally don’t operate opening to the inside.

It’s important to note that once the threshold is exceeded all the exhausted air needs to be made up. This helps combat the depressurization as a result of other contributing factors from dryers, exhaust fans, etc. Simply making up air over the threshold isn’t good enough. Currently the code calls for makeup air on dryers over 200 cfm. This proposal is consistent with that line of reasoning.

M79-12

Final Action: AS AM AMPC____ D

M80-12
505.2

Proposed Change as Submitted

Proponent: Dan Buuck, National Association of Home Builders (NAHB)
(dbuuck@nahb.org)

Revise as follows:

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m3/s) shall be provided with makeup air at a rate approximately equal to the difference between the exhaust air rate and 400 cubic feet per minute (0.19 m3/s). Such makeup air systems shall be equipped with a backdraft damper~~means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system~~.

> **Exception:** In dwelling units, where all appliances are of direct-vent, power-vented, unvented, or electric type, makeup air is not required for hood systems that exhaust 600 CFM or less. Exhaust hood systems located in such dwelling units and capable of exhausting in excess of 600 cubic feet per minute (0.28 m3/s) shall be provided with makeup air at a rate approximately equal to the difference between the exhaust air rate and 600 cubic feet per minute.

Reason: This section, new in the 2009 International Residential Code (IRC) and 2009 International Mechanical Code (IMC), attempts to solve an unproven backdrafting problem with range hoods. The exhaust rate of 400 cubic feet per minute (cfm) was chosen arbitrarily and without substantiation other than it being greater than the minimum exhaust rate of range hoods on the market. However, several manufacturers do not produce any range hoods below the 400 cfm threshold, effectively reducing a homeowner's choice of kitchen exhaust options without the added difficulty and expense of installing makeup air.

The reasoning that kitchen exhaust systems are available with an exhaust rate under 400 cfm does not take down-draft systems, popular with homeowners, into consideration. Most of them operate at 500 to 600 cfm and therefore require makeup air under this section.

As written, this section allows range hoods up to 400 cfm to be installed without makeup air. It would be consistent to require makeup air equaling the amount above and beyond 400 cfm for larger fans. Essentially, there would be no difference between the effect a 400 cfm fan has on a house and a 600 cfm fan with 200 cfm of makeup air. This would also improve the feasibility and acceptance of this code section as well as cut down on the amount of wasted energy in heating or cooling the makeup air.

This section requires an automatic means of closure for the makeup air opening beyond what the code has historically required for residential construction. For example, Section G2407.6 requires no dampers whatsoever for combustion air openings to the outdoors, such as found in many homes in the northern US. The amended section would allow barometric dampers as required for clothes dryer exhaust ducts.

Finally, the current code section does not take into account the fact that in many homes there is no danger of backdrafting (the original reason for this code section) due to the lack of natural draft appliances. The 400 cfm threshold could be raised to 600 cfm in those cases with no added danger. This would allow for down-draft fans without dedicated makeup air when the exception is met.

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

505.2-M-BUUCK.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproval is based on the action taken on M79-12. The text regarding the difference between 600 cfm and the actual exhaust rate will confuse code users.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Dan Buuck, Dipl.-Ing. (FH), representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m3/s) shall be mechanically or passively provided with *makeup air* at a rate approximately equal to ~~the difference between~~ the *exhaust air rate* ~~and 400 cubic feet per minute (0.19 m3/s)~~. Makeup air shall be outdoor air, recirculated air, transfer air or a combination of such. Such makeup air systems shall be equipped with a ~~backdraft damper~~means of closure and shall automatically open when the exhaust system operates. Such means of closure include barometrically controlled dampers and mechanical dampers.

Exceptions: ~~In dwelling units, where all appliances are of direct-vent, power-vented, unvented, or electric type, makeup air is not required for hood systems that exhaust 600 CFM or less. Exhaust hood systems located in such dwelling units and capable of exhausting in excess of 600 cubic feet per minute (0.28 m3/s) shall be provided with makeup air at a rate approximately equal to the difference between the exhaust air rate and 600 cubic feet per minute.~~

1. Makeup air for kitchen exhaust systems is not required where any of the following apply:
   1.1 Fuel-fired appliances are not located within the dwelling unit.
   1.2 Fuel-fired appliances are located in an enclosed space and provided with outdoor combustion air in accordance with Section 304.6 of the *International Fuel Gas Code* or Section G2407.6 of the *International Residential Code.*
   1.3 The dwelling unit infiltration is confirmed to be 5.0 air changes per hour or greater at 0.2-inch water column (50 Pa).
   1.4 An approved test verifies proper operation of vented fuel-fired appliances during the operation of the kitchen exhaust system.
2. Additional makeup air is not required where all vented appliances in the dwelling unit are direct-vent and the kitchen exhaust does not exceed the calculated cfm determined by:

   $cfm_{exhaust} = ACH^{50} \times cu\ ft_{dwelling} \div 60\ min \times 0.80$

   where:

   $cfm_{exhaust}$ = kitchen exhaust fan air flow rate in cubic feet per minute

   ACH^{50} = air changes per hour of the dwelling unit at 0.2-inch water column (50 Pa)

   $cu\ ft_{dwelling}$ = volume of the dwelling

Commenter's Reason: This comment allows outdoor air, recirculated air and transfer air from other parts of the dwelling to provide makeup air for the kitchen exhaust fan. The added language is referenced from Section 403.4. Transfer air is already addressed in Section 403.2.2. This section states that transfer air from other occupiable spaces shall not be prohibited. Credit goes to Mike Moore for this language and for several of the exceptions.

I give credit to the PMG CAC for the language "mechanically or passively" which it also proposes in a separate comment. These modifications clarify the original intent of the section, and "means of closure" replaced the proposed term—changing back to the language from the existing code section.

The original intent of this section was to allow simple, non-mechanized openings for high-cfm kitchen exhaust fans. Because the original language allows for multiple interpretations, we are revisiting the question of whether a motorized or passive damper is allowed. We must remember that this section applies to residential construction and nowhere else is an interlocked damper required in the code for a house or dwelling unit. A simple barometrically-activated damper that opens when there is negative pressure inside the dwelling is a simple and effective solution to this issue with several advantages: It does not have the inherent complexity and cost of an interlocked damper with a motor, and it also can serve to automatically eliminate pressure differentials in the dwelling caused by any other equipment that exhausts to the exterior.

The current code section does not take into account the fact that in many homes backdrafting is not an issue, the original reason for this code section. The added exceptions address such cases. Exception 2 takes into account that direct-vent appliances function without danger of backdrafting up to a negative pressure of 50 Pascals. The equation calculates the allowable cfm for a kitchen exhaust fan (with a 20% safety factor) that will not exceed this limit. It will be most useful for larger dwelling units (houses), and it is being introduced here to coordinate with a possible change in the IRC. Example: a 2,000 sq ft house with 8-ft ceilings and a tested ACH^{50} of 3 would be permitted to have a kitchen exhaust fan of max. 640 cfm without additional, i.e. dedicated, makeup air. This is a common sense solution to this issue which will provide safety while not punishing owners from installing efficient gas appliances, and it complies with the intent of the IMC to be a minimum code.

Public Comment 2:

Mike Moore, Newport Ventures, representing Broan NuTone, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

505.2 Makeup air required. Exhaust ~~hood~~ systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m3/s) shall be provided with makeup air at a rate approximately equal to ~~the difference between~~ the exhaust air rate ~~and 400 cubic feet per minute (0.19 m3/s)~~. <u>Makeup air shall be outdoor air, transfer air, or a combination of such.</u> ~~Such m~~Makeup air systems shall be equipped with ~~a~~ <u>not less than one</u> ~~backdraft~~ <u>motorized</u> damper ~~means of closure and~~ <u>that</u> shall be automatically controlled to ~~start and~~ operate simultaneously with the exhaust system.

~~**Exception:** In dwelling units, where all appliances are of direct-vent, power-vented, unvented, or electric type, makeup air is not required for hood systems that exhaust 600 CFM or less. Exhaust hood systems located in such dwelling units and capable of exhausting in excess of 600 cubic feet per minute (0.28 m3/s) shall be provided with makeup air at a rate approximately equal to the difference between the exhaust air rate and 600 cubic feet per minute.~~

Commenter's Reason:
The current language in 505.2 is confusing and needs to be reworked. First, the current language only addresses exhaust hood systems, but the physics of back drafting are indifferent as to whether the exhaust system is a hood, a down draft, a through the wall vent, or any other type of exhaust system. So, the word "hood" is removed to reflect this fact.

Second, because the IMC's definition of makeup air is obscure (i.e., *air that is provided to replace air being exhausted*) clarification needs to be provided as to the source of makeup air (i.e., makeup air can come from outdoors and can come via transfer from an adjacent space). This is consistent with other sections of the IMC (i.e., Section 403.4) and with ASHRAE 62.1 (see the 62.1 definition of makeup air). Third, clarification is needed to better describe the system required by the section. To understand what is being required in this section, it's important to look to other areas of the code for an interpretation. Section 508.1, which addresses makeup air for commercial kitchens, states, "Mechanical makeup air systems shall be automatically controlled to start and operate simultaneously with the exhaust system." Based on the phrase "automatically controlled to start and operate simultaneously" which is echoed in 505.2, the language in 505.2 clearly points to a requirement for a mechanical makeup air system. Mechanical makeup air systems could take many different forms, but at a minimum, this phrase implies a system with a motorized damper.

Gravity dampers are not approved by this text because they can malfunction at the low pressure differentials at which naturally vented appliances can potentially back draft (i.e., 3-5 Pascals based on info from BPI, CMHC, and CAN/CSA F326-M91; see references below). Malfunction can occur through improper balancing and slight restrictions in the damper caused by dirt, debris, or other matter.

For these reasons, this proposal was drafted as a clarification as to what type of kitchen exhaust systems require makeup air (any greater than 400 cfm), where makeup air comes from (transfer and outdoor air), and what type of system should be specified (motorized, automatically controlled damper).

References:

- BPI (Building Performance Institute). *Technical Standards for the Building Analyst Professional*. http://www.bpi.org/Web%20Download/BPI%20Standards/Building%20Analyst%20Professional_2-28-05nNC-newCO.pdf
- CAN/CSA F326-M91. *Residential Mechanical Ventilation Systems, A National Standard of Canada.* Reaffirmed 2010.
- CMHC (Canada Mortgage Housing Corporation). *Chimney Safety Tests Users Manual, Second Edition*. January 12, 1988. http://publications.gc.ca/collections/collection_2011/schl-cmhc/nh18-1/NH18-1-61-1988-eng.pdf.
- Minnesota Mechanical and Fuel Gas Code 1346.0501.501.3.2. https://www.revisor.mn.gov/rules/?id=1346.0501.

Cost Impact:
This language is clarification of an existing requirement, so is not expected to add any new costs to construction.

M80-12

Final Action: AS AM AMPC____ D

M84-12
506.3.2.5

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

506.3.2.5 Grease duct test. Prior to the use or concealment of any portion of a grease duct system, a leakage test shall be performed. Ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the ductwork from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary *equipment* and perform the grease duct leakage test. A light test or an air test shall be performed to determine that all welded and brazed joints are liquid tight. A test shall be performed for the entire duct system, including the hood-to-duct connection. For listed factory-built ducts, tests shall be limited to duct joints assembled in the field and shall exclude factory welds. The duct work shall be permitted to be tested in sections, provided that every joint is tested.

A light test shall be performed by passing a lamp having a power rating of not less than 100 watts through the entire section of ductwork to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls. ~~A test shall be performed for the entire duct system, including the hood-to-duct connection. The duct work shall be permitted to be tested in sections, provided that every joint is tested. For *listed* factory-built grease ducts, this test shall be limited to duct joints assembled in the field and shall exclude factory welds.~~

An air test shall be performed by capping the ductwork system at the outlet and at the point of connection to the hood and then pressurizing the system with air at a pressure of not less than 1 inch wc. A manometer shall be used to measure pressure within the ductwork. Before taking pressure readings, the temperature of the air in the ductwork and the ductwork itself shall be allowed to stabilize and the source of air pressure shall be disconnected from the ductwork system. The ductwork system shall maintain the pressure without loss for a period of not less than 15 minutes.

Reason: The code allows only one method of testing grease ducts and that method is far from precise. An air test is much more likely to expose a leak and provides the installer with an option. This air test is also allowed by ASHRAE 154. Much of Sections 506 and 507 is parallel with 154.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

506.3.2.5-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Testing with air is difficult. False failure can result from air testing because of temperature changes. Grease ducts operate under negative pressure. Factory welds can also leak and need to be tested.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Submitted.

Commenter's Reason: Because current code language only allows for one type of testing for grease ducts, the purpose of this code change was to allow test methods other than light. This gives the installer options which would be acceptable to the inspector. Unfortunately, the committee voiced multiple reasons for disapproving this code change.

The first reason stated was that testing with air is difficult and that false failures with air testing can occur due to temperature changes. If testing with air is difficult, then don't test with it. The air test is an option. This proposed code change was allowing for an option for duct testing as opposed to utilizing the only option currently allowed by code which is the light test. The original proposed text clearly addressed the issue raised by the committee about temperature changes and pressure stabilization.

Another reason for the committee's disapproval was that grease ducts operate under negative pressure and cannot be tested with positive pressure. There are ways to test under negative pressure and it doesn't matter anyway because a leak is a leak, whether leaking into the duct or out of the duct.

In M83, the committee stated that factory-built ducts do not need to be tested except at the joints between sections and fittings yet on this code change the committee stated that factory welds can also leak and need to be tested so they should also be covered in the testing parameters. The current code language acknowledges that factory built ducts are to be tested, but limited only to the duct joints which are assembled in the field, excluding factory welds.

M84-12

Final Action: AS AM AMPC____ D

M89-12
506.3.11, 506.3.11.1

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council (tcrimi@sympatico.ca) and John D. Nicholas of Perceptive Solutions LLC representing Unifrax I LLC (john@perceptivesolutionsllc.com)

Revise as follows:

506.3.11 Grease duct enclosures. A grease duct serving a Type I hood that penetrates a ceiling, wall, floor or any concealed spaces shall be enclosed from the point of penetration to the outlet terminal. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code*. The duct enclosure shall serve a single grease duct and shall not contain other ducts, piping or wiring systems. Duct enclosures shall be either field-applied or factory-built. Duct enclosures shall have a fire-resistance rating of not less than that of the assembly penetrated and not less than 1 hour. Duct enclosures shall be as prescribed by Section 506.3.11.1 or 506.3.11.2 ~~or 506.3.11.3~~.

~~**506.3.11.1 Shaft enclosure.** Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be permitted to be enclosed in accordance with the *International Building Code* requirements for shaft construction. Such grease duct systems and exhaust *equipment* shall have a *clearance* to combustible construction of not less than 18 inches (457 mm), and shall have a *clearance* to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 6 inches (76 mm). Duct enclosures shall be sealed around the duct at the point of penetration and vented to the outside of the building through the use of weather-protected openings.~~

506.3.11.1 ~~2~~ Field-applied grease duct enclosure. Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be enclosed by field applied grease duct enclosure that is a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E 2336. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration fire-stop system classified in accordance with ASTM E 814 or UL 1497 and having a “F” and “T” rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer’s installation instructions. Partial application of a field-applied grease duct enclosure system shall not be installed for the sole purpose of reducing clearances to combustibles at isolated sections of grease duct. Exposed duct-wrap systems shall be protected where subject to physical damage.

506.3.11.2 ~~3~~ Factory-built grease duct assemblies. Factory- built grease duct assemblies incorporating integral enclosure materials shall be *listed* and *labeled* for use as commercial kitchen grease duct assemblies in accordance with UL 2221. Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 or UL 1479 and having an “F” and “T” rating equal to the fire-resistance rating of the assembly being penetrated. Such assemblies shall be installed in accordance with the listing and the manufacturer’s installation instructions.

506.3.11.3 4 Duct enclosure not required. A duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.

Reasons:
CRIMI- The use of a grease duct enclosure installed in conformance with the IBC requirements for shaft construction is really just another "field-applied" grease duct enclosure system, and should be subject to the same conditions as any other field-applied grease duct enclosure system. In that case, Section 506.3.1 becomes redundant, since testing in conformance with ASTM E2336 addresses the issues related to clearances to combustible and noncombustible construction.

The historical practice of allowing certain materials to be used to enclose grease ducts serving Type 1 hoods without specifically fire testing then for the application needs to be revisited. The IBC requirements for shaft construction cover many items, but the fire-resistance requirements to conform to ASTM E119 do not address normal service conditions for grease ducts at all. Evaluating enclosure materials used to protect a grease duct from fire is an aid for predicting their fire performance and promotes uniformity in requirements of various authorities. To do this it is necessary that the fire-endurance properties of enclosure materials be measured and specified according to a common standard expressed in terms that are applicable alike to a wide variety of materials, situations, and conditions of exposure. The ASTM E2336 and UL 2221 test methods evaluate the enclosure materials and the grease duct enclosure systems using the following test methods: noncombustibility, fire resistance, durability, internal fire, and fire-engulfment with a through-penetration fire stop.

In contrast to the requirements of IBC Section 713 for Shaft Enclosures, these test methods prescribe a standardized fire exposure for comparing the test results of grease duct enclosure materials and grease duct enclosure systems. Using these test results to predict the performance of actual grease duct enclosure systems requires the evaluation of these specific test conditions.

Over the last decade, the technology surrounding the installation and protection of grease ducts has evolved in response to growing concern over grease duct fires, and concerns over space. The protection of grease ducts under fire exposure conditions is an item of importance in securing constructions that are safe, and that are not a menace to adjacent construction or building occupants. Protection of grease ducts has long been addressed in the codes of many authorities, municipal and other agencies. Many types of enclosure materials are used to protect grease ducts. Normally, these enclosure materials are either applied to grease ducts in the field or are fabricated as part of the grease duct when shipped from the factory.

NICHOLAS-This proposed code change allows for the use of either a pre-fabricated duct system or field applied enclosure system when these systems are tested and listed in accordance with *ASTM E2336, Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems* a full consensus test method that was specifically designed to assess both specific end use of the duct and its protection materials.

The history of many provisions in our building codes are traced back to ASTM E119 as it is the oldest fire-resistance standard cited in the U.S. building codes. However, when fire test standards are developed for specific material applications those test standards replaced ASTM E119. There are many examples of advancements in fire testing being used to provide a fire test based on ASTM E119 but specifically developed for a particular application: doors, windows, firestop systems, joint systems, etc. For example, doors were tested to ASTM E119, then ASTM E152, and now to UL10b and 10c, which were developed to assess the door's fire performance in a specific application. This proposed code change is a cost effective method of providing a test specifically designed to test the duct system as the shaft is not tested as constructed in the field but rather as a wall panel. ASTM E119 does not have a protocol for testing shafts that can be engulfed in a fire. The fire-resistance engulfment test of ASTM E2336 is a much more serve test scenario for a shaft or duct system as the volume of air within the shaft or duct is limited and will heat faster than the ambient laboratory air in contact with the wall panel. Also, the stability of the shaft as constructed in the field will react differently than a wall panel. The corners of the shaft will be tested as the sides of the shaft create stresses on the corners that are not evaluated by the ASTM E119 wall panel, which is secured into a test frame. Using tests designed to address the actual construction and application of materials is more conservative and usually increases life safety. Further, sometimes newer fire tests of materials allow more cost effective materials and construction than materials assessed by traditional tests not specifically designed to address their actual construction and application.

As products are in service for prolonged periods of time some performance limitations are noted and addressed by industry and the codes. GA-216-2007, *Specifications for the Application and Finishing of Gypsum Panel Products* states "1.4 Gypsum panel products shall not be used where they will be exposed to sustained temperatures of more than 125ºF (52ºC) for extended periods of time.[1]"

Also, several changes related to the use of conventional shaft materials have taken place within the building and mechanical codes over the years. For example, the IMC under Section 602.2 **Construction** states, "The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature." A similar limitation is noted in the IMC under Section 603.5.1 **Gypsum Ducts** states, "The use of gypsum boards to form air shafts (ducts) shall be limited to return air systems where the air temperatures do not exceed 125ºF (52ºC) and the gypsum board surface temperature is maintained above the airstream dew-point temperature. Air ducts formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers." For these reasons, a shaft wall construction tested to ASTM E119 as a panel may not provide the performance when that construction is tested as a shaft engulfed in a fire. Nor may a shaft wall construction tested to ASTM E119 as a panel maintain its stability and insulation when tested as a shaft subjected to a prolonged service test temperature established by UL1978 and adopted by ASTM E2336 and UL 2221.

Both ASTM E2336 and UL2221 have an engulfment fire tests and a portion of their standard dedicated to a prolonged internal service temperature test, approximately 500°F, which must be maintained for a minimum of 4-hour exposure. Then with 15 minutes the fire test temperature is increase to approximately 2000°F and sustained for 30 minutes. These test protocols are designed to subject the fire protection materials to an exposure that may be experienced in service. As these tests where not developed for a particular material, having conventional shaft materials tested to the same tests will ensure conformity of fire protection and dispel concerns about the service temperature limitations, which may decrease the performance of conventional shaft materials, cited in the codes and by the industry.

This method of tests uses the ASTM E119 time-temperature for the engulfment test to assess the duct system. This method of tests also assesses both internal and external fire threats as well as both horizontal ducts and vertical ducts. In ASTM E2336, the systems supports are also tested as part of the fire resistance test. ASTM E2336 offers the following tests to assess performance: ASTM E136 for insulation's non-combustibility, ASTM C518 for the insulation's durability and ASTM E814 for the system's ability as a firestop to prevent the spread of fire from compartment to compartment, and ASTM E2226 for the resistance to the application of a hose stream.

ICC-ES AC101, *Acceptance Criteria For Grease Duct Enclosure Assemblies*, establishes requirements for fire protection enclosure systems, applied to grease ducts which provide an alternate to required fire-resistance-rated shafts, as well as to determine the characteristics of the system and enclosure material currently cited in the codes.

These comments are respectfully submitted as the ASTM Task Group Chair of ASTM E2336 who drafted its first version, as the ANSI Designated Expert to ISO TC92 SC2 WG4 that created and maintains ISO 6944 *Fire Containment — Elements of Building Construction — Part 2: Kitchen Extract Ducts* and one who has designed, supervised, and overseen grease duct fire tests as part of an international laboratory as well as one who had jurisdiction over the product certification process for products and materials.

Bibliography:

1. GA-216-2007, Copyright 2007, Gypsum Association

Cost Impact: This change will potentially reduce the cost of construction.

506.3.11-M-CRIMI-NICHOLAS.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Shafts are a proven method of protection and no substantiation was provided to indicate that shafts are failing. The IMC is a minimum code and it contains options for compliance that should not be eliminated.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

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

Modify the proposal as follows:

506.3.11 Grease duct enclosures. A grease duct serving a Type I hood that penetrates a ceiling, wall, floor or any concealed spaces shall be enclosed from the point of penetration to the outlet terminal. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code*. The duct enclosure shall serve a single grease duct and shall not contain other ducts, piping or wiring systems. Duct enclosures shall be either field-applied or factory-built. Duct enclosures shall have a fire-resistance rating of not less than that of the assembly penetrated and not less than 1 hour. Duct enclosures shall be as prescribed by Section 506.3.11.1 ~~or~~, 506.3.11.2 <u>or 506.3.11.3.</u>

<u>**506.3.11.1 Shaft enclosure.** Vertical commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be permitted to be enclosed in accordance with the *International Building Code* requirements for shaft construction. Such grease duct systems and exhaust *equipment* shall have a *clearance* to combustible construction of not less than 18 inches (457 mm), and shall have a *clearance* to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 6 inches (76 mm). Duct enclosures shall be sealed around the duct at the point of penetration and vented to the outside of the building through the use of weather-protected openings.</u>

506.3.11.~~1~~ <u>2</u> Field-applied grease duct enclosure. Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be enclosed by a field applied grease duct enclosure that is a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E 2336. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration fire-stop system classified in accordance with ASTM E 814 or UL 1497 and having a “F” and “T” rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer’s installation instructions. Partial application of a field-applied grease duct enclosure system shall not be installed for the sole purpose of reducing clearances to combustibles at isolated sections of grease duct. Exposed duct-wrap systems shall be protected where subject to physical damage.

506.3.11.~~2~~ <u>3</u> Factory-built grease duct assemblies. Factory- built grease duct assemblies incorporating integral enclosure materials shall be *listed* and *labeled* for use as commercial kitchen grease duct assemblies in accordance with UL 2221. Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 or UL 1479 and having an “F” and “T” rating equal to the fire-resistance rating of the assembly being penetrated. Such assemblies shall be installed in accordance with the listing and the manufacturer’s installation instructions.

506.3.11.~~3~~ <u>4</u> Duct enclosure not required. A duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.

Commenter's Reason: This proposal has been modified to reflect the Committee comments and testimony during the Spring Code Action Hearings. While it was acknowledged that the use of a grease duct enclosure installed in conformance with the IBC requirements for shaft construction is really just another "field-applied" grease duct enclosure system, there was reluctance to remove a traditional option from the Codes. This proposal does, at the very minimum, require the fire resistant enclosures to be installed in the manner in which they are typically tested, which is as vertical wall assemblies in accordance with ASTM E119. Neither testing Laboratories nor Manufacturers endorse the use of a fire resistance rated wall assembly for use in a horizontal orientation without specific and detailed limitations because it is well known that such assemblies will very likely not provide the equivalent hourly rating.

The historical practice of allowing certain materials to be used to enclose grease ducts serving Type 1 hoods without specifically fire testing then for the application needs to be revisited. The IBC requirements for shaft construction cover many items, but the fire-resistance requirements to conform to ASTM E119 do not address normal service conditions for grease ducts at all.

In contrast to the requirements of IBC Section 713 for Shaft Enclosures, ASTM E2336 and UL 2221 test methods evaluate and compare the enclosure materials and the grease duct enclosure systems and prescribe a standardized fire exposure, testing the assembly in both in a vertical and horizontal orientations representative of the configuration the system would be installed in the application.

M89-12

Final Action: AS AM AMPC____ D

M95-12
506.3.11.2

Proposed Change as Submitted

Proponent: Richard Grace, Fairfax County Government, representing The Virginia Plumbing and Mechanical Inspectors Association, The Virginia Building Code Officials Association; Guy McMann, MCP, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Revise as follows:

506.3.11.2 Field-applied grease duct enclosure Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be enclosed by a field-applied grease duct enclosure that is a listed and labeled material, system, product or method of construction specifically evaluated for such purpose in accordance with ASTM E 2336.

The surface of the duct shall be continuously covered on all sides <u>with two layers of field applied grease duct enclosure material,</u> from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration fire stop system classified in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions. Partial application of a field applied grease duct enclosure system shall not be installed for the sole purpose of reducing clearances to combustibles at isolated sections of grease duct. Exposed duct wrap systems shall be protected where subject to physical damage

Reason: As with many Standards, some of the pertinent language is not included in code text forcing the user to locate the Standard which may not be available or possibly even having to purchase it. In order to satisfy ASTM E 2336, two layers of wrapping material must be installed. This is extremely important information that the user needs to be aware of ahead of time, not only for bidding purposes but in order to pass an inspection the fist time around. Inspectors also need this information so they know what to look for. Although the manufacturer's instructions require the two layers, this is simply a benefit for the user as this will aid on the front side of a possible installation.

Cost Impact: None

506.3.11-2-M-GRACE-MCMANN.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The performance standard does not dictate the number of layers of the material, rather, this is dictated by the manufacturer's instructions. The proposed text could clash with the product listing.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Modify the proposal as follows:

506.3.11.2 Field-applied grease duct enclosure Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be enclosed by a field-applied grease duct enclosure that is a listed and labeled material, system, product or method of construction specifically evaluated for such purpose in accordance with ASTM E 2336.

The surface of the duct shall be continuously covered on all sides with <u>one or more layers</u> ~~two layers~~ of field applied grease duct enclosure material, from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration fire stop system classified in accordance with ASTM E 814 or UL 1479 and having an “F” and “T” rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer’s installation instructions. Partial application of a field applied grease duct enclosure system shall not be installed for the sole purpose of reducing clearances to combustibles at isolated sections of grease duct. Exposed duct wrap systems shall be protected where subject to physical damage.

Commenter’s Reason: The committee reason for disapproval revolved around the concern that there maybe duct wrap systems available that require one, two or three layers of material. Although the majority of systems use two layers, the door needs to be left open for other systems. The intent is still achieved with this revision and that is to give the installer advance notice that more than one layer might be required depending on the product of choice.

M95-12

Final Action: AS AM AMPC____ D

M99-12
506.5.1.2(New), 507.2

Proposed Change as Submitted

Proponent: Guy McMann, MCP, Jefferson County Colorado, Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Revise as follows:

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

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

506.5.1.2 Down draft cooking appliances and ventilation systems. Down draft cooking appliances and ventilation systems shall be installed in accordance with the manufacturer's instructions and shall comply with all of the following requirements:

1. Exhaust ducts shall comply with Section 506.
2. Clearances to combustibles shall be in accordance with the manufacturer's listing.
3. Appliances shall be provided with filters complying with UL 1046.
4. Spaces containing such appliances shall be provided with makeup air complying with Section 508.
5. Appliances shall be interlocked with the exhaust system such that they cannot operate unless the exhaust system and makeup air system are operating.
6. The exhaust system shall be provided with controls that will prevent appliance operation when airflow falls below 25% of the normal operating flow rate or 10% below the exhaust air flow specified in the equipment listing, whichever is lower.
7. The ventilation system shall be capable of capturing and containing the effluent at the source

Reason: It's not a good practice to send the user to another Standard only to be confused by the different language and requirements that are not in the IMC. The IMC has all the pertinent information required for safe installations.

Currently the code is silent and provides no guidance on what to expect when code officials come across these types of appliances (Hibachi Tables). The National Standard contains requirements that are not present in the code and needs to be addressed. These appliances usually involve bottom discharge exhaust systems that may need monitoring to maintain capture and containment as they are not required to have type I hoods over them.

Cost Impact: None

506.5.1.2(NEW)-M-MCCANN.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Some of the requirements in the standard were omitted such as fire protection and material requirements above the cooking surface. It is preferable to reference the standard rather than putting the requirements in the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Modify the proposal as follows:

506.5.1.2 Down draft cooking appliances and ventilation systems. Down draft cooking appliances and ventilation systems shall be installed in accordance with the manufacturer's instructions and shall comply with all of the following requirements:

1. Exhaust ducts shall comply with Section 506.
2. Clearances to combustibles shall be in accordance with the manufacturer's listing.
3. Appliances shall be provided with filters complying with UL 1046.
4. Spaces containing such appliances shall be provided with makeup air complying with Section 508.
5. Appliances shall be interlocked with the exhaust system to prevent operation of the appliances when the ~~such that they cannot operate unless~~ the exhaust system and makeup air system are not operating.
6. The exhaust system shall be provided with ~~controls~~ an exhaust airflow monitoring system that will ~~prevent~~ terminate appliance operation when exhaust flow rate falls below 25% of the normal operating flow rate or 10% below the exhaust ~~air flow~~ the specified in the equipment listing, whichever is lower. A manual reset operation shall be required to restore appliance operation after termination by the airflow monitoring system.
7. The ventilation system shall be capable of capturing and containing the effluent at the source.
8. Surfaces located directly above the appliance shall be composed of noncombustible materials either elementary or composite, in accordance with the *International Building Code* Sections 703.5.1 and 703.5.2 respectively.
9. The appliances shall be equipped with integral fire extinguishing equipment that is listed for the application or fire extinguishing equipment shall be provided that complies with the *International Fire Code* and all of the following requirements:
   9.1 The cooking surfaces and exhaust ducts shall be provided with protection.
   9.2 Not less than one detection device shall be provided inside each duct opening and above each appliance. Such detection devices shall be installed in accordance with the manufacturers' installation instructions.
   9.3 A manual activation device shall be provided at each appliance.

(Portions of the proposal not shown are unaffected by this public comment.)

Commenter's Reason: The committee was concerned that not enough detail was pulled from the standard and that the proposal was somewhat incomplete. Now all the information has been incorporated, along with some general cleanup, providing complete guidance.

Currently the code is silent and provides no guidance on what to expect when code officials come across these types of appliances (Hibachi Tables). The National Standard contains requirements that are not present in the code and needs to be addressed. These appliances usually involve bottom discharge exhaust systems that may need monitoring to maintain capture and containment as they are not required to have type I hoods over them.

M99-12

Final Action: AS AM AMPC____ D

M105-12

202, 507.2.1, 507.2.1.3 (New), 507.2.2, 507.2.2.1, Table 507.2.1, Table 507.2.2.1, 507.2.2.2, Table 507.2.2.2

Proposed Change as Submitted

Proponent: Steve Ferguson, American Society of Heating Refrigerating and Air-Conditioning Engineers

Revise as follows:

507.2.1 Type I hoods. Type I hoods shall be installed where cooking *appliances* produce grease or smoke as a result of the cooking process. Type I hoods shall be installed over *medium-duty*, *heavy-duty* and *extra-heavy-duty cooking appliances*. Type I hoods shall be installed over *light-duty cooking appliances* that produce grease or smoke. The duty classifications of cooking appliances served by Type I hoods shall be in accordance with Table 507.2.1

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

507.2.1.3. Type I hoods shall overhang the appliances and equipment in accordance with their listing.

TABLE 507.2.1
APPLIANCE DUTY CLASSIFICATIONS BY APPLIANCE TYPE

Appliance Description	Size	Type I Hoods			
		Light Duty	Medium Duty	Heavy Duty	Extra-Heavy Duty
Braising pan/tilting skillet, electric	All	●	_	_	_
Oven, rotisserie, electric and gas	All	●	_	_	_
Oven, Combi, electric and gas	All	●	_	_	_
Oven, convection, full-size, electric and gas	All	●	-	-	-
Oven, convection, half-size, electric and gas [protein cooking]	All	●	-	-	-
Oven, deck, electric and gas	All	●	_	_	_
Oven, mini-revolving rack, electric and gas	All	●	-	-	-
Oven, rapid cook, electric	All	●	_	_	_
Oven, rotisserie, electric and gas	All	●	_	_	_
Range, discrete element, electric (with or without oven)	All	●	-	-	-
Salamander, electric and gas	All	●	_	_	_
Braising pan/tilting skillet, gas	All	_	●	_	_
Broiler, chain conveyor, electric	All	_	●	_	_
Broiler, electric, under-fired	All	_	●	_	_
Conveyor oven, electric	6 kW or larger	_	●	_	_
Conveyor oven, gas	All	_	●	_	_
Fryer, doughnut, electric and gas	All	_	●	_	_

Appliance Description	Size	Type I Hoods			
		Light Duty	Medium Duty	Heavy Duty	Extra-Heavy Duty
Fryer, kettle, electric and gas	All	-	●	-	-
Fryer, open deep-fat, electric and gas	All	-	●	-	-
Fryer, pressure, electric and gas	All	-	●	-	-
Griddle, double-sided, electric and gas	All	-	●	-	-
Griddle, flat, electric and gas	All	-	●	-	-
Range, cook-top, induction	All	-	●	-	-
Range, open-burner, gas (with or without oven)	All	-	●	-	-
Range, hot top, electric and gas	All	-	●	-	-
Broiler, chain conveyor, gas	All	-	-	●	-
Broiler, electric and gas, over-fired (upright)	All	-	-	●	-
Broiler, gas, under-fired	All	-	-	●	-
Range, wok, gas and electric	All	-	-	●	-
Appliances using solid fuel (wood, charcoal, briquettes, and mesquite) to provide all or part of the heat source for cooking	All	-	-	-	●

507.2.2 Type II hoods. Type II hoods shall be installed above dishwashers and appliances as required by Table 507.2.2. The duty classifications of cooking appliances served by Type II hoods shall be in accordance with Table 507.2.2 ~~that produce heat or moisture and do not produce grease or smoke as a result of the cooking process, except where the heat and moisture loads from such appliances are incorporated into the HVAC system design or into the design of a separate removal system~~. Type II hoods shall be installed above all appliances that produce products of *combustion* and do not produce grease or smoke as a result of the cooking process. ~~Spaces containing cooking appliances that do not require Type II hoods shall be provided with exhaust at a rate of 0.70 cfm per square foot (0.00033 m^3/s). For the purpose of determining the floor area required to be exhausted, each individual *appliance* that is not required to be installed under a Type II hood shall be considered as occupying not less than 100 square feet (9.3 m^2). Such additional square footage shall be provided with exhaust at a rate of 0.70 cfm per square foot [.00356 m^3/(s □ m^2)].~~Where hoods are not required, the additional heat and moisture loads generated by such appliances shall be accounted for in the sensible and latent loads for the HVAC system.

TABLE 507.2.2
TYPE II HOOD REQUIREMENTS BY APPLIANCE DESCRIPTION

Appliance Description	Size	Hood Not Required[a,b]	Type II Hoods[a]	
			Light Duty	Medium Duty
Cabinet, holding, electric	All	●	-	-
Cabinet, proofing, electric	All	●	-	-
Cheese-melter, electric	All	●	-	-
Coffee maker, electric	All	●	-	-
Cooktop, induction, electric	All	●	-	-
Dishwasher, under-counter, electric	All	●	-	-
Dishwasher, powered sink, electric	All	●		
Drawer Warmer, 2 drawer, electric	All	●	-	-

Appliance Description	Size	Hood Not Required[a,b]	Type II Hoods[a]	
			Light Duty	Medium Duty
Egg cooker, electric	All	●	-	-
Espresso machine, electric	All	●	-	-
Grill, panini, electric	All	●	-	-
Hot dog cooker, electric	All	●	-	-
Hot plate, countertop, electric	All	●	-	-
Ovens, conveyor, electric	< 6 kW	●		
Ovens, microwave, electric	All	●		
Ovens, warming, electric (add temp.)	All	●	-	-
Popcorn machine, electric	All	●	-	-
Rethermalizer, electric	All	●	-	-
Rice cooker, electric	All	●	-	-
Steam table, electric	All	●	-	-
Steamers, bun, electric	All	●	-	-
Steamer, compartment atmospheric, countertop, electric	All	●		
Steamer, compartment pressurized, countertop, electric	All	●		
Table, hot food, electric	All	●		
Toaster, electric	All	●	-	-
Waffle Iron, electric	All	●	-	-
Cheese-melter, gas	All	-	●	-
Dishwasher, conveyor rack, chemical sanitizing	All	-	●	-
Dishwasher, conveyor rack, hot water sanitizing	All	-	●	-
Dishwasher, door-type rack, chemical sanitizing	All	-	●	-
Dishwasher, door-type rack, hot water sanitizing	All	-	●	-
Kettle, steam jacketed, tabletop, electric, gas and direct steam	< 20 gallons	-	●	-
Oven, convection, half-size, electric and gas [non-protein cooking]	All		●	
Pasta cooker, electric	All	-	●	-
Rethermalizer, gas	All	-	●	-
Rice cooker, gas	All	-	●	-
Steamer, atmospheric, gas	All		●	
Steamer, pressurized, gas	All		●	
Steamer, atmospheric, floor-mounted, electric	All		●	
Steamer, pressurized, floor-mounted, electric	All		●	
Kettle, steam-jacketed floor mounted, electric, gas and direct steam	< 20 gallons	-	●	
Pasta cooker, gas	All	-	-	●
Smoker, electric and gas, pressurized	All	-	-	●
Steam-jacketed kettle, floor mounted, electric and gas	20 gallons or larger	-	-	●

[a] A hood shall be provided for an electric appliance if it produces 3.1×10^{-7} lb/ft^3 (5 mg/m^3) of grease or more when measured at 500 cfm (236 L/s). See Section 4.2.1.

[b] Where hoods are not required, the additional heat and moisture loads generated by such appliances shall be accounted for in the sensible and latent loads for the HVAC system.

507.2.2.1 Type II hood exhaust flow rates. The net exhaust flow rate for Type II hoods shall comply with Table 507.2.2.1. The duty level for the hood shall be the duty level of the appliance that has the highest (heaviest) duty level of all of the appliances that are installed underneath the hood according to Table 507.2.2. The net exhaust flow rate is the exhaust flow rate for a hood, minus any internal discharge makeup air flow rate.

TABLE 507.2.2.1:
TYPE II HOOD MINIMUM NET EXHAUST AIRFLOW RATES

Type of Hood	**Minimum Net Exhaust Flow Rate per Linear Hood Length in cfm/ft (L/s/m)**	
	Light Duty Equipment	**Medium Duty Equipment**
Wall-mounted Canopy	200 (310)	300 (465)
Single island	400 (620)	500 (775)
Double island (per side)	250 (388)	300 (465)
Eyebrow	250 (388)	250 (388)
Backshelf/ Pass-over	200 (310)	300 (465)

507.2.2.2 Type II hood overhang. Type II hoods shall overhang the appliances and equipment served in accordance with Table 507.2.2.2.

TABLE 507.2.2.2
MINIMUM OVERHANG REQUIREMENTS FOR TYPE II HOODS

Type of Hood	**End Overhang**	**Front Overhang**	**Rear Overhang**
Wall-mounted canopy	6 in. (154 mm)	12 in. (154 mm)	N/A
Single-island canopy	12 in. (154 mm)	12 in. (154 mm)	12 in. (154 mm)
Double-island canopy	12 in. (154 mm)	12 in. (154 mm)	N/A
Eyebrow	N/A	12 in. (154 mm)	N/A
Backshelf/ Proximity/Pass-over	6 in. (154 mm)	10 in. (254 mm) (setback)	N/A
N/A = not applicable			

Delete definitions as follows:

~~**LIGHT-DUTY COOKING APPLIANCE**~~
~~**MEDIUM DUTY COOKING APPLIANCE**~~
~~**HEAVY-DUTY COOKING APPLIANCE**~~
~~**EXTRA-HEAVY-DUTY COOKING APPLIANCE**~~

Reason: The changes presented here reflect ASHRAE Standard 154-2011. Unlisted Type I hoods have been eliminated – the reasons for this change are that Type 1 hoods have been tested for the ability to structurally not warp or fail when subjected to grease fires as well as listed hoods tend to be more energy efficient than unlisted Type I hoods. Additionally Standard 154 has classified the duty-level required for both Type 1 and Type II hoods based on ASHRAE research projects. Additionally, Standard 154 has determined whether appliances need to be classified as unhooded, requiring Type 1 hoods or requiring Type II hoods.

Cost Impact: Requiring Type I hoods and showing which appliances can be unhooded does not have a cost for the operator. Both of these actually save significant amounts of energy (and costs) by reducing the amount of exhaust air required in kitchen spaced. Additionally there are cost savings in terms of reduced fan and duct sizes.

507.2.1-M-FERGUSON.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The definitions should not be deleted because they address gaps and omissions in the table. Section 507.2.1.3 addresses only listed hoods. Lists of appliances can place limits on those not in the list. Such lists can restrict new technology.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Steve Ferguson representing the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, requests Approval as Submitted.

Commenter's Reason: Steve Ferguson representing the American Society of Heating, Refrigerating, and Air-Conditioning Engineers" The definitions should not be deleted because they address gaps and omissions in the table. Section 507.2.1.3 addresses only listed hoods. Lists of appliances can place limits on those not in the list. Such lists can restrict new technology", but the text clearly refers to the tables for the definitions. The current definitions are vague and open-ended. More specificity is required to define when Type I hoods should be used. The additional modification is included to address some appliances that were not included in the table, and to allow the use of custom built hoods.

Public Comment 2:

Steve Ferguson representing the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

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

> <u>Exception: Where an appliance is either custom built for the application, includes new technology or is of a type that is not listed in Tables 507.2.1 and 507.2.2, the hood type and ventilation rates shall be calculated based on the use and heat gain results that are equal to or less than the most comparable appliance shown in the Tables 507.2.1 and 507.2.2. The corresponding data used for this decision shall be reviewed and approved by the AHJ.</u>

507.2.2 Type II hoods. Type II hoods shall be installed above dishwashers and appliances as required by Table 507.2.2. The duty classifications of cooking appliances served by Type II hoods shall be in accordance with Table 507.2.2. Type II hoods shall be installed above all appliances that produce products of *combustion* and do not produce grease or smoke as a result of the cooking process. Where hoods are not required, the additional heat and moisture loads generated by such appliances shall be accounted for in the sensible and latent loads for the HVAC system.

> <u>**Exception:** Dishwashers and appliances that are installed with integral ventilation ducts shall not require a hood.</u>

Table 507.2.2
Type II Hood Requirements by Appliance Description

Appliance Description	Size	Hood Not Required[a,b]	Type II Hoods[a]	
			Light Duty	Medium Duty
Cooktop, induction, electric	All	●		
Dishwasher, door-type, vapor condensing	All	●		
Dishwasher, door-type rack, chemical sanitizing	All	●		
Dishwasher, under-counter, electric	All	●		
…..				

(Portions of proposal not shown are unaffected by this public comment.)

Commenter's Reason: Steve Ferguson representing the American Society of Heating, Refrigerating, and Air-Conditioning Engineers" The definitions should not be deleted because they address gaps and omissions in the table. Section 507.2.1.3 addresses only listed hoods. Lists of appliances can place limits on those not in the list. Such lists can restrict new technology", but the text clearly refers to the tables for the definitions. The current definitions are vague and open-ended. More specificity is required to define when Type I hoods should be used. The additional modification is included to address some appliances that were not included in the table, and to allow the use of custom built hoods.

M105-12
Final Action: AS AM AMPC____ D

M111-12
507.11.1

Proposed Change as Submitted

Proponent: Jay S. Parikh, Compliance Solutions International Inc., representing self.

Revise as follows:

507.11.1 Criteria. Filters shall be of such size, type and arrangement as will permit the required quantity of air to pass through such units at rates not exceeding those for which the filter or unit was designed or *approved*. Filter units shall be installed in frames or holders so as to be readily removable without the use of separate tools, unless designed and installed to be cleaned in place and the system is equipped for such cleaning in place. Where filters are designed to be and required to be cleaned, removable filter units shall be of a size that will allow them to be cleaned in a dishwashing machine or pot sink. Filter units shall be arranged in place or provided with drip-intercepting devices to prevent grease or other condensate from dripping into food or on food preparation surfaces.

Reason: Some grease filters available today are not to be cleaned, but are to be disposed of when loaded with grease, and replaced with new filters. The proposed change addresses such filters.

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

507.11.1-M-PARIKH.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based on the proponent's published reason and the action taken on M110-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Richard Grace, Fairfax County, Virginia, represents Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building Code and Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: It appears by the reason statement provided, the proponent introduced the proposed change to address disposable filters. The current language does not exclude disposable filters, nor does it exclude the disposal and replacement of permanent filters. More so, the proposed language suggests that there are filters, disposable or permanent, that do not have to be designed, nor are required to be cleaned.

M111-12
Final Action: AS AM AMPC____ D

M112-12
508.1.2 (New)

Proposed Change as Submitted

Proponent: Steve Ferguson, American Society of Heating Refrigerating and Air-Conditioning Engineers

Add new text as follows:

508.1.2 Air balance. Design plans for a facility with a commercial kitchen ventilation system shall include a schedule or diagram indicating the design outdoor air balance. The design outdoor air balance shall indicate all exhaust and replacement air for the facility, plus the net exfiltration if applicable. The total replacement air airflow rate shall equal the total exhaust airflow rate plus the net exfiltration.

Reason: The proposed text is consistent with ASHRAE 154 and the IMC is currently silent on this issue.

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

508.1.2(NEW)-M-FERGUSON.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based on the proponent's published reason and the need to inform the designer.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Richard Grace, Fairfax County, Virginia, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building Code and Officials Association (VBCOA), requests Disapproval.

Commenter's Reason: The IMC covers balancing (403.4.4) and pressure equalization (501.4) of all systems, including kitchens. Kitchens are not excluded from 403.4.4 or 501.4. It is redundant to repeat the same language in each applicable section of the same code when compliance requirements are already written within that code. Additionally, by adding in the language "net exfiltration", this section will directly conflict with 501.4 where stated "Where mechanical exhaust is required in a room or space in other than occupancies in R-3 and *dwelling units* in R-2, such space shall be maintained with a neutral or negative pressure." Exfiltration will require a positive pressure.

M112-12
Final Action: AS AM AMPC____ D

M123-12
514.2

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

514.2 Prohibited applications. Energy recovery ventilation systems shall not be used in the following systems:

> **Exception:** The application of ERV equipment that recovers sensible heat only utilizing coil-type and fixed- plate heat exchangers shall not be limited by this section.

(Portions not shown remain unchanged.)

Reason: Section 514 limits the applications for ERV's and was focused on wheel- type heat exchanger units. Exemptions should apply for "run-around-coils", fixed plate heat exchangers and other non- latent energy types of ERV's. The ERV types in the exception cannot leak contaminants from one air stream to another, which was the concern of the original text. ERV's are in demand for some of these applications to meet the goals of energy and sustainability "green" codes, standards and rating systems.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

514.2-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The listing of some ERV's could prohibit such applications. Relaxation of the prohibition is a threat to indoor air quality.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

514.2 Prohibited applications. Energy recovery ventilation systems shall not be used in the following systems:

> **Exception:** The application of ERV equipment that recovers sensible heat only utilizing coil-type ~~and fixed plate~~ heat exchangers shall not be limited by this section.

Commenter's Reason: Fixed plate heat exchangers have been removed from the original change because of concern for cross contamination resulting from the loss of integrity of a fixed plate. Coil type heat exchangers would not pose a threat to indoor air quality.

M123-12
Final Action: AS AM AMPC____ D

M126-12
602.1

Proposed Change as Submitted

Proponent: Guy McMann, MCP, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO)
(gmcmann@jeffco.us)

Revise as follows:

SECTION 602
PLENUMS

602.1 General. Supply, return, exhaust, relief and ventilation air plenums shall be limited to uninhabited crawl spaces, areas above a ceiling or below the floor, attic spaces and mechanical equipment rooms. Plenums shall be limited to one fire area. Return and transfer air shall be ducted from the boundary of the fire area directly to the air handling equipment. Fuel-fired appliances shall not be installed within a plenum**.**

Reason: It needs to be clarified that protected openings connecting one fire area to another are still linking the fire areas together regardless of whether a fire damper is installed in a fire barrier. There will still be a physical path for smoke to travel through even when the equipment has stopped in fire mode. Making it clear that this situation would require a direct ducted connection to the air handling equipment will be helpful to the user.

Cost Impact: None

602.1.#2-M-MCMANN.DOC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

SECTION 602
PLENUMS

602.1 General. Supply, return, exhaust, relief and ventilation air plenums shall be limited to uninhabited crawl spaces, areas above a ceiling or below the floor, attic spaces and mechanical equipment rooms. Plenums shall be limited to one fire area. ~~Return and transfer~~ Air systems shall be ducted from the boundary of the fire area served directly to the air handling equipment. Fuel-fired appliances shall not be installed within a plenum**.**

Committee Reason: Approval is based on the proponent’s published reason. The modification adding the word “served” clarifies the relationship between the fire area and the air handler that serves the fire area. The modification opens the requirement to all air systems which can include supply and exhaust air as well as return and transfer air.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Claude Kennedy, City of Salem, Oregon, representing Oregon Mechanical Officials Association, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

Section 602
Plenums

602.1 General. Supply return, exhaust, relief and ventilation air plenums shall be limited to the uninhabited crawl spaces, areas above ceiling or below floor, attic spaces, and mechanical equipment rooms. Plenums shall be limited to one fire area. ~~Air systems shall be ducted from the boundary of the fire area served directly to the air handling equipment.~~ Return and transfer air connections to a plenum shall be continuously ducted from the boundary of the fire area to the air handling equipment located outside of the fire area. Fuel-fired appliances shall not be installed within a plenum.

Commenter's Reason: The original language found to be unclear and in need of clarification; OMOA officials suggest modifications as listed. Supportive comment is to clarify that return or transfer air in a plenum must be in ductwork when passing outside of its fire zone. The air handler/fan for this air cannot be located in a return plenum when outside of the originating fire zone.

M126-12
Final Action: AS AM AMPC____ D

M129-12
202, Section 602

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Add new definition as follows:

NON-DISCRETE PRODUCT. Products such as conduit, cable and plastic piping systems that are tested in accordance with ASTM E84 or UL 723.

Delete and substitute as follows:

~~**SECTION 602**~~
~~**PLENUMS**~~

~~**602.1 General.** Supply, return, exhaust, relief and *ventilation air* plenums shall be limited to uninhabited crawl spaces, areas above a ceiling or below the floor, attic spaces and mechanical *equipment* rooms. Plenums shall be limited to one fire area. Fuel-fired appliances shall not be installed within a *plenum*.~~

~~**602.2 Construction.** *Plenum* enclosures shall be constructed of materials permitted for the type of construction classification of the building.~~

~~The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Air plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.~~

~~**602.2.1 Materials within plenums.** Except as required by Sections 602.2.1.1 through 602.2.1.5, materials within plenums shall be noncombustible or shall be listed and labeled as having a flame spread index of not more than 25~~
~~and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.~~

~~**Exceptions:**~~

1. ~~Rigid and flexible ducts and connectors shall conform to Section 603.~~
2. ~~Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.~~
3. ~~This section shall not apply to materials exposed within plenums in one- and two-family dwellings.~~
4. ~~This section shall not apply to smoke detectors.~~
5. ~~Combustible materials fully enclosed within one of the following:~~
   - ~~5.1. Continuous noncombustible raceways or enclosures.~~
   - ~~5.2. Approved gypsum board assemblies.~~
   - ~~5.3. Materials listed and labeled for installation within a plenum.~~
6. ~~Materials in Group H, Division 5 fabrication areas and the areas above and below the fabrication area that share a common air recirculation path with the fabrication area.~~

~~**602.2.1.1 Wiring.** Combustible electrical wires and cables and optical fiber cables exposed within a plenum shall be listed as having a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 5 feet (1524 mm) or less when tested in accordance with NFPA 262 or shall be installed in metal raceways or metal sheathed cable. Combustible optical fiber and communication raceways exposed within a plenum shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame~~

~~spread distance of 5 feet (1524 mm) or less when tested in accordance with ANSI/UL 2024. Only plenum-rated wires and cables shall be installed in plenum-rated raceways. Electrical wires and cables, optical fiber cables and raceways addressed in this section shall be listed and labeled and shall be installed in accordance with NFPA 70.~~

~~**602.2.1.2 Fire sprinkler piping.** Plastic fire sprinkler piping exposed within a *plenum* shall be used only in wet pipe systems and shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887. Piping shall be *listed* and *labeled*.~~

~~**602.2.1.3 Pneumatic tubing.** Combustible pneumatic tubing exposed within a *plenum* shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1820. Combustible pneumatic tubing shall be *listed* and *labeled*.~~

~~**602.2.1.4 Electrical equipment in plenums.** Electrical *equipment* exposed within a *plenum* shall comply with Sections 602.2.1.4.1 and 602.2.1.4.2.~~

~~**602.2.1.4.1 Equipment in metallic enclosures.**Electrical *equipment* with metallic enclosures exposed within a *plenum* shall be permitted.~~

~~**602.2.1.4.2 Equipment in combustible enclosures.**Electrical *equipment* with combustible enclosures exposed within a *plenum* shall be *listed* and *labeled* for such use in accordance with UL 2043.~~

~~**602.2.1.5 Foam plastic insulation.** Foam plastic insulation used as interior wall or ceiling finish, or as interior~~
~~trim, in plenums shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723 and shall also comply with one or more of Sections 602.2.1.5.1, 602.2.1.5.2 and 602.2.1.5.3.~~

~~**602.2.1.5.1 Separation required.** The foam plastic insulation shall be separated from the plenum by a thermal barrier complying with Section 2603.4 of the *International Building Code* and shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness and density intended for use.~~

~~**602.2.1.5.2 Approval.** The foam plastic insulation shall exhibit a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness and density intended for use and shall meet the acceptance criteria of Section 803.1.2 of the *International Building Code* when tested in accordance with NFPA 286.~~

~~The foam plastic insulation shall be approved based on tests conducted in accordance with Section 2603.10 of the *International Building Code*.~~

~~**602.2.1.5.3 Covering.** The foam plastic insulation shall be covered by corrosion-resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm) and shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness and density intended for use.~~

~~**602.3 Stud cavity and joist space plenums.** Stud wall cavities and the spaces between solid floor joists to be utilized as air plenums shall comply with the following conditions:~~

1. ~~Such cavities or spaces shall not be utilized as a *plenum* for supply air.~~
2. ~~Such cavities or spaces shall not be part of a required fire-resistance-rated assembly.~~
3. ~~Stud wall cavities shall not convey air from more than one floor level.~~
4. ~~Stud wall cavities and joist space plenums shall comply with the floor penetration protection requirements of the *International Building Code*.~~

5. ~~Stud wall cavities and joist space plenums shall be isolated from adjacent concealed spaces by *approved* fireblocking as required in the *International Building Code*.~~
6. ~~Studwall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.~~

~~**[B] 602.4 Flood hazard.** For structures located in flood hazard areas, plenum spaces shall be located above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment or shall be designed and constructed to prevent water from entering or accumulating within the plenum spaces during floods up to such elevation.~~

~~If the plenum spaces are located below the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment, they shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to such elevation.~~

602.1 General. Supply, return, exhaust, relief and ventilation air plenums shall be limited to uninhabited crawl spaces, areas above a ceiling or below the floor, attic spaces and mechanical equipment rooms. Plenums shall be limited to one fire area. Fuel-fired appliances shall not be installed within a plenum.

602.2 Construction. Plenum enclosures shall be constructed of materials permitted for the type of construction classification of the building.

The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Air plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

602.3 Materials installed within plenums. Sections 602. 3.1 through 602.3.8 shall apply to materials exposed within plenums. Such sections shall not apply to the following:

1. Dwelling units.
2. Smoke detectors.
3. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, gypsum board or other assembly meeting the fire resistive requirements of the building type of construction.
4. Materials in Group H, Division 5 fabrication areas and the areas above and below the fabrication area that share a common air recirculation path with the fabrication area.

602.3.1 Rigid and flexible ducts and connectors. Rigid and flexible ducts and connectors shall conform to Section 603.

602.3.2 Duct coverings, linings, tape and connectors. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.

602.3.3 Combustible Wiring. Combustible electrical wires and cables and optical fiber cables exposed within a plenum shall be listed as having a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 5 feet (1524 mm) or less when tested in accordance with NFPA 262 or shall be installed in metal raceways or metal sheathed cable. Combustible optical fiber and communication raceways exposed within a plenum shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 5 feet (1524 mm) or less when tested in accordance with ANSI/UL 2024. Only plenum-rated wires and cables shall be installed in plenum-rated raceways. Electrical wires and cables, optical fiber cables and raceways addressed in this section shall be listed and labeled and shall be installed in accordance with NFPA 70.

602.3.4 Combustible fire sprinkler piping. Combustible fire sprinkler piping exposed within a plenum shall be used only in wet pipe systems and shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887.

602.3.5 Combustible pneumatic tubing. Combustible pneumatic tubing exposed within a plenum shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1820.

602.3.6 Electrical equipment in plenums. Electrical equipment exposed within a plenum shall be enclosed within metallic enclosures or shall meet the requirements of UL 2043.

602.3.7 Foam plastic insulation. Foam plastic insulation used as interior wall or ceiling finish, or as interior trim, in plenums shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723 and shall also comply with one or more of the following:

1. The foam plastic insulation shall be separated from the plenum by a thermal barrier complying with Section 2603.4 of the International Building Code and shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness and density intended for use.
2. The foam plastic insulation shall exhibit a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness and density intended for use and shall meet the acceptance criteria of Section 803.1.2 of the International Building Code when tested in accordance with NFPA 286. The foam plastic insulation shall be approved based on tests conducted in accordance with Section 2603.10 of the International Building Code .
3. The foam plastic insulation shall be covered by corrosion-resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm) and shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness and density intended for use.

602.3.8 Non-discrete products. *Non-discrete products* not addressed in Sections 602.3.1 through 602.3.7 installed within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Reason: This section was reorganized to eliminate a format having several exceptions. New text was added to cover what was addressed in the current Section 602.2.1, which was, in essence, what the industry refers to as non–discrete products that can be tested to ASTM E 84 or UL 723.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

202-NON-DISCRETE PRODUCT-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Beyond the reorganization of text, substantial technical changes were made. The listing and labeling requirement was deleted from fire sprinkler piping and pneumatic tubing sections. The word "exposed" was added back into Section 602.3. "Dwellings" in the exception to Section 602.3 was changed from "one- and two-family dwellings," which changes the application. Item # 3 of Section 602.3 speaks of fire-resistive requirements which are not relevant. The definition of non-discrete is vague.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**NON-DISCRETE PRODUCT.** Products such as conduit, cable and plastic piping systems that are tested in accordance with ASTM E84 or UL 723.~~

602.1 General. Supply, return, exhaust, relief and ventilation air plenums shall be limited to uninhabited crawl spaces, areas above a ceiling or below the floor, attic spaces and mechanical equipment rooms. Plenums shall be limited to one fire area. Fuel-fired appliances shall not be installed within a plenum.

602.2 Construction. Plenum enclosures shall be constructed of materials permitted for the type of construction classification of the building.

The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Air plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

602.3 Materials installed within plenums. Sections 602. 3.1 through 602.3.8 shall apply to materials ~~exposed~~ within plenums. Such sections shall not apply to the following:

1. ~~Dwelling~~ one- and two-family dwellings ~~units~~.
2. Smoke detectors.
3. ~~Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, gypsum board or other assembly meeting the fire resistive requirements of the building type of construction.~~

~~4.~~3. Materials in Group H, Division 5 fabrication areas and the areas above and below the fabrication area that share a common air recirculation path with the fabrication area.

602.3.1 Rigid and flexible ducts and connectors. Rigid and flexible ducts and connectors shall conform to Section 603.

602.3.2 Duct coverings, linings, tape and connectors. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.

602.3.3 Combustible Wiring. Combustible electrical wires and cables and optical fiber cables exposed within a plenum shall be listed as having a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 5 feet (1524 mm) or less when tested in accordance with NFPA 262 or shall be installed in metal raceways or metal sheathed cable. Combustible optical fiber and communication raceways exposed within a plenum shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 5 feet (1524 mm) or less when tested in accordance with ANSI/UL 2024. Only plenum-rated wires and cables shall be installed in plenum-rated raceways. Electrical wires and cables, optical fiber cables and raceways addressed in this section shall be listed and labeled and shall be installed in accordance with NFPA 70.

602.3.4 Combustible fire sprinkler piping. Combustible fire sprinkler piping exposed within a plenum shall be used only in wet pipe systems and shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887. Such piping shall be listed and labeled.

602.3.5 Combustible pneumatic tubing. Combustible pneumatic tubing exposed within a plenum shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1820. Combustible pneumatic tubing shall be listed and labeled.

602.3.6 Electrical equipment in plenums. Electrical equipment exposed within a plenum shall be enclosed within metallic enclosures or shall meet the requirements of UL 2043.

602.3.7 Foam plastic insulation. Foam plastic insulation used as interior wall or ceiling finish, or as interior trim, in plenums shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723 and shall also comply with one or more of the following:

1. The foam plastic insulation shall be separated from the plenum by a thermal barrier complying with Section 2603.4 of the International Building Code and shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness and density intended for use.
2. The foam plastic insulation shall exhibit a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness and density intended for use and shall meet the acceptance criteria of Section 803.1.2 of the International Building Code when tested in accordance with NFPA 286. The foam plastic insulation shall be approved based on tests conducted in accordance with Section 2603.10 of the International Building Code.
3. The foam plastic insulation shall be covered by corrosion-resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm) and shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness and density intended for use.

602.3.8 ~~Non-discrete~~ Other products. ~~Non-discrete~~ Products not addressed in Sections 602.3.1 through 602.3.7 and installed within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

602.4 Stud cavity and joist space plenums. Stud wall cavities and the spaces between solid floor joists to be utilized as air plenums shall comply with the following conditions:

1. Such cavities or spaces shall not be utilized as a *plenum* for supply air.
2. Such cavities or spaces shall not be part of a required fire-resistance-rated assembly.
3. Stud wall cavities shall not convey air from more than one floor level.
4. Stud wall cavities and joist space plenums shall comply with the floor penetration protection requirements of the *International Building Code*.
5. Stud wall cavities and joist space plenums shall be isolated from adjacent concealed spaces by *approved* fireblocking as required in the *International Building Code*.
6. Studwall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

[B] 602.5 Flood hazard. For structures located in flood hazard areas, plenum spaces shall be located above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment or shall be designed and constructed to prevent water from entering or accumulating within the plenum spaces during floods up to such elevation.
If the plenum spaces are located below the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment, they shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to such elevation.

Commenter's Reason: The following revisions are in response to the committee reasons for disapproval. The listing and labeling requirement was deleted from fire sprinkler piping and pneumatic tubing sections. The word "exposed" was deleted from Section 602.3. "Dwellings" in the exception to Section 602.3 has been changed to "one- and two-family dwellings,". Item # 3 of Section 602.3 was deleted. The definition of non-discrete was deleted. Deleting the Stud Cavity and Flood hazard sections was unintended and they are added back in.

M129-12

Final Action: AS AM AMPC____ D

M130-12
602.2

Proposed Change as Submitted

Revise as follows:

602.2 Construction. *Plenum* enclosures shall be constructed of materials <u>that comply with the requirements of section 703.5 of the *International Building Code* or of materials that have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723</u> ~~permitted for the type of construction classification of the building~~. The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Air plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

Reason: All the materials contained <u>within a plenum</u> must be noncombustible or have a flame spread index of not more than 25 and a smoke developed index of not more than 50, except for a series of materials that meet their own special tests. The materials of construction of the plenum itself need to meet similar requirements. The IMC section is shown below.

> **602.2.1 Materials within plenums**. Except as required by Sections 602.2.1.1 through 602.2.1.6, materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Plenums should not be allowed to be constructed simply of combustible materials (for example plain wood) because if the plenum enclosures can be made of wood, any fire would be able to spread along the walls of the plenum (wood typically has a flame spread index of up to 200) even with the best materials contained within the plenum.

During the last cycle proposal M88 introduced this issue but the technical committee was concerned that the proposal was placed in the wrong location because the requirements were placed in section 602.2.1 and they conflicted with the requirements of section 602.2 which would appear to allow plenum enclosures to be constructed of wood or other combustible building materials.

Requiring that a material be noncombustible in accordance with Section 703.5 of the IBC is much less onerous than simply requiring it to be noncombustible because composite materials are actually permitted to be "somewhat combustible" in accordance with 703.5.2 and only "elementary materials" are required to be strictly noncombustible. In particular section 703.5.2 of the IBC is intended to allow gypsum board to be classified as noncombustible, and, therefore, this avoids a conflict with the remainder of section 602.2 that allows gypsum board into certain plenums.

Section 703.5 of the IBC reads as follows:

703.5 Noncombustibility tests. *The tests indicated in Sections 703.5.1 and 703.5.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2 602.3 and 602.4 in Type I, II, III and IV construction. The term "noncombustible" does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.*
703.5.1 Elementary materials. *Materials required to be noncombustible shall be tested in accordance with ASTM E 136.*
703.5.2 Composite materials. *Materials having a structural base of noncombustible material as determined in accordance with Section 703.5.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E 84 or UL 723 shall be acceptable as noncombustible materials.*

The revised language proposed for the IMC takes care of the problem of using highly combustible materials to construct plenums by requiring that plenum enclosures be constructed of noncombustible materials (in accordance with section 703.5 of the IBC, which includes gypsum board) or of materials that meet the same fire test requirements as the materials contained within the plenum for all types of buildings.

Cost Impact: Plenums will not be permitted to be constructed of wood.

602.2-M-HIRSCHLER.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed text could be interpreted to require the materials in wall assemblies to comply as opposed to only the surfaces exposed to airflow.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Marcelo M. Hirschler, representing GBH International, Jesse Beitel, representing Hughes Associates for XPSA and Robert Davidson, representing Davidson Code Concepts, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2 Construction. Plenum enclosure construction materials that are exposed to the airflow shall ~~*Plenum* enclosures shall be constructed of materials that~~ comply with the requirements of Section 703.5 of the *International Building Code* or such materials shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723. The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Air plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

Commenter's Reason: The technical committee pointed out during the discussion that "The proposed text could be interpreted to require the materials in wall assemblies to comply as opposed to only the surfaces exposed to airflow." The public comment makes it clear that the new requirements apply only to those plenum enclosure construction materials exposed to the airflow.

The original proposal was opposed by one of the submitters of this public comment and the modification resolves the issue. The original reason for the code proposal remains valid and is adequately addressed by this comment, albeit (properly) by restricting it to the materials of construction exposed to the airflow: "All the materials contained within a plenum must be noncombustible or have a flame spread index of not more than 25 and a smoke developed index of not more than 50, except for a series of materials that meet their own special tests. The materials of construction of the plenum itself need to meet similar requirements."

The other issue addressed by the proposal is also still valid: the requirements of section 703.5 of the IBC allow gypsum board to continue to be used as a plenum construction material.

M130-12

Final Action: AS AM AMPC____ D

M131-12
202, 602.2.1, 602.2.1.6 (New), Chapter 15

Proposed Change as Submitted

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association (PPFA) (mikec@cmservnet.com)

Add definition as follows:

WATER DISTRIBUTION PIPE. Piping or tubing within the structure or on the premises that conveys water from the water service pipe, or from the meter when the meter is at the structure, to the points of utilization.

Add text as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.~~5~~6, materials within plenums shall be noncombustible or shall be listed and labeled as having a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within one of the following:
   5.1. Continuous noncombustible raceways or enclosures.
   5.2. Approved gypsum board assemblies.
   5.3. Materials listed and labeled for installation within a plenum.
6. Materials in Group H, Division 5 fabrication areas and the areas above and below the fabrication area that share a common air recirculation path with the fabrication area.

602.2.1.6 Plastic water distribution pipe. Plastic water distribution piping and tubing used in a pressurized wet system exposed within a plenum shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887 or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84, UL 723 or CAN/ULC S102.2

Add referenced standard to Chapter 15:

CAN/ULC S102.2-10
Standard Method of Test for Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.

Reason: The intent of this proposal is to provide known and accepted test methods, such as CAN/ULC S102.2 and UL-1887, to evaluate the acceptability of combustible supply piping to be used in plenum spaces. Such piping is used for hot and cold water supply but not as drain, waste and vent piping.

This action will complement the current standard, the ASTM E-84 test method, which is available to assess flame spread properties of combustible supply piping, and provide regulators and suppliers with the improved option of the UL test method to assess production of smoke by combustible piping. We do not wish to remove ASTM E84 as a suitable test for there are existing listings.

While UL 1887 is specifically scoped for use with combustible sprinkler piping at the present time, it is my understanding from discussions with UL representatives that allowing for/requiring its utilization for combustible pressure piping, will not require modification of that standard. The membership should note that such piping is functionally equivalent to sprinkler piping in the application covered by the proposed code change.

In all cases testing according to UL 1887 is carried out on empty piping, i.e. piping NOT including water or any other liquid. This was a concern stated by the Committee in its earlier deliberations. This test condition insures that under the proposal combustible piping will be tested according to the most pessimistic scenario possible when comparing full or empty piping. This is because empty combustible piping is far more easily ignited and presents a greater smoke hazard than combustible piping that is full of water when they are compared directly.

S102.2 is referenced in the building code, and UL 1887 is already in the IMC.
The term “water distribution pipe” is already defined in the IPC.

Cost Impact: None

Analysis: A review of the standard proposed for inclusion in the code, [CAN/ULC S102.2-10] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

602.2.1-M-CUDAHY.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The standards are not necessarily equivalent. UL1887 is scoped to sprinkler piping only. ASTM E84 and UL 723 do not give sample testing direction, are not specific and are not consistent. Pipe in plenums must be listed for the application.

Analysis: Any update to this standard will be considered by the Administrative Code Committee during the 2013 Code Development Cycle.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Michael Cudahy, representing Plastic Pipe and Fittings Association (PPFA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

WATER DISTRIBUTION PIPE. Piping or tubing within the structure or on the premises that conveys water from the water service pipe, or from the meter when the meter is at the structure, to the points of utilization.

602.2.1.6 Plastic water distribution pipe. Plastic water distribution piping and tubing used in a pressurized wet system exposed within a plenum ~~shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887 or~~ shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84, UL 723 or CAN/ULC S102.2 <u>Such piping shall be listed and labeled.</u>

Add referenced standard to Chapter 15:

CAN/ULC S102.2-10
Standard Method of Test for Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.

(Portions not shown are unaffected by this Public Comment.)

Commenter’s Reason: The committee at the initial hearing felt the proposal should include “listed and labeled” and also preferred S102.2 over UL 1887. The proposal has been modified to address those issues.

Public Comment 2:

Rosemary Heinze, representing Arkema, Inc., requests Disapproval.

Commenter's Reason: The Committee Action to disapprove this proposal should be upheld. No test data was provided by the proponent to demonstrate equivalency of the proposed additional test standards to the existing test standards. In fact, piping materials that meet 25/50 when tested in accordance with CANIULC S 102.2 have produced smoke-developed index values of 450 and higher when tested in accordance with UL 723. This proposal would reduce the standard of safety that is maintained in the current code. Additionally, it is worth mentioning that there was a Floor Action following the Committee's decision to disapprove the proposal, and the Floor Action was not successful. Enclosed reference: Test data from JSH Polymers & Plastics, File# R21427 for CPVC resin.

SUMMARY OF RESULTS

ENGINEER	: Karen Foxx-Smith	TECHNICIAN	: Sly Smith
FILE NO.	: R21427	TEST DATE	: 5/12/03
ASSIGNMENT NO.	: 03CA16601	TEST TIME	: 7:27 AM
APPLICANT	: JSH Polymers & Plastics	TEST CODE	: 05120306
MATERIAL	: CPVC resin	TEST NO	: 1
		MOUNTING	: Rods and Wire

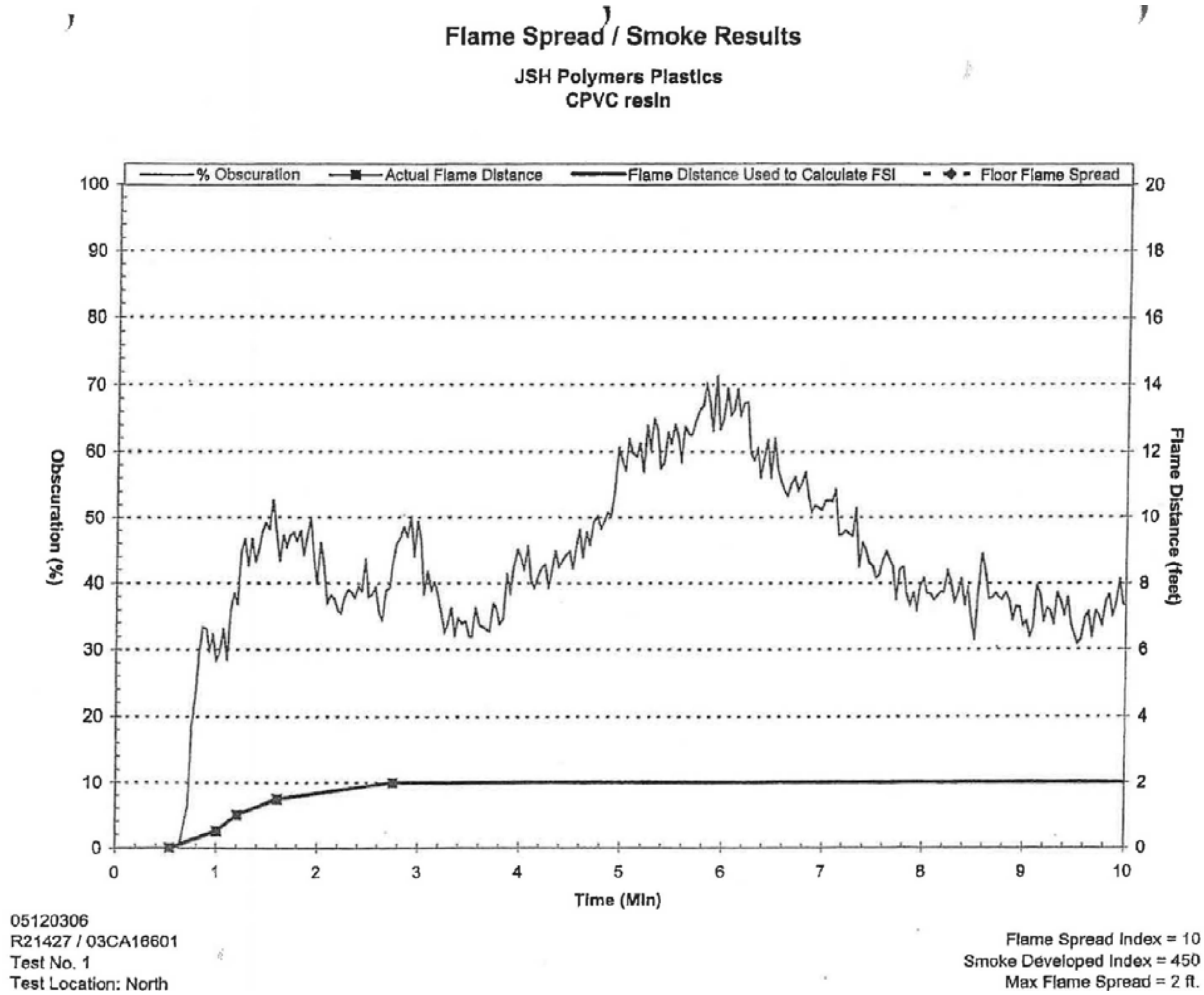
FLAME SPREAD RESULTS

Distance (ft.)	Time (sec)
0.00	32
0.50	60
1.00	72
1.50	96
2.00	165

Calculated Flame Spread (CFS):	8.82
Flame Spread Index(FSI):	10
Duration of test:	10 min
Time to ignition:	32 sec
Maximum Flame Spread:	2 ft prior to 10 minutes
Actual area under the Flame spread Curve (ft.-min):	17.1

SMOKE RESULTS

Calculated Smoke Developed (CSD) :	436.6
SmokeDeveloped Index (SDI):	450
Area under the Smoke Curve:	20.74 square inches
Area under the Red Oak Curve:	4.75 square inches



Public Comment 3:

Marcelo Hirschler, representing GBH International, requests Disapproval.

Commenter's Reason: Continue disapproving this proposal – UL 1887 and CAN/ULC S102.2 are not equivalent standards to ASTM E84 or UL 723, which is the default standard for materials in plenums. In fact, UL 1887 (which is intended for sprinkler piping) and CAN/ULC S102.2 (which is primarily intended for flooring materials and loose fill insulation materials) are much less severe fire tests than ASTM E84 or UL 723. Moreover, this proposal would not specifically require "Plastic water distribution piping and tubing" to be listed for the application. Moreover the definition addresses "water distribution pipe" and the requirements are for "plastic water distribution piping and tubing used in a pressurized water system" and thus are not consistent with each other.

The standards are not necessarily equivalent. UL1887 is scoped to sprinkler piping only. ASTM E84 and UL 723 do not give sample testing direction, are not specific and are not consistent. Pipe in plenums must be listed for the application.

M131-12

Final Action: AS AM AMPC____ D

M133-12
602.2.1

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc, representing International Firestop Council (tcrimi@sympatico.ca)

Revise as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.5, materials within plenums shall be noncombustible or shall be listed and labeled as having a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within one of the following:
   5.1. Continuous noncombustible raceways or enclosures.
   5.2. Approved gypsum board assemblies.
   5.3. Materials listed and labeled as <u>plenum protection systems</u> for use within a plenum.

Reason: This proposal aims to clarify Exception 5 to 602.2.1 which permits combustible materials to be installed in plenums provided they are fully enclosed in, amongst other things, "Materials listed and labelled for installation within a plenum." However, the current language lacks any kind of specific test standard, or detail as to the intent. Some have interpreted the exception to mean that the combustible item can be covered with *any* 25/50 rated material to bring it into code compliance. Testing has demonstrated that this is not the case. An individual material may pass the flame/smoke criteria, but may not provide enough protection for the combustible item beneath it to also pass the test. Reasons for this may include material shrinkage, high thermal conductivity, inadequate thickness, etc.

Testing and Certification Laboratories do provide Listings for “Plenum Protection Systems”, which serve to protect a combustible item, keeping it from the degrading under fire conditions. These materials are qualified through fire testing of the combustible item together with the 'plenum protection material' as a system, to one of the plenum fire test methods dictated by the item type (such as NFPA 262, UL 1887, UL 1820 or UL 2024). These fire tests are a modified version of ASTM E 84 and utilise the Steiner Tunnel furnace. Testing is conducted at nationally recognised testing laboratories (NRTL) such as Intertek, ETL or UL. Listed system are then identified under the plenum protection (PP) category in the lab’s Certifications Directory.

Cost Impact: This proposal will not affect the cost of construction.

602.2.2.1-M-CRIMI.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: It is unnecessary to name such products. No listing agency uses such term. There is no definition for this term. The proposal would limit other materials. No performance criteria are given for such products. The current text already states what can be in a plenum.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Modify the proposal as follows:

602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.5, materials within plenums shall be noncombustible or shall be listed and labeled as having a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within one of the following:
   5.1. Continuous noncombustible raceways or enclosures.
   5.2. Approved gypsum board assemblies.
   5.3. Materials listed and labeled as ~~plenum protection systems~~ <u>a system</u> for use within a plenum.

Commenter's Reason: This proposal is a clarification to Exception 5 to 602.2.1 which permits combustible materials to be installed in plenums provided they are fully enclosed in, amongst other things, "Materials listed and labelled for installation within a plenum."

Some have interpreted the exception to mean that the combustible item can be covered with *any* 25/50 rated material to bring it into code compliance. Testing has demonstrated that this is not the case. An individual material may pass the flame/smoke criteria, but may not provide enough protection for the combustible item beneath it to also pass the test. Reasons for this may include material shrinkage, high thermal conductivity, inadequate thickness, etc. The proposed language identifies that these combined materials must be tested together, and comply with flame spread and smoke developed requirements for plenums.

This approach is very commonly used with building materials. For example, foil facers for insulation products are tested both independently (as is the insulation) and together as faced batts and blankets.

M133-12

Final Action: AS AM AMPC____ D

M134-12
202, 602.2.1.4

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Add new definition as follows:

DISCRETE PRODUCT. Products such as duct straps, duct fittings, duct registers, and pipe hangers that are tested to UL 2043.

Revise as follows:

~~**602.2.1.4 Electrical equipment in plenums**. Electrical equipment exposed within a plenum shall comply with Sections 602.2.1.4.1 and 602.2.1.4.2~~

~~**602.2.1.4.1 Equipment in metallic enclosures.** Electrical equipment with metallic enclosures exposed within a plenum shall be permitted.~~

~~**602.2.1.4.2 Equipment in combustible enclosures**. Electrical equipment with combustible enclosures exposed within a plenum shall be listed and labeled for such use in accordance with UL 2043.~~

602.2.1.4 Discrete electrical, plumbing and mechanical products in plenums. Where discrete electrical, plumbing and mechanical products and appurtenances are located in a plenum and have exposed combustible material, they shall be listed and labeled for such use in accordance with UL 2043.

Reason: The first part of this proposal is just a text cleanup to delete unnecessary wording. Section 602.2.1.4.1 does not state a requirement and is simply the inverse of section 602.2.1.4.2. With Section 602.2.1.4.1 gone, Section 602.2.1.4 has no purpose. The only actual requirement is stated in Section 602.2.1.4.2. The second part of this proposal revises the remaining section to broaden its coverage to more than electrical products. There are combustible plumbing and mechanical products such as plumbing appurtenances, pipe and duct supports, condensate pumps, duct fittings, etc that are used in plenums and that cannot be effectively tested in accordance with standards ASTM E84 or UL 723. The UL 2043 standard was developed to test products and materials not able to be tested in accordance with ASTM E84 or UL 723, and is currently adopted by reference in Section 602.2.1.4.2. These products are individual distinct pieces and non-continuous (i.e. "discrete"). This proposal was presented last cycle and the Committee had questions about the term "discrete'. Per the dictionary, 'discrete' refers to products that are non-continuous, individual distinct pieces, as compared to non-discrete products such as cable or plastic pipe. If adopted, this proposal will provide consistency in how the ICC codes treat discrete components in plenums. The new definition is necessary because of the new term. The definition basically states that a discrete product is something that is necessarily tested to UL 2043. A discrete product is defined by how it is tested.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

202-DISCRETE PRODUCT (NEW)-M-STRAUSBAUGH-PMGCAC.DOC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

DISCRETE PRODUCT. Products that are non-continuous, individual, distinct pieces such as, but not limited to, ~~such as~~ duct straps, duct fittings, duct registers, and pipe hangers. ~~that are tested to UL 2043.~~

Revise as follows:

602.2.1.4 Electrical equipment in plenums. Electrical equipment exposed within a plenum shall comply with Sections 602.2.1.4.1 and 602.2.1.4.2

602.2.1.4.1 Equipment in metallic enclosures. Electrical equipment with metallic enclosures exposed within a plenum shall be permitted.

602.2.1.4.2 Equipment in combustible enclosures. Electrical equipment with combustible enclosures exposed within a plenum shall be listed and labeled for such use in accordance with UL 2043.

602.2.1.~~4~~ 5 Discrete ~~electrical~~, plumbing and mechanical products in plenums. Where discrete ~~electrical~~, plumbing and mechanical products and appurtenances are located in a plenum and have exposed combustible material, they shall be listed and labeled for such use in accordance with UL 2043.

Committee Reason: Approval is based on the proponent's published reason. The modification restores text that recognizes that electrical equipment having metallic enclosures is allowed in a plenum, despite the fact that such enclosures are not continuous because of the presence of mounting and similar holes in the metallic enclosure. The text of current Section 602.2.1.4.1 is needed to counter item # 5 of Section 602.2.1 which calls for combustible items to be fully enclosed by continuous enclosures.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Marcelo M. Hirschler, representing GBH International, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

DISCRETE PRODUCT. Products that are non-continuous, individual, distinct pieces such as, but not limited to, electrical, plumbing and mechanical products and duct straps, duct fittings, duct registers, and pipe hangers.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: This public comment addresses only the definition and supports the remainder of the proposal as approved by the technical committee. The reason for the proposed modification is to make the definition consistent with the requirements in sections 602.2.1.4 and 602.2.1.5. Discrete products such as duct straps, duct fittings and so on are clearly covered by the requirements of 602.2.1.5 but the requirements of 602.2.1.4 and 602.2.1.5 tend to apply also to larger discrete products with exposed combustible materials.

M134-12

Final Action: AS AM AMPC____ D

M136-12
602.2.1.6 (New)

Proposed Change as Submitted

Proponent: Marcelo M. Hirschler/GBH International
(gbhint@aol.com)

Add new text as follows:

602.2.1.6 Plastic piping and tubing used in plumbing systems shall exhibit a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723. The fire test report shall indicate that the materials were tested at full width of the tunnel and without water or any other liquid in the piping or tubing during the test.

Reason: The IMC requires, in 602.2.1, that all materials within plenums must meet a flame spread index of 25 and a smoke developed index of 50 when tested to ASTM E84. However, in actual practice, many plastic piping and tubing materials are tested by filling the product with water during the test. This is neither a test in accordance with ASTM E84 nor is it adequate for the following reasons:

1. The plastic piping and tubing is listed for use in plenums and can be used with liquids other than water. For example it could be used for combustible liquids.
2. The plastic piping and tubing is not required to be held horizontally in the plenum. If the pipe is not horizontal then the water will not be retained in the pipe during use.
3. During construction and remodeling pipes are often empty.
4. Fire testing for all other products using ASTM E84 is conducted on the material to be used and not on the material with some fillings.
5. ASTM E84 requires all materials and products to be tested at full tunnel width, with only very few exceptions. Plastic piping and tubing is not one of the exceptions. The exceptions in ATM E84 are: (1) when there is a standard practice for the material (as shown in section 6.8), (2) when adhesives and trim have been listed with tests at less than full width and (3) when a specific test or application standard has been issued (as shown in Appendix X5). The relevant sections are shown below (section 6.3 and its associated subsections, section 6.8 and appendix X5).
6. Other plastic piping and tubing materials are tested without water and the comparison is inadequate if some materials are tested full of water.
7. Some materials are tested with water simply because they cannot meet the requirements otherwise.
8. If the IMC committee believes that ASTM E84 is not an appropriate test for such materials (which is a reasonable approach) a code change is needed and an alternate test must be specified because the present wording of section 602.2.1 of the IMC requires plastic piping and tubing to be tested to the ASTM E84/UL 723 test by default, without offering additional guidance on how to do the testing.

ASTM E84 section 6.3, 6.8 and Appendix X5:
6.3 The size of the test specimen shall be:
Width: between 20 and 24 in. (508 and 610 mm)
Length: 24 ft + 12 in. — 6 in.
Thickness: maximum 4 in. (101 mm).
NOTE 1 - The test apparatus is not designed for testing at thicknesses greater than 4 in. (101 mm), but has the ability to be modified if required. This is accomplished through (a) modifications to the test apparatus lid to maintain an airtight seal, and (b) the introduction, usually of additional sample/lid supports above the test apparatus ledges. Due to the composition of some materials, test results obtained at a thickness greater than 4 in. (101 mm) will potentially vary from results of a test on the same material tested at a thickness of 4 in. (101 mm) or less.
6.3.1 The test specimen shall not be required to conform to the test specimen length and width described in 6.3 when the material complies with 6.3.1.1-6.3.1.3.
NOTE 2—When tests are conducted with materials installed at less than full width, representing the end-use width, any resulting flame spread and smoke developed indices will not relate to indices obtained with the calibration material, which is tested using the specimen width described in 6.3.
6.3.1.1 Materials for which there is a standard practice to address specimen preparation and mounting with this test method shall be tested as described in the appropriate standard practice (see 6.8).
6.3.1.2 Adhesives and trim shall be permitted to be tested in the width or length, or both, specified in their listings, or as part of their conditions for being labeled, by a nationally recognized testing laboratory.
6.3.1.3 Materials and products for which there is a specific test method or application standard requiring the use of the apparatus described in Section 5 shall be permitted to be tested in accordance with that specific test method or application standard (see Appendix X5).
6.8 In addition to the above provisions, the standard practices listed below shall be used for specimen preparation and mounting of the relevant test materials. For all other products, guidance on mounting methods is provided in Appendix X1.
E2231 for pipe and duct insulation materials.

E2404 for paper, vinyl and textile wall and ceiling covering materials.
E2573 for site-fabricated stretch systems.
E2579 for the following wood products: solid board, lumber and timber products (including solid boards, lumber, timber, fingerjoined lumber, glulam, laminate wood, laminated veneer lumber and parallel strand lumber products), panel products (including fibreboard, hardboard, oriented strandboard, waferboard, and plywood panel products), decorative wood products (including fine woodwork, millwork and moulding) and shingles and shakes used as interior wall and ceiling finish and interior trim.
E2599 for reflective insulation, radiant barrier and vinyl stretch ceiling materials for building applications.
E2688 for tapes up to and including 8 in. (203.2 mm) in width.
E2690 for caulks and sealants intended to be applied up to and including 8 in. (203.2 mm) in width.

X5. SPECIFIC TEST METHODS AND APPLICATION STANDARDS
X5.1 The following standards address testing of materials in accordance with test methods that are applications or variations of this test method or apparatus.
X5.1.1 Wires and cables for use in air-handling spaces are covered by NFPA 262.
X5.1.2 Pneumatic tubing for control systems are covered by UL 1820.
X5.1.3 Combustible sprinkler piping is covered by UL 1887.
X5.1.4 Optical fiber and communications raceways are covered by UL 2024.

IMC 602.2.1 Materials within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.5, materials within plenums shall be noncombustible or shall be listed and labeled as having a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723.

For information also:
NFPA 90A (section on ceiling cavity plenums)
4.3.11.2.6.6 Plastic piping and tubing used in plumbing systems shall be permitted to be used within a ceiling cavity plenum if it exhibits a flame spread index of 25 or less and a smoke developed index of 50 or less when tested in accordance with ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, at full width of the tunnel and with no water or any other liquid in the pipe during the test.

NFPA 90A (section on raised floor plenums)
4.3.11.5.5.7 Plastic piping and tubing used in plumbing systems shall be permitted to be used within a raised floor plenum if it exhibits a flame spread index of 25 or less and a smoke developed index of 50 or less when tested in accordance with ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, at full width of the tunnel and with no water or any other liquid in the pipe during the test.

Cost Impact: None

602.2.1.6(NEW)-M-HIRSCHLER.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: E84 is already in the code and this proposal will be confusing to the code officials. E84 describes the specimen setup fully. There is no need to tell the testing lab what to put in the test report.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Marcelo M. Hirschler, representing GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2.1.6 Plastic piping and tubing used in plumbing systems shall be listed and shall exhibit a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723. ~~The fire test report shall indicate that the materials were tested at full width of the tunnel and with no water or any other liquid in the piping or tubing during the test.~~

Commenter's Reason: The technical committee stated that ASTM E84 is already in the code. However, there is no explicit reference to testing plastic piping and tubing and there has been a lot of confusion in recent years regarding the need (or lack of it) for testing these materials. In view of the fact that the issues of "full width" or of water are addressed in the ASTM E84 standard I agree with the committee that they do not need to be addressed in the IMC.

However, it is important to state explicitly that plastic piping and tubing needs to comply with ASTM E84 requirements in view of the multiple discussions and challenges that have taken place in recent years regarding other test methods and in view of the fact (as shown below) that plastic pipe has often been tested full of water and by placing a single pipe in the ASTM E84 apparatus, neither of which is allowed by recent editions of ASTM E84.

Moreover it is important to clarify that plastic piping and tubing in plenums must be listed and this public comment adds that requirement.

M136-12

Final Action: AS AM AMPC____ D

M137-12
602.2.1.6 (New), Chapter 15

Proposed Change as Submitted

Proponent: David W. Ash, Lubrizol Advanced Materials Inc.

Add next text as follows:

602.2.1.6 Plastic plumbing piping. Plastic plumbing piping exposed within a plenum shall have a peak optical density not greater than 0.50. an average optical density not greater than 0.15, and a flame spread index of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887 or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with CAN/ULC S102.2. Piping shall be listed and labeled.

Add referenced standard to Chapter 15:

CAN/ULC S102.2-10
Standard Method of Test for Surface Burning Characteristics of Flooring. Floor Coverings and Miscellaneous Materials and Assemblies

Reason: Currently ASTM E-84 is the required test to determine the flame and smoke properties of materials. These values then determine whether or not a material may be used within plenums. There are exceptions to this standard for those products with special criteria and those are shown in sections 602.2.1.1 through 602.2.1.5.

Since that test is specified by the IMC, all other products, including plastic plumbing pipe, must be evaluated by this test. The scope of ASTM E-84 test states that it is applicable to surfaces such as walls and ceilings. Many products that are not used in a flat form are impacted by this requirement. Obviously, a pipe's tubular shape does not correspond to a flat shape. Although an ASTM committee has been attempting to decide on a test method for pipe, to date they have not been successful. Consequently, ASTM E-84 does not provide any direction in testing a pipe.

Other test standards have been developed that do include provisions for testing pipe. These standards have been successfully used for a number of years. The UL 1887 and CAN/ULC S1 02.2 standards recognize that the appropriate way to evaluate the flame and smoke characteristics of a pipe is to test a sample in that shape. These standards provide specific direction in the testing of the pipe and do not leave the decision of what sample to test up to the manufacturer or the testing agency. The addition of these two standards to the IMC as method to evaluate plastic plumbing pipe provides a clearer direction than what the IMC currently offers.

The CAN/ULC S102.2 standard is currently referenced in the International Building Code. The UL 1887 standard is currently referenced in the International Mechanical Code.

Cost Impact: This proposal would not increase the cost of construction.

602.2.1.6(NEW)-M-ASH.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproval is consistent with the action taken on M131-12.

Analysis: Any update to this standard will be considered by the Administrative Code Committee during the 2013 Code Development Cycle.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

David W. Ash, representing Lubrizol Advanced Materials, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

602.2.1.6 Plastic plumbing piping. Plastic plumbing piping exposed within a plenum ~~shall have a peak optical density not greater than 0.50. an average optical density not greater than 0.15, and a flame spread index of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887 or~~ shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with CAN/ULC S102.2. Piping shall be listed and labeled.

Commenter's Reason: Currently ASTM E-84 is the required test to determine the flame and smoke properties of materials. These values then determine whether or not a material may be used within plenums. There are exceptions to this standard for those products with special criteria and those are shown in sections 602.2.1.1 through 602.2.1.5.

Since that test is specified by the IMC, all other products, including plastic plumbing pipe, must be evaluated by this test. The scope of ASTM E-84 test states that it is applicable to surfaces such as walls and ceilings. Many products that are not used in a flat form are impacted by this requirement. Obviously, a pipe's tubular shape does not correspond to a flat shape. Although an ASTM committee has been attempting to decide on a test method for pipe, to date they have not been successful. Consequently, ASTM E-84 does not provide any direction in testing a pipe.

Other test standards have been developed that do include provisions for testing pipe. These standards have been successfully used for a number of years. The CAN/ULC S102.2 standard recognizes that the appropriate way to evaluate the flame and smoke characteristics of a pipe is to test a sample in that shape. This standard provides specific direction in the testing of the pipe and does not leave the decision of what sample to test up to the manufacturer or the testing agency. Depending on the size of the pipe this standard requires that either multiple pipes be tested, or that the pipe be cut in half lengthwise and tested, or that a flat sheet be tested. The addition of this standard to the IMC as method to evaluate plastic plumbing pipe provides a clearer direction than what the IMC currently offers.

The CAN/ULC S102.2 standard is currently referenced in the International Building Code.

Public Comment 2:

Marcelo M Hirschler, representing GBH International, requests Disapproval.

Continue disapproving this proposal – CAN/ULC S102.2 is not an equivalent standard to ASTM E84 or UL 723, which is the default standard for materials in plenums. In fact, CAN/ULC S102.2 (which is primarily intended for flooring materials and loose fill insulation materials) is a much less severe fire test than ASTM E84 or UL 723. Moreover, the term "Plastic plumbing piping" is not specifically defined and it is unclear how "plastic plumbing piping" differs from other plastic plumbing products and this requirement would introduce confusion also.

M137-12

Final Action: AS AM AMPC____ D

M138-12
602.3.1 (New)

Proposed Change as Submitted

Proponent: Guy McMann, MCP, Jefferson County Colorado, Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Add new text as follows:

602.3.1 Dwelling stud cavity and joist space plenums prohibited. Building framing cavities in dwelling units shall not be utilized as ducts or plenums

Reason:
- This proposal brings consistency between the IMC and the residential portion of the IECC. A distinction needs to be made here that this prohibition only applies to dwellings. There is nothing in the commercial portion of the IECC to support this prohibition in commercial applications.
- These requirements still have value in non-residential applications and should not be deleted in their entirety. The new sub-section isolates the residential prohibition.

Cost Impact: None

602.3.1(NEW)-M-MCMANN.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Section 101.3 of the IMC does not include energy efficiency. The IMC should not have its content dictated by the IECC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Modify the proposal as follows:

602.3.1 Dwelling stud cavity and joist space plenums prohibited. In Group R2, R3 and R4 occupancies 3 stories or less in height, ~~b~~building framing cavities ~~in dwellings units~~ shall not be utilized as ducts or plenums

Commenter's Reason: It's very important that the IECC and the IMC be consistent in its approach as to how building cavities are to be utilized when it comes to plenums. The committee reason for disapproval assumed this would no longer permit this option which they would be correct but only for dwellings that meet the definition of "Residential Building" in the IECC. Without this proposal, two residential buildings on the same lot could quite possibly be treated differently without justification. This added language makes the two codes consistent with each other eliminating confusion and inconsistent enforcement by tying the IECC definition and this section together.

M138-12
Final Action: AS AM AMPC____ D

M139-12
602.2.1.6 (New)

Proposed Change as Submitted

Proponent: Dustin McLehaney, Chesterfield County, VA, Va. Plumbing and Mechanical Inspectors Association (VPMIA) And Va. Building Code Officials Association (VBCOA) (MclehaneyD@chesterfield.gov)

Delete and substitute as follows:

~~**602.3 Stud cavity and joist space plenums.** Stud wall cavities and the spaces between solid floor joists to be utilized as air plenums shall comply with the following conditions:~~

1. ~~Such cavities or spaces shall not be utilized as a plenum for supply air.~~
2. ~~Such cavities or spaces shall not be part of a required fire-resistance-rated assembly.~~
3. ~~Stud wall cavities shall not convey air from more than one floor level.~~
4. ~~Stud wall cavities and joist space plenums shall comply with the floor penetration protection requirements of the *International Building Code*.~~
5. ~~Stud wall cavities and joist space plenums shall be isolated from adjacent concealed spaces by approved fire-blocking as required in the *International Building Code*.~~
6. ~~Stud wall cavities in the outside wall of building envelope assemblies shall not be utilized as air plenums.~~

602.3 Building cavities. Building framing cavities shall not be used as ducts or plenums.

Reason: 2012 IECC section R403.2.3 and IRC N1103.2.3 both read as follows;

Building cavities. *Building framing cavities shall not be used as ducts or plenums.*

This practice is not permitted in residential applications. There is no logical reasoning that it should be permitted in a commercial application.

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

602.3-M-MCLEHANEY.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproval is based on the action taken on M138-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dustin Mclehaney, Chesterfield County, Virginia, representing both the Virginia Plumbing Mechanical Inspectors Association, and the Virginia Building and Code Officials Association, requests Approval as Submitted.

Commenter's Reason: Code change proposal M139 was disapproved based on the following reasoning-Section 101.3 of the IMC does not include energy efficiency. The IMC should not have its content dictated by the IECC.

This concern here is not that the IECC is dictating what should be in the IMC but rather an inconsistency between the two codes. The IMC gives prescriptive requirements on how to utilize building framing cavities as ducts or plenums and the IECC states that building framing cavities shall not be used as ducts or plenums. The following language has been copied directly from the introduction section of the mechanical code- **This 2012 edition is fully compatible with all of the International Codes** (I-Codes) published by the International Code Council (ICC), **including** the International Building Code, **International Energy Conservation Code,** International Existing Building Code, International Fire Code, International Fuel Gas Code, International Green Construction Code (to be available March 2012), International Plumbing Code, ICC performance Code, International Private Sewage Code, International Property Maintenance Code, International Residential Code, International Swimming Pool and Spa Code (to be available March 2012), International Urban-Wildland Interface Code and International Zoning Code. Based on this language the IMC and the IECC are clearly inconsistent with one another on this issue. There should be a higher order of priority to have the I-Codes consistent or compatible as referenced above.

M139-12

Final Action: AS AM AMPC____ D

M140-12
603

Proposed Change as Submitted

Proponent: Bob Eugene, Underwriters Laboratories, representing Underwriters Laboratories (Robert.Eugene@ul.com)

Revise as follows:

603.4 Metallic ducts. All metallic ducts shall be constructed as specified in the SMACNA *HVAC Duct Construction Standards- Metal and Flexible* *or shall comply with UL181.* Flexible metallic ducts complying with UL 181 shall be listed and labeled as Class 0 or Class 1 flexible air ducts and shall be installed in accordance with Section 304.1.

> **Exception:** Ducts constructed and installed in accordance with SMACNA *HVAC Duct Construction Standards- Metal and Flexible* within single *dwelling units* shall have a minimum thickness as specified in Table 603.4

603.4.1 Minimum fasteners. Rigid Round metallic ducts constructed in accordance with SMACNA *HVAC Duct Construction Standards- Metal and Flexible* shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint.

> **Exception:** Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion so as to prevent a hinge effect.

603.5 Nonmetallic ducts. Nonmetallic ducts shall comply with UL 181, shall be ~~constructed~~ listed and labeled as ~~with~~ Class 0 or Class 1 flexible air ducts ~~material~~, and shall be ~~comply with UL 181~~ installed in accordance with Section 304.1. Fibrous duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards.* The air temperature within nonmetallic ducts shall not exceed 250ºF (121ºC).

603.6 Installation of listed and labeled air ducts. Listed and labeled air ducts shall be installed in accordance with Sections 603.6.1 and 603.6.2.

603.6.1 Air temperature. The design temperature of air to be conveyed in flexible air ducts and flexible air connectors shall be less than 250ºF (121ºC).

603.6.2 Flexible air duct and air connector clearance. Flexible air ducts and air connectors shall be installed with a minimum *clearance* to an *appliance* as specified in the *appliance* manufacturer's installation instructions.

~~**603.6 Flexible air ducts and flexible air connectors.** Flexible air ducts, both metallic and nonmetallic, shall not be limited in length. shall comply with Sections 603.6.1, 603.6.1.1, 603.6.3 and 603.6.4. Flexible air connectors, both metallic and nonmetallic, shall comply with Sections 603.6.2 through 603.6.4.~~

~~**603.6.1 Flexible air ducts.** Flexible air ducts, both metallic and nonmetallic, shall be tested in accordance with UL 181. Such ducts shall be *listed* and *labeled* as Class 0 or Class 1 flexible air ducts and shall be installed in accordance with Section 304.1.~~

~~**603.6.2.**~~ **603.7 Flexible air connectors.** Flexible air connectors, both metallic and nonmetallic, shall comply with UL 181, shall be *listed* and *labeled* as Class 0 or Class 1 flexible air connectors, and shall be installed in accordance with Section 304.1.

~~603.6.2.1~~ 603.7.1 **Connector length.** Flexible air connectors shall be limited in length to 14 feet (4267 mm).

~~603.6.2.2~~ 603.7.2 **Connector penetration limitations.** Flexible air connectors shall not pass through any wall, floor or ceiling.

~~**603.6.3 Air temperature.** The design temperature of air to be conveyed in flexible air ducts and flexible air connectors shall be less than 250ºF (121ºC).~~

~~**603.6.4 Flexible air duct and air connector clearance.** Flexible air ducts and air connectors shall be installed with a minimum *clearance* to an *appliance* as specified in the *appliance* manufacturer's installation instructions.~~

603.9 Joints, seams and connections. All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in *SMACNA HVAC Duct Construction Standards—Metal and Flexible or NAIMA Fibrous Glass Duct Construction Standards* in accordance with 603.9.1 *or* shall comply with *UL181* in accordance with Section 603.9.2*.* Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Closure systems used to seal ductwork shall be installed in accordance with the duct and closure system manufacturer's instructions. Unlisted duct tape is not permitted as a sealant on any duct.

603.9.1 Ducts in accordance with SMACNA and NAIMA. Joints, seams and connections in metallic and nonmetallic ducts constructed as specified in *SMACNA HVAC Duct Construction Standards—Metal and Flexible and NAIMA Fibrous Glass Duct Construction Standards* ~~All joints, longitudinal and transverse seams and connections in ductwork~~ shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants ~~or~~ tapes, or closure systems in accordance with Section 603.9.2.

> **Exception:** Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures of less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

603.9.2 Ducts in accordance with UL 181. Closure systems used to seal ductwork in accordance with UL181 shall be listed and labeled in accordance with either UL 181A or 181B in accordance with Table 603.9.2. Closure systems used to seal rigid metallic and rigid fiberglass ducts shall comply with 181A and shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. Closure systems used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181B-FX" for pressure-sensitive tape or "181B-M" for mastic. ~~Duct connections to flanges of air distribution system *equipment* shall be sealed and mechanically fastened.~~ Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked "181B-C." ~~Closure systems used to seal metal ductwork shall be installed in accordance with the manufacturer's installation instructions. Unlisted duct tape is not permitted as a sealant on any duct.~~

> ~~**Exception:** Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~

TABLE 603.9.2
CLOSURE SYSTEMS

Type of Ductwork	Standard	Type of Closure System	Marking
Rigid Metallic or Rigid Fiberglass	UL 181A	Pressure Sensitive Tape	181A-P
Rigid Metallic or Rigid Fiberglass	UL 181A	Mastic Tape	181A-M
Rigid Metallic or Rigid Fiberglass	UL 181A	Heat Sensitive Tape	181A–H
Flexible Air Ducts and Air Connectors	UL 181B	Pressure Sensitive Tape	181B-FX
Flexible Air Ducts and Air Connectors	UL 181B	Mastic Tape	181B-M
Flexible Non-Metallic Air Ducts	UL181B	Mechanical Fastener[a]	181B-C[a]

a. Mechanical fasteners shall be used in conjunction with a listed pressure sensitive tape or mastic in accordance with UL181.

(Portions not shown remain unchanged.)

Reason: To provide additional clarity and consistency in the requirements air ducts constructed to SMACNA requirements and those that comply with UL181. This also provides additional clarity and consistency for the sealing of all ductwork.

Cost Impact: None

603.4-M-EUGENE.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: UL181 refers to rigid ducts, not metal ducts. UL181 is not a construction standard, but Section 603.4, as revised, suggests that it is.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

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

Replace original proposal to Section 603.4 as follows:

603.4 Metallic ducts. All metallic ducts shall be constructed as specified in the SMACNA *HVAC Duct Construction Standards-Metal and Flexible*.

Exceptions:

1. Ducts installed within single *dwelling units* shall have a minimum thickness as specified in Table 603.4.
2. Flexible metallic ducts complying with UL 181, *listed* and *labeled* as Class 0 or Class 1 flexible air ducts, and installed in accordance with Section 304.1.

Revise section 603.4.1 as follows:

603.4.1 Minimum fasteners. ~~Rigid~~ Round metallic ducts ~~constructed in accordance with SMACNA HVAC Standards-Metal and Flexible~~ shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint.

Exception: Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion so as to prevent a hinge effect.

(Portions of code change not shown remain unchanged)

Commenter's Reason: Products that meet the criteria of UL181 have demonstrated equivalency with metallic ducts constructed in accordance with SMACNA *HVAC Duct Construction Standards—Metal and Flexible.* Text has therefore been revised to recognize UL181 ducts as an exception to the construction standard, SMACNA *HVAC Duct Construction Standards—Metal and Flexible.*

Public Comment 2:

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

Replace original proposal to Sections 603.5 through 603.6.4 as follows:

603.5 Nonmetallic ducts. Nonmetallic ducts shall comply with UL 181, shall be ~~constructed~~ *listed* and *labeled* as ~~with~~ Class 0 or Class 1 ducts ~~material~~, and shall be ~~comply with UL 181~~ installed in accordance with Section 304.1. Fibrous duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards.* The air temperature within nonmetallic ducts shall not exceed 250ºF (121ºC).

603.5.1 Gypsum ducts. The use of gypsum boards to form air shafts (ducts) shall be limited to return air systems where the air temperatures do not exceed 125ºF (52ºC) and the gypsum board surface temperature is maintained above the airstream dew-point temperature. Air ducts formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

603.6 Flexible air ducts~~ and flexible air connectors~~. *Listed* and *labeled* ~~F~~flexible air ducts, both metallic and nonmetallic~~,~~ shall comply ~~with Sections 603.6.1, 603.6.1.1, 603.6.3 and 603.6.4. Flexible air connectors, both metallic and nonmetallic, shall comply with Sections 603.6.2 through 603.6.4.~~

~~**603.6.1 Flexible air ducts.** Flexible air ducts, both metallic and nonmetallic, shall be tested in accordance~~ with UL 181~~, Such ducts~~ shall be *listed* and *labeled* as Class 0 or Class 1 flexible air ducts and shall be installed in accordance with Section 304.1,603.6.1 and 603.6.2.

~~**603.6.1.1 Duct length.** Flexible air ducts shall not be limited in length.~~

603.6.1 Air temperature. The design temperature of air to be conveyed in flexible air ducts shall be less than 250ºF (121ºC).

603.6.2 Flexible air duct clearance. Flexible air ducts shall be installed with the minimum *clearance* to an *appliance* as specified in the *appliance* manufacturer's installation instructions.

603.7~~6.2~~ Flexible air connectors. Flexible air connectors both metallic and nonmetallic, shall be tested in accordance with UL 181, ~~Such connectors~~ shall be *listed* and *labeled* as Class 0 or Class 1 flexible air connectors and shall be installed in accordance with Sections 304.1, and 603.7.1 through 603.7.4.

~~**603.6.2.1**~~ **603.7.1 Connector length.** Flexible air connectors shall be limited in length to 14 feet (4267 mm).

~~**603.6.2.2**~~ **603.7.2 Connector penetration limitations.** Flexible air connectors shall not pass through any wall, floor or ceiling.

603.~~6~~7.3 Air temperature. The design temperature of air to be conveyed in flexible ~~air ducts and flexible~~ air connectors shall be less than 250ºF (121ºC).

603.~~6~~7.4 Flexible ~~air duct and~~ air connector clearance. Flexible ~~air ducts and~~ air connectors shall be installed with a minimum *clearance* to an *appliance* as specified in the *appliance* manufacturer's installation instructions.

(Renumber subsequent sections)

(Portions of code change not shown remain unchanged)

Commenter's Reason: To provide additional clarity and consistency in the requirements for air ducts constructed to SMACNA requirements and those that comply with UL181 by:

- Clarifying that it is the UL181 ducts are listed and labeled as Class 0 and Class 1, not the material.
- Clarifying that UL181 ducts are installed in accordance with the manufacturer's installation instructions (Section 304.1)
- Separating requirements that apply to flexible air ducts from those that apply to flexible air duct connectors to avoid confusion regarding the two types of products.

Public Comment 3:

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

Replace original proposal to sections 603.9 through 603.9.2 as follows:

603.9 Joints, seams and connections. All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in *SMACNA HVAC Duct Construction Standards—Metal and Flexible or NAIMA Fibrous Glass Duct Construction Standards* in accordance with Section 603.9.1 *or* shall comply with *UL181 Standard for Factory-made Air Ducts and Air Connectors* in accordance with Section 603.9.2*.* Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Closure systems used to seal all ductwork shall be installed in accordance with the duct and closure system manufacturer's instructions.

603.9.1 Ducts in accordance with SMACNA and NAIMA. All joints, longitudinal and transverse seams and connections in metallic and nonmetallic ductwork constructed as specified in *SMACNA HVAC Duct Construction Standards—Metal and Flexible and NAIMA Fibrous Glass Duct Construction Standards* shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants, ~~or~~ tapes, or closure systems in accordance with 603.9.2.

Exception: Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

603.9.2 Ducts in accordance with UL 181. Closure systems used to seal ductwork in accordance with UL181 shall be *listed* and labeled for use with the intended type of ductwork in accordance with either UL 181A or UL181B and shall be marked in accordance with Table 603.9.2.

~~shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. Closure systems used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181B-FX" for pressure-sensitive tape or "181B-M" for mastic. Duct connections to flanges of air distribution system *equipment* shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked "181B-C." Closure systems used to seal metal ductwork shall be installed in accordance with the manufacturer's installation instructions. Unlisted duct tape is not permitted as a sealant on any duct.~~

> ~~**Exception:** Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~

Table 603.9.2

Type of Ductwork	**Standard**	**Type of Closure System**	**Marking**
Rigid Ducts	UL 181A	Pressure Sensitive Tape[a]	"181A-P"
		Heat-Activated Tape	"181A–H"
		Mastic Plus Embedded Fabric System	"181A-M"
Flexible Air Ducts and Air Connectors	UL 181B	Pressure Sensitive Tape[a]	"181B-FX"
		Mastic Plus Embedded Fabric System	"181B-M"

a Pressure sensitive tapes and mastics used as a closure system for non-metallic flexible air ducts and air connectors shall be used in conjunction with metal draw band or *listed* mechanical fasteners in accordance with UL181B and marked "181B-C".

(Portions of code change not shown remain unchanged)

Commenter's Reason: To provide additional clarity and consistency in the requirements for sealing air ducts constructed to SMACNA requirements and those that comply with UL181 by:

- Addressing committee concerns regarding the use of the term "metallic" in table 603.9.2.
- Deletion of verbiage in section 603.9.2 that is redundant with information in table 603.9.2.
- Updating Section 603.9 to incorporate M149 proposed language which was accepted as submitted.

M140-12

Final Action: AS AM AMPC____ D

M143-12
Table 603.4

Proposed Change as Submitted

Proponent: Luis Escobar, Air Conditioning Contractors of America, representing ACCA (luis.escobar@acca.org)

Revise as follows:

TABLE 603.4
DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESSES FOR SINGLE DWELLING UNITS

DUCT SIZE	GALVANIZED Minimum thickness (in.)	GALVANIZED Equivalent galvanized gauge ~~gage~~ no.	Appropriate Aluminum B&S Gauge ~~ALUMINUM MINIMUM THICKNESS (in.)~~
Round ducts and enclosed rectangular ducts			
14 inches or less	0.013 ~~0.0157~~	30 ~~28~~	26 ~~0.0175~~
Over 14" ~~16 and 18 inches~~	0.016 ~~0.0187~~	28 ~~26~~	24 ~~0.018~~
~~20 inches and over~~	~~0.0236~~	~~24~~	~~0.023~~
Exposed rectangular ducts			
14 inches or less	0.016 ~~0.0157~~	28	24 ~~0.0175~~
Over 14 inches[a]	0.019 ~~0.0187~~	26	22 ~~0.018~~

For SI: 1 inch = 25.4 mm, 1 inch water gage = 249 Pa.

~~a. For duct gages and reinforcement requirements at static pressures of ½-inch, 1-inch and 2-inch w.g., SMACNA *HVAC Duct Construction Standards*, Tables 2-1, 2-2, and 2-3, shall apply.~~

Reason: The change that was previously made in the 2009 IMC (and carried forward to the 2012 IMC) unnecessarily increased the material thickness required for round sheet metal ducts.

This proposed change seeks to return to the requirements of 2006 and previous IMC editions which have historically recognized 30 gauge sheet metal as being appropriate for round ducts 14 inches or less diameter in "Single Dwelling Units".

The changes to table 603.4 in the 2009 IMC (and carried forward to the 2012 IMC):

1. Significantly increased cost for round sheet metal ducts
2. Did not improve safety
3. Did not improve energy performance
4. Encourages increased use of less expensive and less efficient non-metallic ducts.

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

T603.4-M-ESCOBAR.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The current and past practice has been to allow 30 gage duct material. There is no safety issue with 30 gage duct. Nothing is gained by requiring 28 gage material.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mark Terzigni, representing SMACNA Sheet Metal and Air Conditioning Contractors' National Association, requests Approval as Modified by this Public Comment.

Replace the table in the original proposal with the following:

TABLE 603.4
DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESS FOR SINGLE DWELLING UNITS[a]

Duct Shape and Size		**½ Inch Water Gage (125 Pa)**				**1 inch water Gage (250 Pa)**			
ROUND diameter		**Galvanized**		**Aluminum**		**Galvanized**		**Aluminum**	
inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
0-11	0-280	0.013	0.323	0.018	0.465	0.013	0.323	0.018	0.465
12-14	281-350	0.013	0.323	0.018	0.465	0.016	0.399	0.023	0.574
15-17	351-430	0.016	0.399	0.023	0.574	0.019	0.475	0.027	0.684
18	431-450	0.016	0.399	0.023	0.574	0.024	0.599	0.034	0.863
19-20	451-500	0.019	0.475	0.027	0.684	0.024	0.599	0.034	0.863
RECTANGULAR		**Galvanized**		**Aluminum**		**Galvanized**		**Aluminum**	
inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
0-8	0-200	0.013	0.323	0.018	0.465	0.013	0.323	0.018	0.465
9-10	201-250	0.013	0.323	0.018	0.465	0.016	0.399	0.023	0.574
11-12	251-300	0.016	0.399	0.023	0.574	0.019	0.475	0.027	0.684
13-16	301-400	0.019	0.475	0.027	0.684	0.019	0.475	0.027	0.684
17-18	401-450	0.019	0.475	0.027	0.684	0.024	0.599	0.034	0.863
19-20	451-500	0.024	0.599	0.034	0.863	0.024	0.599	0.034	0.863

a. Ductwork that exceeds 20 inches by dimension or exceeds a pressure of 1 inch gage (250 Pa) shall be constructed in accordance with *ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible*.

Commenter's Reason: The proposed change M143-12 wanted to return 14 inch round duct to its previous gage (prior to the code change adopted in 2009). SMACNA, the developer of the duct construction standard referenced in section 603 evaluated the request with consideration of limiting the application to single dwelling units. The above table permits the use of 30 gage (0.013 in) for dimensions up to 14 inch round if the static pressure is at or below ½ in. w.g. The table also provides options for 1 inch water gage. This should address all but the largest single dwelling units in which case the ductwork should be constructed as required by the ANSI/SMACNA HVAC Duct Construction Standard. The above modification:

1. Addresses the concern of the original proponent
2. Complies with methods used by SMACNA (ANSI Standard Developer)
3. Provides upper limits for size and pressure
4. Uses actual thickness not "gage" for both steel and aluminum
5. Provides valid options for "low" and "high" pressure single dwelling systems
6. Encourages the use of resource efficient material.

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

M143-12
Final Action: AS AM AMPC____ D

M149-12
603.9

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

603.9 Joints, seams and connections All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA *HVAC Duct Construction Standards-Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards.* All joints, longitudinal and transverse seams and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. ~~Closure systems~~ Tapes and mastics used to seal metallic and fibrous glass ductwork shall be *listed* and *labeled* in accordance with UL 181A and shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. Closure systems used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181B-FX" for pressure-sensitive tape or "181B-M" for mastic. Duct connections to flanges of air distribution system *equipment* shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked "181B-C." Closure systems used to seal ~~metal~~ all ductwork shall be installed in accordance with the manufacturer's ~~installation~~ instructions. ~~Unlisted duct tape is not permitted as a sealant on any duct~~.

Reason: This proposal simplifies this section by stating what is meant by "closure systems." Tapes and mastics are addressed in UL181A. There is no closure system listed specifically for metal ducts, but it is appropriate to require sealing products used for metal ducts to be listed to UL181A because if the sealing product is good enough for fibrous glass ducts it is good enough for metal ducts. This is the case in the field, as fibrous glass duct tapes are commonly used with metal ducts. The manufacturer's instructions should apply for all closure systems, not just those for metal ducts. The last sentence is unnecessary because this proposal requires all tapes to be listed, including those used with metal ducts.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

603.9#1-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

603.9 Joints, seams and connections All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA *HVAC Duct Construction Standards-Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards.* All joints, longitudinal and transverse seams and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. Tapes and mastics used to seal ~~metallic and~~ fibrous glass ductwork shall be *listed* and *labeled* in accordance with UL 181A and shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. ~~Closure systems~~ Tapes and mastics used to seal metallic and flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181B-FX" for pressure-sensitive tape or "181B-M" for mastic. Duct connections to flanges of air distribution system *equipment* shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked "181B-C." Closure systems used to seal all ductwork shall be installed in accordance with the manufacturer's instructions.

Committee Reason: Approval is based on the proponent's published reason. The modification corrects the application of UL181A verses UL181B.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

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

Further modify the proposal as follows:

603.9 Joints, seams and connections All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA *HVAC Duct Construction Standards-Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards.* All joints, longitudinal and transverse seams and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. ~~Tapes and mastic~~ Closure systems used to seal fibrous glass ductwork shall be *listed* and *labeled* in accordance with UL 181A and shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. ~~Tapes and mastics~~ Closure systems used to seal metallic and flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181B-FX" for pressure-sensitive tape or "181B-M" for mastic. Duct connections to flanges of air distribution system *equipment* shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked "181B-C." Closure systems used to seal all ductwork shall be installed in accordance with the manufacturer's instructions.

Commenter's Reason: Products certified to UL181B are listed as a system and may include other components in addition to the tape or mastic itself. In order to properly seal the duct or connector in accordance with the listing, which include the manufacturer's installation instructions, a *closure system* is required.

M149-12

Final Action: AS AM AMPC____ D

M151-12
603.9

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

603.9 Joints, seams and connections. All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA *HVAC Duct Construction Standards—Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards*. All joints, longitudinal and transverse seams and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. Closure systems used to seal ductwork *listed* and *labeled* in accordance with UL 181A shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. Closure systems used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181B-FX" for pressure-sensitive tape or "181B-M" for mastic. Duct connections to flanges of air distribution system *equipment* shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked "181B-C." Closure systems used to seal metal ductwork shall be installed in accordance with the manufacturer's installation instructions. Unlisted duct tape is not permitted as a sealant on any duct.

> **Exception:** ~~Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems~~ For ducts having a static pressure classification of less than 2 inches of water column (500Pa), additional closure systems shall not be required for continuously welded joints and seams and locking-type joints and seams of other than the snap-lock and button-lock types.

Reason: Unless sealant or a gasket is used, snap-lock and button-lock type seams will leak significantly. The current exception attempted to prevent unnecessary sealing for joints and seams that leak very little or not at all, but it went too far by including all locking type joints and seams. Some locking joints are leakproof such as mechanically folded seams used for spiral seam duct, but this cannot be said for all locking joints.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

603.9-#2-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based on the proponent's published reason.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dan Buuck, Dipl.-Ing. (FH), representing National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: This proposal will require that all longitudinal joints and seams are sealed—even in low-pressure systems. No data is supplied to prove that ducts will leak "significantly" (as stated in the reason statement) in these systems. In fact, there is no such data (SMACNA presentation – March 2010, slide 15 www.smacnawpa.org/links/documents/HVACAirDuct LeakageMarch2010presentation.pdf). Leakage rates for longitudinal joints in duct systems serving a single dwelling unit are extremely minimal, because the pressures are a fraction of 2 inches water column, the upper limit of this exception. Sealing these joints will not be an effective means of saving energy.

This proposal adds significant installation costs without giving any proof that sealing longitudinal seams is cost-effective. It will also significantly increase inspection time for residential systems without any proven benefit.

M151-12

Final Action: AS AM AMPC____ D

M154-12
603.12

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

603.12 Condensation. Provisions shall be made to prevent the formation of condensation on the exterior <u>and interior surfaces</u> of any duct.

Reason: Ducts such as toilet and kitchen exhaust and clothes dryer exhaust that are run in unconditioned spaces will be subject to the formation of condensation on the inside of the duct. It is common for exhaust ducts in ventilated attics to fill with water in low points and become blocked and/or leak into the exhaust fan or dryer. Condensation can also form in HVAC ducts where humid indoor air passes through such ducts that are chilled in unconditioned spaces. External insulation combined with a vapor barrier can prevent condensation on the outside of ducts and that same insulation with or without a vapor barrier can also prevent condensation on the inside of a duct, except for when the airflow initially starts. When the duct temperature comes up to the temperature of the air within it, the condensation will stop and the initial condensation will evaporate.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

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

603.12-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: It is not enforceable to require that condensation be prevented. Prevention is absolute and how far must one go to achieve this?

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Shawn Strausbaugh, Arlington County, VA, representing International Code Council Plumbing, Mechanical, and Fuel Gas Code Action Committee (ICC PMG CAC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

603.12 Condensation. Provisions shall be made to prevent the formation of condensation on the exterior ~~and interior surfaces~~ of any duct <u>and the accumulation of condensation on the interior of any duct</u>.

Commenter's Reason: The committee correctly expressed that condensation cannot be prevented from forming on the interior duct surface. If the duct wall temperature is below the dew point of the air in the duct, condensation will form, thus condensation cannot be absolutely prevented in the duct interior. The intent is to make that formation brief, before water can accumulate and leak from the duct or partially block the duct. If properly insulated, condensation will quickly cease as the duct wall temperature rises to that of the airflow and any condensate will vaporize. The intent is to prevent accumulation which would result in water filling ducts and leaking from, exhaust fans, duct joints and appliances. The primary problem is bath, clothes dryer and kitchen exhaust ducts that run through cold attics and similar spaces.

M154-12
Final Action: AS AM AMPC____ D

M155-12
202, 604.7

Proposed Change as Submitted

Proponent: Ken Sagan, NRG Code Advocates, representing Reflective Insulation Manufacturers Association International
(ken@nrgcodeadvocates.com)

Add new text as follows:

REFLECTIVE INSULATION. Reflective insulation materials consist of one or more low-emittance surfaces, such as metallic foil or metallic deposits, unmounted or mounted on substrates. Reflective insulations derive their thermal performance from surfaces with an emittance of 0.1 or less, facing enclosed air spaces, yielding a reduction in radiant heat transfer.

Revise text as follows:

604.7 Identification. External duct insulation, except spray polyurethane foam, and factory-insulated flexible duct shall be legibly printed or identified at intervals not greater than 36 inches (914 mm) with the name of the manufacturer, the thermal resistance R-value at the specified installed thickness and the flame spread and smoke-developed indexes of the composite materials. All duct insulation product R-values shall be based on insulation only, excluding air films, vapor retarders or other duct components, and shall be based on tested C-values at 75°F (24°C) mean temperature at the installed thickness, in accordance with recognized industry procedures. The installed thickness of duct insulation used to determine its R-value shall be determined as follows:

1. For duct board, duct liner and factory-made rigid ducts not normally subjected to compression, the normal insulation thickness shall be used.
2. For duct wrap, the installed thickness shall be assumed to be 75 percent (25 percent compression) of normal thickness.
3. For factory-made flexible air ducts, the installed thickness shall be determined by dividing the difference between the actual outside diameter and nominal inside diameter by two.
4. For spray foam polyurethane foam, the aged R-value per inch, measured in accordance with recognized industry standards, shall be provided to the customer in writing at the time of foam application.
5. For reflective insulation, R-values shall be based on tested U-values using recognized industry procedures as a reflective insulation system on rigid duct in heating, ventilation and air conditioning systems. Packages of reflective insulation shall be labeled with the number of reflective sheets, the number and thickness of the air spaces in the assembly and the R-value of the assembly.

Reason: A type of reflective insulation (reflective plastic core insulation) is currently included in the IBC Code Definitions. This proposal attempts to provide additional information relating to that product category as a whole and for the products specified in this proposal.

The proposal proposes to clarify the process within the codes for accurately labeling and evaluating the performance of reflective insulation when installed on ducts. ASTM C1668-10 addresses this issue and provides specification on how to determine product performance.

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

202-REFLECTIVE INSULATION-M-SAGAN.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There are no standards referenced for the performance and installation of such materials.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Vickie Lovell, InterCode Incorporated, representing Reflective Insulation Manufacturers Association International, requests Approval as Modified by this Public Comment.

Replace original proposal as follows:

REFLECTIVE DUCT INSULATION. An assembly that has one or more low- emittance surfaces of 0.1 or less, and at least one low-emittance surface that faces an enclosed air space.

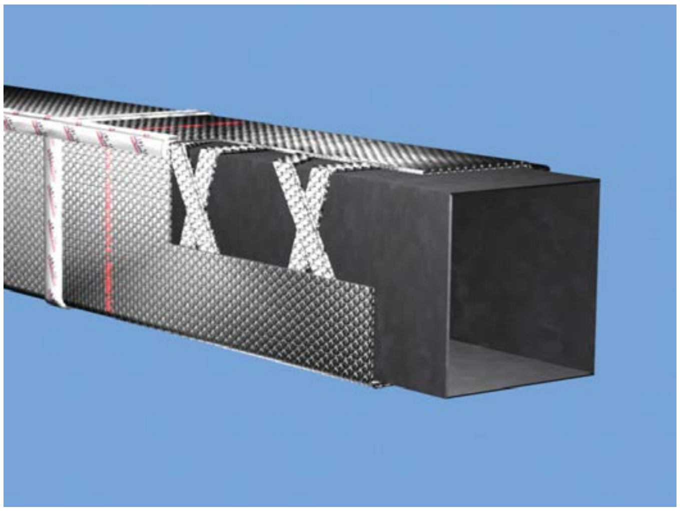
604.14 Reflective Duct Insulation. The R-values for reflective duct insulation used as external duct insulation shall be based on tested U-values.

604.14.1 Identification. Packaging of reflective duct insulation shall contain the name of the manufacturer, the number of reflective sheets, the number and thickness of air spaces required to attain the R-value of the assembly, and the flame spread and smoke development index.

Commenter's Reason: The original proposal placed new requirements in Section 604.7 of the IMC for reflective duct insulation. The intent of the original proposal was to clarify the accurate labeling and evaluation of the performance of reflective insulation when installed on ducts. However, upon closer examination, several of the requirements in 604.7 do not apply to reflective duct insulation. The proponent requested for disapproval so that the proposal could be re-worked.

This public comment establishes a new section for this type of insulation with better formatting.

The committee's stated reason for disapproval was the lack of a standard for this type of insulation. In fact, there is a standard; ASTM C 1668 "Standard Specification for Externally Applied Reflective Insulation Systems on Rigid Duct in Heating, Ventilation, and Air Conditioning (HVAC) Systems". It was not ready for submission for Group A. It has been recently revised and will be proposed during the 2018 cycle. For this cycle, the proposed language is essential to ensure that the materials are being properly specified for the appropriate use, and correctly installed.



M155-12

Final Action: AS AM AMPC____ D

M158-12
202 (New), 608 (New), 608.1 (New)

Proposed Change as Submitted

Proponent: Timothy Burgos, InterCode Incorporated, representing 3M Company

Add new text as follows:

REFLECTIVE DUCT. A duct or conduit with a reflective interior surface utilized for conveying daylight or artificial light.

SECTION 608
REFLECTIVE DUCTS

608.1 Reflective Ducts. Reflective ducts that are designed and installed to provide light to the interior space of a building shall be constructed, braced, reinforced and installed to provide structural strength and durability in accordance with the requirements of Section 603. The installation of reflective ducts shall not affect the fire protection requirements specified in the *International Building Code*. Reflective ducts shall not be used for conveying air and are not required to be pressurized.

Reason: The purpose of this code change proposal is to add a new definition and section to the International Mechanical Code in order to differentiate between duct used to convey air and duct used to convey light. There are many new technologies that exist worldwide today that bring light from the exterior of a building to the interior space of a building. These technologies utilize a reflective duct to convey the light into the building. The reflective duct is similar in construction to duct used to convey air in the way it is braced, reinforced, and installed. Reflective duct differs because it is not used to condition a space. Additionally, reflective duct does not need to meet all the requirements of an air conveying duct, i.e. the insulation and pressurization requirements.

The language used to create the new Section 608.1 was adapted from Section 603 of the 2012 International Mechanical Code. The definition for reflective duct was adapted from the definition of duct found in the 2012 International Mechanical Code.

Reflective duct (the two ducts on the outside) in an open ceiling alongside a traditional HVAC duct.

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

202-REFLECTIVE DUCTS-M-BURGOS.DOC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Such ducts are not mechanical in nature, are not within the scope of the code and thus are not appropriate for inclusion in the IMC. The IBC covers lighting systems and this text belongs in Chapter 12 of that code. There are no referenced standards for such products. The installation requirements such as roof flashings are IBC related.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Vickie Lovell, InterCode Incorporated, representing 3M Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

REFLECTIVE DUCT. A duct or conduit with a reflective interior surface utilized for conveying daylight or artificial light.

SECTION 608
REFLECTIVE DUCTS

608.1 Reflective Ducts. Reflective ducts that ~~are designed and installed to~~ provide light to the interior space of a building shall be constructed~~, braced, reinforced and installed to provide structural strength and durability~~ in accordance with the requirements of Section<u>s</u> 603<u>.4, 603.7, 603.10, and 603.12</u>. The installation of reflective ducts shall not ~~affect~~ <u>reduce</u> the fire ~~protection requirements~~ <u>resistance ratings</u> specified in the *International Building Code*. Reflective ducts shall not be used for conveying air and are not required to be pressurized.

Commenter's Reason: Reflective duct systems that convey light are an existing technology worldwide, but new to this code. The purpose of this code change proposal is to add a new definition and section to the International Mechanical Code to correlate the duct construction requirements for duct used to convey air and duct used to convey light. The bracing, reinforcement, installation, structural strength and durability requirements are nearly identical between air duct and reflective duct and that is the reason we have placed this section in this chapter of the International Mechanical Code.

The Mechanical Committee disapproved the original proposal, stating that "such ducts are not mechanical in nature and are not in the scope of the code." It is true that reflective duct are not used to condition a space and are not required to meet **ALL** the requirements of an air conveying duct, i.e. the insulation and pressurization requirements. However, in order to ensure that the reflective duct is properly constructed and installed for the safety of the occupants and functionality of the system, many of the same construction requirements for air ducts are applicable to reflective ducts.

The language used to create the new Section 608.1 was adapted from Section 603 of the 2012 International Mechanical Code. The definition for reflective duct was adapted from the definition of duct found in the 2012 International Mechanical Code.

The Fire Safety Committee narrowly recommended disapproval for a similar code change proposal by a vote of 7 to 6. One of the concerns the committee had was with the use of the term "fire protection." In the International Building Code 'fire protection systems" tend to deal with detection, alarm, and suppression systems. This public comment changed the term "protection" to "resistance" in order to clarify that reflective duct will not reduce the fire resistance rating of any building assembly.

M158-12
Final Action: AS AM AMPC____ D

M161-12
802.10

Proposed Change as Submitted

Proponent: Guy McMann, MCP, Jefferson County Colorado, Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Add new text as follows:

802.10 Door swing. Appliance and equipment vent terminals shall be located such that doors cannot swing within 12 inches (305 mm) horizontally of the vent terminals. Door stops or closures shall not be installed to obtain this clearance.

Reason: As indicated in the photo, any appliance vent can be subject to damage as a result of a door swing even when the vent has been installed in accordance with the manufacturer's instructions. Most manufacturers do not address proximity to doors on a different plane. Even if the door doesn't come in contact with the vent terminal, the door could be left too close to the vent when the appliance is operating and possibly overheating the door causing problems.

Cost Impact: None

802.10(NEW)-M-MCMANN.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based on the proponent's published reason.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dan Buuck, Dipl.-Ing. (FH) representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

802.10 Door swing. Appliance and equipment vent terminals shall be located such that doors cannot ~~swing within 12 inches (305 mm) horizontally of~~ come in contact with the vent terminals. Required clearances to combustibles shall be maintained as required in Section 304.9.~~Door stops or closures shall not be installed to obtain this clearance.~~

> **Exception:** Door stops and other door-swing limiting devices shall not be prohibited as a means to prevent a door from coming in contact with the vent terminals.

Commenter's Reason: The proposed section 802.10 is meant to prevent physical damage to vent terminals from swinging doors. Another section, 304.9, already deals with door swing as pertaining to clearances to combustibles. Therefore, the proposed section does not need to give a set 12-inch clearance, which is not even stated in 304.9. That section references the manufacturer's instructions. A metal and glass storm door, for example, would not be required to meet the clearance to combustibles, so there is no reason to keep it 12 inches away as proposed. It should only be kept from hitting the vent terminal.

Adding an exception for door stops and other door-swing limiting devices makes sense in this section because their purpose will be obvious to the occupant. Some might argue that they can be removed and should not be allowed, but handrails, fall protection, and other code-required safety devices can also be removed by an occupant. That does not mean that we keep them out of the code. This is a minimum code, and we are dealing with a rare situation. The proposal is too restrictive as approved by the committee.

To be clear, if a combustible door swings near a vent terminal, section 304.9 is more restrictive than this modification, and therefore trumps it. But since this section is only meant to address physical damage, it does not need to be as restrictive where non-combustible doors are installed.

M161-12

Final Action: AS AM AMPC____ D

M165-12
908.8 (New), Chapter 15

Proposed Change as Submitted

Proponent: Tracy Quinn, Natural Resources Defense Council, on behalf of self (tquinn@nrdc.org)

Add new text as follows:

908.8 Cooling Towers. Cooling towers greater than 150 tons in capacity shall comply with Sections 908.8.1 through 908.8.4.

908.8.1 Conductivity or Flow-based Control. Cooling towers shall include of controls that maximize the cycles of concentration based on local water quality conditions. Such controls shall automate system bleed and chemical feed based on conductivityor in proportion to metered makeup volume, metered bleed volume, or bleed time.

908.8.2 Flow Meter. A water meter or sub-meter shall be installed to measure the volume of makeup water entering the cooling tower. Where both potable and non-potable water are supplied to the tower, a meter or sub-meter shall be installed to measure each source separately.

908.8.3 Overflow Alarm. Cooling towers shall include of an overflow alarm to prevent overflow of the sump in case of makeup water valve failure. Such overflow alarm shall send an audible signal or provide an alert by means of the Building Management System to the tower operator in case of sump overflow.

908.8.4 Drift Eliminators. Cooling towers shall be equipped with drift eliminators that achieve drift reduction to 0.002 percent of the circulated water volume. Drift eliminators shall be tested using the Isokinetic Drift Measurement Test Cost for Water Cooling Tower – ATC – 140" testing code from the Cooling Technology Institute.

Add new standard to Chapter 15 as follows:

ATC-140-2011 Isokinetic Drift Measurement Test Cost for Water Cooling Tower – ATC-140" testing code.

Reason: This section includes water efficiency provisions for cooling towers and evaporative cooling systems that tend to waste large quantities of water.

The complexity of managing cooling systems combined with the high operational and financial cost of early failure of a cooling tower, can result in an overly conservative approach to tower bleed frequency. The codes as proposed here aim to ensure that all cooling towers covered by the IMC have the controls necessary to maximize cycles of concentration and minimize unintentional waters losses such as leaks and overflow. Below we have provided information specific to the revisions we have proposed. The information comes from a 2011 Codes and Standards Enhancement Initiative (CASE) for Cooling Tower Water Savings prepared by the California Statewide Utility Code and Standards Program on Cooling Tower Water Savings (attached), hereafter referred to as the CASE study.

Flow meter – "This measure provides a number of water-efficiency benefits. A flow meter on the makeup water line effectively submeters the cooling tower, allowing the operator to know how much water the tower is using and facilitating the identification of excessive water use due to leaks, for example."

Alarm – "Unintended water losses can occur if the standard float valve that controls the flow of makeup water in the sump fails, resulting in overflow into the sewer line. The failure of the makeup water line control also results in uncontrolled dilution and no activation of chemical feed, putting the system at risk for scale. An overflow alarm prevents these losses from going undetected for days, weeks or longer. An overflow alarm system includes a float switch and an audible electronic signaling device or notification through a building management system. Industry contacts, including cooling tower manufacturers and water treatment companies, generally indicated that the prevalence of installed overflow alarms is very low."

Drift Eliminators – "Efficient drift eliminators minimize losses due to drift, which is liquid water that is blown or splashed out of the tower during normal operations. Drift eliminators include secondary benefits, such as minimizing the spread of disease and preventing damage to adjacent property, such as parked cars, that would otherwise be splashed. According to representatives of cooling tower manufacturers, water treatment companies and drift eliminator distributors, most cooling towers have drift eliminators installed and the drift eliminators are likely to control drift losses to 0.005% or less. Current practice for new tower installations is to include drift eliminators and at least one manufacturer, Evapco, specifies equipment that limits losses to a maximum of 0.0001%." The Cooling Technology Institute (CTI) has a test code for measuring drift that should be used to meet this requirement; "Isokinetic

Drift Measurement Test Cost for Water Cooling Tower – ATC – 140". The purpose of this code is to describe instrumentation and procedures for the testing and evaluation of drift from water-cooling towers. The code was revised in July 2011.

According to the CASE study, application of these code changes should result in a first year statewide water savings 32.3 million gallons in California (based on statewide annual sales of water-cooled chillers). Using the statewide average embedded energy value of 9.977 kWh/million gallons of water, the first year statewide energy savings is 323 MWh. Extracting this to an estimated national savings (based on population ratios), this code change could save 268 million gallons of water in the first year, and 2678 MWh.

Cost Impact: A cost-effectiveness analysis was performed as part of a Codes and Standards Enhancement Initiative (CASE) for Cooling Tower Water Savings, prepared by the California Statewide Utility Codes and Standards Program (attached).

From CASE: "Below are the present value costs and savings associated with the proposed measures installed on a 350 ton cooling tower over the 15 year analysis period."

Table 11. Life Cycle Cost of Proposed Measures

Measure Name	Additional Costs- Current Measure Costs (Relative to Basecase) ($)		PV of Additional Maintenance Costs (Savings) (Relative to Basecase) (PV$)		PV of Water and Chemical Cost Savings - Per Proto Building (PV$)	LCC Per Prototype Building ($)	
	Per unit	Per Proto Building	Per unit	Per Proto Building		Based on Current Costs	Based on Post-Adoption Costs
Cooling Tower Measures	$3,624	$3,624	$0	$0	$11,165	-$7,540	-$7,540

Analysis: A review of the standard proposed for inclusion in the code, [ATC-140-2011] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

908.5.1-M-QUINN.DOC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

908.8 Cooling Towers. Cooling towers greater than 150 tons in capacity shall comply with Section 908.8.1. ~~through 908.8.4~~.

908.8.1 Conductivity or Flow-based Control. Cooling towers shall include controls that maximize the cycles of concentration based on local water quality conditions. Such controls shall automate system bleed and chemical feed based on conductivity or in proportion to metered makeup volume, metered bleed volume, or bleed time.

~~**908.8.2 Flow Meter.** A water meter or sub-meter shall be installed to measure the volume of makeup water entering the cooling tower. Where both potable and non-potable water are supplied to the tower, a meter or sub-meter shall be installed to measure each source separately.~~

~~**908.8.3 Overflow Alarm.** Cooling towers shall include of an overflow alarm to prevent overflow of the sump in case of makeup water valve failure. Such overflow alarm shall send an audible signal or provide an alert by means of the Building Management System to the tower operator in case of sump overflow.~~

~~**908.8.4 Drift Eliminators.** Cooling towers shall be equipped with drift eliminators that achieve drift reduction to 0.002 percent of the circulated water volume. Drift eliminators shall be tested using the Isokinetic Drift Measurement Test Cost for Water Cooling Tower ATC – 140" testing code from the Cooling Technology Institute.~~

~~**Add new standard to Chapter 15 as follows:**~~

~~**ATC-140-2011** Isokinetic Drift Measurement Test Cost for Water Cooling Tower – ATC-140" testing code~~.

Committee Reason: Approval is based on the proponent's published reason. The modification eliminates a standard with which a limited number of testing agencies are able to conduct such testing. The modification simplifies the proposed text.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Tracy Quinn, Natural Resources Defense Council, representing self, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

908.8 Cooling Towers. Cooling towers ,both open circuit and closed circuit type, and evaporative condensers ~~greater than 150 tons in capacity~~ shall comply with Sections 908.8.1 and 908.8.2.

908.8.1 Conductivity or Flow-based Control of Cycles of Concentration. Cooling towers and evaporative condensers shall include controls that ~~maximize the cycles of concentration based on local water quality conditions. Such controls shall automate system bleed and chemical feed based on conductivity or in proportion to~~ automate system bleed based on conductivity, fraction of metered makeup volume, metered bleed volume, recirculating pump run time, or bleed time**.**

908.8.2 Drift Eliminators. Cooling towers and evaporative condensers shall be equipped with drift eliminators that have a maximum drift rate of 0.005 percent of the circulated water flow rate as established in the equipment's design specifications.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The modifications in this comment provide clarifications and specificity that will be useful to code users and enforcement officials. Both open circuit and closed circuit cooling towers as well as evaporative condensers will clearly fall within the scope of this section. Paragraph 908.8.1 is modified to more objectively state the intent to automate the control of bleed operations, and the resulting cycles of concentration. New paragraph 908.8.2 addresses subject matter – drift eliminators – that was in the original M165-12 as submitted, before the floor modification to remove it was accepted at the code action hearing. NRDC and industry representatives supported the floor modification with the intention to work further to refine the original proposal's language on drift eliminators. By reducing the escape of liquid water and dissolved treatment chemicals, drift eliminators mitigate important health and safety concerns, including ice accumulation and the dispersion of chemicals, as well as reducing water loss. These objectives must be balanced with the need to maintain tower operation without excessive impedance that can degrade its efficiency. Drift eliminators are widely available today that can meet these objectives while achieving the drift reduction criterion stated in 908.8.2.

Baltimore Aircoil Company (BAC) is recognized as the world's largest manufacturer of evaporative cooling, thermal storage, and heat transfer equipment. BAC products are sold to the commercial building market as components for air conditioning systems, to the food industry for air conditioning and refrigeration applications, and to a broad range of industries for process and power equipment cooling. BAC has worked with NRDC as well as representatives of other organizations to develop a consensus proposal on cooling towers for the International Mechanical Code. As a result of these efforts, BAC supports the adoption of this consensus proposal in the IMC.

M165-12

Final Action: AS AM AMPC____ D

M175-12
1007.1, 1007.2, 1007.3

Proposed Change as Submitted

Proponent: Shawn Strausbaugh, Chair, Plumbing/Mechanical/Gas Code Action Committee

Revise as follows:

1007.1 General. ~~All~~ Steam and hot water boilers shall be protected with a low-water cutoff control <u>except as required by Section 1007.2</u>.

<u>**1007.2 Flow sensing control.** Coil-type and water-tube-type boilers that require forced circulation of water through the boiler shall be protected with a flow sensing control.</u>

1007.~~2~~ <u>3</u> Operation. ~~The~~ Low-water cutoff <u>controls and flow sensing controls required by Sections 1007.1 and 1007.2</u> shall automatically stop the combustion operation of the appliance when the water level drops below the lowest safe water level as established by the manufacturer <u>or when water circulation stops, respectively</u>.

Reason: There is no exception to Section 1007.1 for coil-type hot water supply boilers that require forced circulation and use flow switches to stop combustion when water flow is lost. Flow switches that monitor forced circulation through a water tube- or coil-type boiler provide the same function as a low-water cutoff and should be recognized as an alternative to a low-water cutoff.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC). The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the PMGCAC has held 2 open meetings, multiple conference calls and multiple workgroup calls which included members of the PMGCAC. Interested parties also participated in all of the meetings and conference calls to discuss and debate the proposed changes.

Cost Impact: None

1007.1-M-STRAUSBAUGH.PMGCAC.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based on the proponent's published reason.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Modify the proposal as follows:

1007.1 General. Steam and hot water boilers shall be protected with a low-water cutoff control.

> <u>**Exception:**</u> <u>A low-water cutoff is not required for</u> coil-type and water-tube-type boilers that require forced circulation of water through the boiler and that are protected with a flow sensing control.

1007.3 Operation. The Low-water cutoff controls and flow sensing controls required by Sections 1007.1 and 1007.2 shall automatically stop the combustion operation of the appliance when the water level drops below the lowest safe water level as established by the manufacturer or when water circulation stops, respectively.

Commenter's Reason: The additional text clarifies that the flow sensing control is an exception to the general low-water cutoff control for the boilers specified.

M175-12

Final Action: AS AM AMPC____ D

M181-12
1102.3 (New)

Proposed Change as Submitted

Proponent: Mona Casey, Founder, United Parents to Restrict Open Access to Refrigerant

Add new text as follows:

1102.3 Access port protection. Refrigerant access ports shall be protected in accordance with Section 1101.10 whenever refrigerant is added to or recovered from refrigeration or air conditioning systems.

Reason: The purpose of the code change proposal is to add requirements to the code for securing refrigerant access ports whenever intrusive access to the refrigeration or air conditioning units are necessary for adding or recovering refrigerant. This change compliments the current requirements in the code.

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

1102.3 (NEW)-M-CASEY.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed text is not enforceable since permits are not required to service refrigeration systems. Such text is appropriate for the IPMC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mona Casey, representing United Parents to Restrict Open Access to Refrigerant, requests Approval as Submitted.

Commenter's Reason: Refrigerant is a hot topic in the HVAC industry today. With public safety at the forefront, followed by environmental concerns and bottom line cost, refrigerant containment is more important than ever.

The age of social media and Internet access allows society the ability to learn about things they shouldn't be doing. Huffing refrigerant is a prime example of that. Statistics nationwide show there have been more than 2000 reported cases of huffing refrigerant since 2009, according to the American Association of Poison Control. In those cases, the individuals had to be hospitalized.

To minimize the impact of ozone depleting compounds on the environment, Refrigerant R22 is being phased out. The downside to that is Refrigerant R22 has tripled in price since November 2011.

For liability and financial reasons, many contractors are becoming '*Refrigerant Responsible*', requiring strict charging practices for peak performance and the prevention of catastrophic failures in the refrigerant circuits. Additionally, tougher certification programs like NATE train new technicians on proper refrigerant charging, recovery and handling techniques. That said, any exposed refrigerant charging port is a weak link for containment. Exposed ports provide easy access to the general public and challenge the aforementioned concerns.

Although the building design standard addresses issues concerning sustainability, air quality, energy efficiency, and thermal, acoustic, and visual comfort, it fails to address the very thing the codes were founded on, public safety. Exposed ports pose a public safety issue. The code needs to address this mechanical issue so that going forward designers, engineers, technicians, property owners, and the public will all become refrigerant responsible. Thus, protecting the environment, minimizing costs associated with heating and cooling, preventing injuries, and most importantly, saving lives.

M181-12
Final Action: AS AM AMPC____ D

M188-12

Table 1202.4, 1203.15, 1208, 1210 (New), 1211 (New), 1212 (New), 1213 (New), 1214 (New), 1215 (New), 1216 (New), Chapter 15

Proposed Change as Submitted

Proponent: Michael Cudahy, Plastic Pipe and Fittings Association (mikec@cmservnet.com)

Revise as follows:

TABLE 1202.4
HYDRONIC PIPE

MATERIAL	STANDARD (see Chapter 15)
~~Polyethylene (PE) pipe, tubing and fittings (for ground source heat pump loop systems)~~	~~ASTM D 2513; ASTM D 3035; ASTM D 2447; ASTM D 2683; ASTM F 1055; ASTM D 2837; ASTM D 3350; ASTM D 1693~~

(Portions of table not shown remain unchanged)

~~**1203.15 Polyethylene plastic pipe and tubing for ground source heat pump loop systems.** Joints between polyethylene plastic pipe and tubing or fittings for ground source heat pump loop systems shall be heat fusion joints conforming to Section 1203.15.1, electrofusion joints conforming to Section 1203.15.2, or stab-type insertion joints conforming to Section 1203.15.3.~~

~~**1203.15.1 Heat-fusion joints.** Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, joined in accordance with ASTM D 2657. Joint surfaces shall be clean and free of moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D 2683 or ASTM D 3261.~~

~~**1203.15.2 Electrofusion joints.** Joints shall be of the electrofusion type. Joint surfaces shall be clean and free of moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F 1055.~~

~~**1203.15.3 Stab-type insert fittings.** Joint surfaces shall be clean and free of moisture. Pipe ends shall be chamfered and inserted into the fittings to full depth. Fittings shall be manufactured in accordance with ASTM F 1924.~~

SECTION 1208
TESTS

1208.1 General. Hydronic piping systems ~~other than groundsource heat pump loop systems~~ shall be tested hydrostatically at one and one-half times the maximum system design pressure, but not less than 100 psi (689 kPa). The duration of each test shall be not less than 15 minutes, but not more than 20 minutes. ~~Ground-source heat pump loop systems shall be tested in accordance with Section 1208.1.1.~~

~~**1208.1.1 Ground source heat pump loop systems.** Before connection (header) trenches are backfilled, the assembled loop system shall be pressure tested with water at 100 psi (689 kPa) for 30 minutes with no observed leaks. Flow and pressure loss testing shall be performed and the actual flow rates and pressure drops shall be compared to the calculated design values. If actual flow rate or pressure drop values differ from calculated design values by more than 10 percent, the problem shall be identified and corrected.~~

SECTION 1210
GROUND-SOURCE HEAT PUMP LOOP SYSTEMS

1210.1 Ground-Source Heat Pump-Loop Water Piping. Ground source heat pump ground loop-piping and tubing material for water-based systems shall conform to the standards cited in this section.

1210.2 Used materials. Reused pipe, fittings, valves, and other materials shall not be permitted in ground-source heat pump loop systems.

1210.3 Material rating. Pipe and tubing shall be rated for the operating temperature and pressure of the ground source heat pump-loop system. Fittings shall be suitable for the pressure applications and recommended by the manufacturer for installation with the pipe and tubing material installed. Where used underground, materials shall be suitable for burial.

1210.4 Piping and tubing materials standards. Ground source heat pump ground-loop pipe and tubing shall conform to the standards listed in Table 1210.4.

TABLE 1210.4
GROUND SOURCE LOOP PIPE

MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F441; ASTM F442
Cross-linked polyethylene (PEX)	ASTM F876; ASTM F877 CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
High Density Polyethylene (HDPE)	ASTM D3035; ASTM D2737; ASTM F714; AWWA C901; CSA B137.1; CSA C448
Polypropylene (PP-R)	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241
Raised temperature polyethylene (PE-RT)	ASTM F2623

1210.5 Fittings. Ground source heat pump pipe fittings shall be approved for installation with the piping materials to be installed, shall conform to the standards listed in Table 1210.5 and if installed underground shall be suitable for burial.

TABLE 1210.5
GROUND SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D 2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F 877; ASTM F1807; ASTM F 1960; ASTM F 2080; ASTM F2159; ASTM F2434; CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F 2434; ASTM F1282, CSA B137.9
High Density Polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448
Polypropylene (PP-R)	ASTM F2389; CSA B137.11

PIPE MATERIAL	STANDARD (see Chapter 15)
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2159; B137.1

SECTION 1211
JOINTS AND CONNECTIONS

1211.1 Approval. Joints and connections shall be of an approved type. Joints and connections shall be tight for the pressure of the ground source -loop system. Joints used underground shall be approved for buried applications.

1211.1.1 Joints between different piping materials. Joints between different piping materials shall be made with approved transition fittings.

1211.2 Preparation of pipe ends. Pipe shall be cut square, reamed, and shall be free of burrs and obstructions. CPVC, PE, and PVC pipe shall be chamfered. Pipe ends shall have full-bore openings and shall not be undercut.

1211.3 Joint preparation and installation. Where required by Sections 1211.4 through 1211.6, the preparation and installation of mechanical and thermoplastic-welded joints shall comply with Sections 1211.3.1 and 1211.3.2.

1211.3.1 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

1211.3.2 Thermoplastic-welded joints. Joint surfaces for thermo plastic-welded joints shall be cleaned by an approved procedure. Joints shall be welded in accordance with the manufacturer's instructions.

1211.4 CPVC plastic pipe. Joints between CPVC plastic pipe or fittings shall be solvent-cemented or threaded joints complying with Section 1203.3.

1211.5 Cross-linked polyethylene (PEX) plastic tubing. Joints between cross-linked polyethylene plastic tubing and fittings shall comply with Sections 1211.4.1 and 1211.4.2. Mechanical joints shall comply with Section 1211.3.

1211.5.1 Compression-type fittings. Where compression- type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

1211.5.2 Plastic-to-metal connections. Soldering on the metal portion of the system shall be performed at least 18 inches (457 mm) from a plastic-to-metal adapter in the same water line.

1211.6 Polyethylene plastic pipe and tubing for ground source heat pump loop systems. Joints between polyethylene plastic pipe and tubing or fittings for ground source heat pump loop systems shall be heat fusion joints complying with Section 1211.6.1, electrofusion joints complying with Section 1211.6.2, or stab-type insertion joints complying with Section 1211.6.3.

1211.6.1 Heat-fusion joints. Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, joined in accordance with ASTM D 2657. Joint surfaces shall be clean and free of moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D 2683 or ASTM D 3261.

1211.6.2 Electrofusion joints. Joints shall be of the electrofusion type. Joint surfaces shall be clean and free of moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall be undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F 1055.

1211.6.3 Stab-type insert fittings. Joint surfaces shall be clean and free of moisture. Pipe ends shall be chamfered and inserted into the fittings to full depth. Fittings shall be manufactured in accordance with ASTM F 1924.

1211.7 Polypropylene (PP) plastic. Joints between PP plastic pipe and fittings shall comply with Sections 1211.7.1 and 1211.7.2.

1211.7.1 Heat-fusion joints. Heat-fusion joints for polypropylene (PP) pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings, electrofusion polypropylene fittings or by butt fusion. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F 2389.

1211.7.2 Mechanical and compression sleeve joints. Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer's instructions.

1211.8 Raised temperature polyethylene (PE-RT) plastic tubing. Joints between raised temperature polyethylene tubing and fittings shall complying with Sections 1211.8.1 and 1211.8.2. Mechanical joints shall comply with Section 1211.3.

1211.8.1 Compression-type fittings. Where compression-type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

1211.8.2 PE-RT-to-metal connections. Solder joints in a metal pipe shall not occur within 18 inches (457 mm) of a transition from such metal pipe to PE-RT pipe.

1211.9 PVC plastic pipe. Joints between PVC plastic pipe and fittings shall be solvent-cemented or threaded joints comply with Section 1203.3.

SECTION 1212
VALVES

1212.1 Where required. Shutoff valves shall be installed in ground source-loop piping systems in the locations indicated in Sections 1212.1.1 through 1212.1.6.

1212.1.1 Heat exchangers. Shutoff valves shall be installed on the supply and return side of a heat exchanger.

> **Exception:** Shutoff valves shall not be required where heat exchangers are integral with a boiler or are a component of a manufacturer's boiler and heat exchanger packaged unit and are capable of being isolated from the hydronic system by the supply and return valves required by Section 1005.1.

1212.1.2 Central systems. Shutoff valves shall be installed on the building supply and return of a central utility system.

1212.1.3 Pressure vessels. Shutoff valves shall be installed on the connection to any pressure vessel.

1212.1.4 Pressure-reducing valves. Shutoff valves shall be installed on both sides of a pressure-reducing valve.

1212.1.5 Equipment and appliances. Shutoff valves shall be installed on connections to mechanical *equipment* and appliances. This requirement does not apply to components of a ground source loop system such as pumps, air separators, metering devices, and similar *equipment*.

1212.1.6 Expansion tanks. Shutoff valves shall be installed at connections to nondiaphragm-type expansion tanks.

1212.2 Reduced pressure. A pressure relief valve shall be installed on the low-pressure side of a hydronic piping system that has been reduced in pressure. The relief valve shall be set at the maximum pressure of the system design. The valve shall be installed in accordance with Section 1006.

SECTION 1213
PIPING INSTALLATION

1213.1 General. Piping, valves, fittings, and connections shall be installed in accordance with the conditions of approval.

1213.3 Protection of potable water. Where ground source heat pump ground loop systems have a connection to a potable water supply, the potable water system shall be protected from backflow in accordance with the *International Plumbing Code*.

1213.4 Pipe penetrations. Openings for pipe penetrations in walls, floors and ceilings shall be larger than the penetrating pipe. Openings through concrete or masonry building elements shall be sleeved. The annular space surrounding pipe penetrations shall be protected in accordance with the *International Building Code*.

1213.5 Clearance from combustibles. A pipe in a ground source heat pump piping system having an exterior surface temperature exceeding 250°F (121°C) shall have a minimum *clearance* of 1 inch (25 mm) from combustible materials.

1213.6 Contact with building material. A ground source heat pump ground-loop piping system shall not be in direct contact with building materials that cause the piping or fitting material to degrade or corrode, or that interfere with the operation of the system.

1213.7 Strains and stresses. Piping shall be installed so as to prevent detrimental strains and stresses in the pipe. Provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement. Piping shall be installed so as to avoid structural stresses or strains within building components.

1213.7.1 Flood hazard. Piping located in a flood hazard area shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the *design flood elevation*.

1213.8 Pipe support. Pipe shall be supported in accordance with Section 305.

1213.9 Velocities. Ground source heat pump ground-loop systems shall be designed so that the flow velocities do not exceed the maximum flow velocity recommended by the pipe and fittings manufacturer and shall be controlled to reduce the possibility of water hammer.

1213.10 Labeling and Marking. Ground source heat pump ground-loop system piping shall be marked with tape, metal tags or other method where it enters a building indicating “GROUND SOURCE HEAT PUMP-LOOP SYSTEM”. The marking shall indicate any antifreeze used in the system by name and concentration.

1213.11 Chemical Compatibility. Antifreeze and other materials used in the system shall be chemically compatible with the pipe, tubing, fittings, and mechanical systems.

SECTION 1214
WORKING FLUID

1214.1 Makeup water. The transfer fluid shall be compatible with the makeup water supplied to the system.

SECTION 1215
TESTS

1215.1 Ground source heat pump loop systems. Before connection header trenches are backfilled, the assembled loop system shall be pressure tested with water at 100 psi (689 kPa) for 30 minutes, but not more than 35 minutes, with no observed leaks. Flow and pressure loss testing shall be performed and the actual flow rates and pressure drops shall be compared to the calculated design values. If actual flow rate or pressure drop values differ from calculated design values by more than 10 percent, the cause shall be identified and corrective action taken.

SECTION 1216
EMBEDDED PIPING

1216.1 Pressurizing during installation. Ground source heat pump ground loop piping to be embedded in concrete shall be pressure tested prior to pouring concrete. During pouring, the pipe shall be maintained at the proposed operating pressure.

Add new standard as follows:

CSA C448 SERIES-02-CAN/CSA-2002
Design and Installation of Earth Energy Systems - First Edition; Update 2: October 2009; Consolidated Reprint 10/2009

Reason: Water based geothermal PE piping is currently listed in the hydronics section where it doesn't quite fit. This special and growing application should have its own section, and it should cover other materials that could potentially be used. Green building rating systems are promoting geothermal ground loop heating and cooling systems, and the code should have more information. I am re-introducing this proposal to accomplish that and would accept friendly amendments to it for any other materials. While HDPE dominates the water based technology with an expected 95% of the systems, other materials can be utilized. Copper is used in direct expansion systems that do not run on water.

Cost Impact: None

Analysis: A review of the standard proposed for inclusion in the code, [CSA C448 SERIES-02-CAN/CSA-2002] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

T1202.4-M-CUDAHY.DOC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify as follows:

SECTION 1210
PLASTIC PIPE GROUND-SOURCE HEAT PUMP LOOP SYSTEMS

1210.1 Plastic pipe ground-source heat pump-loop water piping. Ground source heat pump ground loop-piping and tubing material for water-based systems shall conform to the standards cited in this section.

SECTION 1215
TESTS

1215.1 Ground source heat pump loop systems. Before connection header trenches are backfilled, the assembled loop system shall be pressure tested with water at 100 psi (689 kPa) for ~~30~~ 15 minutes, ~~but not more than 35 minutes~~, with no observed leaks. Flow and pressure loss testing shall be performed and the actual flow rates and pressure drops shall be compared to the calculated design values. If actual flow rate or pressure drop values differ from calculated design values by more than 10 percent, the cause shall be identified and corrective action taken.

(Portions of proposal not shown remain unchanged)
Committee Reason: Approval is based on the proponent's published reason. The modification adds "plastic pipe" to the titles to reflect the coverage of the text. The change to 15 minutes is consistent with current section 1208.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Jeremy Brown, representing NSF International, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

TABLE 1210.4
GROUND SOURCE LOOP PIPE

MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F441; ASTM F442
Cross-linked polyethylene (PEX)	ASTM F876; ASTM F877 CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
High Density Polyethylene (HDPE)	ASTM D3035; ASTM D2737; ASTM F714; AWWA C901; CSA B137.1; CSA C448; <u>NSF 358-1</u>
Polypropylene (PP-R)	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241
Raised temperature polyethylene (PE-RT)	ASTM F2623

TABLE 1210.5
GROUND SOURCE LOOP PIPE
FITTINGS

PIPE MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D 2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F 877; ASTM F1807; ASTM F 1960; ASTM F 2080; ASTM F2159; ASTM F2434; CSA B137.5
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F 2434; ASTM F1282, CSA B137.9
High Density Polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F2389; ASTM F1055; CSA B137.1; <u>NSF 358-1</u>
Polypropylene (PP-R)	CSA B137.11; CSA C448
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2159; B137.1

NSF 358-1 2011 Polyethylene Pipe and Fittings for Water-Based Ground-Source 'Geothermal' Heat Pump Systems

(Portions of proposal not shown remain unchanged)

Commenter's Reason: I was the proponent of M-190, an identical proposal to M-188, with the exception of adding new NSF standards. At the time of the Code Hearing in Dallas, NSF 358-1 was not complete so the code change was disapproved. It is now complete and published. This is the American National Standard for Polyethylene Pipe and Fittings for Water-Based Ground-Source "Geothermal" Heat Pump Systems and should be included as an option in the code. This standard deals with specific performance requirements related to geothermal systems. The standard is written in mandatory language. ICC voting members may obtain a free copy of this NSF standard from http://standards.nsf.org/apps/group_public/document.php?document_id=18123 or by emailing brown@nsf.org.

M188-12

Final Action: AS AM AMPC____ D

M192-12
Table 1202.5, Chapter 15

Proposed Change as Submitted

Proponent: Kevin J. Simko, Victaulic, representing Victaulic

Revise as follows:

MATERIAL	STANDARD
Brass	ASTM F 1974
Bronze	ASTM B 16.24
Copper or copper alloy	ASME BI6.15; ASME BI6.18; ASME BI6.22; ASME BI6.23; ASME BI6.26; AS ME BI6.29; ASTM B 75; ASTM B 152; ASTM B 584
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; A WWA C153/A21.53; ASTM A 395; ASTM A 536; ASTM F 1476; ASTM F 1548
Ductile Iron	ANSI/AWWA *C153/A21.53*
Gray Iron	ASTM A 126
Malleable iron	ASME BI6.3
PEX fittings	ASTM F 877; ASTM F 1807; ASTM F 2159
Plastic	ASTM D 2466; ASTM D 2467; ASTM D 2468; ASTM F 438; ASTM F 439; ASTM F 877; ASTM F2389; ASTM F 2735
Steel	ASME BI6.5; ASME BI6.9; ASME B16.11; ASME BI6.28; ASTM A 53; ASTM A 106; ASTM A 234; ASTM A 420; ASTM A 536; ASTM A 395; ASTM F 1476; ASTM F 1548

Portions not shown remain unchanged.

Add new standards to Chapter 15 as follows:

ASTM A234 / A234M - 11a
Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

ASTM A395 / A395M - 99(2009)
Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures

ASTM A536 - 84(2009)
Standard Specification for Ductile Iron Castings

ASTM B152 / B152M – 09
Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar

ASTM B584 – 11
Standard Specification for Copper Alloy Sand Castings for General Applications

ASTM F1548 - 01(2006)
Standard Specification for the Performance of Fittings for Use with Gasketed Mechanical Couplings Used in Piping Applications

<u>AWWA C153/A21.53-06</u>
<u>Ductile-Iron Compact Fittings for Water Service</u>

Reason: The materials currently listed in Table 1202.5 do not fully represent the materials being used for hydronic systems in the industry. ,the code is overly restrictive with regard to pipe materials and does not allow for the use of materials that offer improved mechanical and electrochemical properties compared with allowed materials. The addition of these standard materials will allow the use of high grade materials that provide improved performance, while still allowing the use of currently approved materials. Many of these materials are also currently referenced in other piping codes.

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

Analysis: A review of the standard proposed for inclusion in the code, [ASTM A234 / A234M - 11a, A395 / A395M - 99(2009), A536 - 84(2009), B152 / B152M – 09, B584 – 11, F1548 - 01(2006); AWWA C153/A21.53-06] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

T1202.5-M-SIMKO.DOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based on the proponent's published reason.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Pennie L. Feehan, Pennie L. Feehan Consulting, representing CDA – Copper Development Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 1202.5
HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ~~ASME B16.23;~~ ASME B16.26; ~~ASME B16.29; ASTM B 75; ASTM B 152; ASTM B 584~~

(Portions of code change not shown remain unchanged)

Commenter's Reason: Brass and Bronze are copper alloys. Moving the standards under the applicable heading cleans-up the table and provides the appropriate terminology and correct information to the end user.

ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV and ASME B 16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings – DWV, are Drain, Waste, and Vent fittings and should not be listed in table 1202.5. ASTM B 75 – Standard Specification for Seamless Copper Tube, ASTM B 152 – Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar, ASTM B584 – Standard Specification for Copper Alloy Sand Casting for General Applications, are tubing, plate, rolled bar, and general castings are not fittings and should not be listed in table 1202.5.

M192-12
Final Action: AS AM AMPC____ D

M199-12

1203.1 through 1203.8.3, Chapter 15

Proposed Change as Submitted

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting, representing Copper Development Association (penniefeehan@me.com)

Revise as follows:

1203.3.1 Brazed joints. Brazed joints between copper pipe or tubing and fittings shall be made with brazing alloys having a liquid temperature exceeding 1000˚F (538˚C). Joint surfaces to be brazed shall be cleaned bright by manual or mechanical means. The ends of the tubing shall be cut square and reamed to full inside diameter. Burrs on the outside end of the pipe or tubing shall be removed. Where required by the brazing alloy manufacturer's instructions, an *approved* brazing flux shall be applied to the joint surfaces ~~where required~~. The joint shall be brazed with a brazing filler metal conforming to AWS A5.8. Brazing filler metal shall be applied at the point where the pipe or tubing enters the socket of the fitting.

1203.3.2 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions. Joints shall include compression, flanged, grooved, press type and threaded.

1203.3.3 Soldered joints. Solder joints ~~surfaces shall be cleaned~~. between copper pipe or tubing and fittings shall be made in accordance with the methods of ASTM B 828 with the following sequence of joint preparation and operation: measuring and cutting, reaming, cleaning, fluxing, assembly and support, heating, applying the solder, cooling and cleaning. The ends of the pipe or tubing shall be cut square and reamed to the full inside diameter. Burrs on the outside end of the pipe or tubing shall be removed. Joint surfaces to be joined shall be cleaned bright by manual or mechanical means. ~~A~~ Flux conforming to ASTM B 813 shall be applied to pipe or tubing and fittings. Such flux shall become noncorrosive and nontoxic after soldering ~~shall be applied~~. Pipe or tubing shall be inserted to the base of the fitting. Excess flux shall be removed from the exterior of the joint. The assembled joint shall be supported to create a uniform capillary space around the joint. An LP gas or acetylene air fuel torch shall be used to apply heat to the assembled joint. The heat shall be applied with the flame perpendicular to the pipe or tubing. The flame shall be moved alternately between the fitting cup and pipe or tubing. ~~The joint shall be soldered with a~~ Solder in compliance with ~~conforming to~~ ASTM B 32 shall be applied to the joint surfaces until capillary action draws the molten solder into the cup of the fitting. The soldered joint shall not be disturbed until cool. Remaining flux residue shall be cleaned from the exterior of the joint. The joining of water supply piping shall be made with lead-free solder and fluxes. "Lead free" shall mean a chemical composition equal to or less than 0.2-percent lead.

1203.3.4 Flared joints. Flared joints shall be made by a tool designed for that operation.

1203.3.5 Push-fit joints. Push-fit joints shall be installed in accordance with the manufacturer's instructions.

1203.3.6 Press joints. *Press joints* shall be installed in accordance with the manufacturer's instructions.

1203.3.7 Grooved and shouldered mechanical joints. Grooved and shouldered mechanical joints shall conform to the requirements of ASTM F 1476 and shall be installed in accordance with the manufacturer's instructions.

1203.3.8 Mechanically formed tee fittings. Mechanically extracted outlets shall have a height not less than three times the thickness of the branch tube wall.

1203.3.8.1 Full flow assurance. Branch tubes shall not restrict the flow in the run tube. A dimple/depth stop shall be formed in the branch tube to ensure that penetration into the outlet is of the correct depth. For inspection purposes, a second dimple shall be placed 1/4 inch (6.4 mm) above the first dimple. Dimples shall be aligned with the tube run.

1203.3.8.2 Brazed joints. Mechanically formed tee fittings shall be brazed in accordance with Section 1203.3.1.

1203.~~3.4~~ 3.9 Solvent-cemented joints. Joint surfaces shall be clean and free of moisture. An *approved* primer shall be applied to CPVC and PVC pipe-joint surfaces. Joints shall be made while the cement is wet. Solvent cement conforming to the following standards shall be applied to all joint surfaces:

1. ASTM D 2235 for ABS joints.
2. ASTM F 493 for CPVC joints.
3. ASTM D 2564 for PVC joints.
   CPVC joints shall be made in accordance with ASTM D 2846.

   Exception: For CPVC pipe joint connections, a primer is not required where all of the following conditions apply:

   1. The solvent cement used is third-party certified as conforming to ASTM F 493.
   2. The solvent cement is yellow in color.
   3. The solvent cement is used only for joining ½ inch (12.7 mm) through 2-inch (51 mm) diameter CPVC pipe and fittings.
   4. The CPVC pipe and fittings are manufactured in accordance with ASTM D 2846.

1203.3.~~5~~10 Threaded joints. Threads shall conform to ASME B1.20.1. Schedule 80 or heavier plastic pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant, pipe-joint compound or tape shall be applied on the male threads only and shall be *approved* for application on the piping material.

1203.3.~~6~~11 Welded joints. Joint surfaces shall be cleaned by an *approved* procedure. Joints shall be welded with an *approved* filler metal.

~~**1203.3.7 Grooved and shouldered mechanical joints.** Grooved and shouldered mechanical joints shall conform to the requirements of ASTM F 1476 and shall be installed in accordance with the manufacturer's installation instructions.~~

~~**1203.3.8 Mechanically formed tee fittings.** Mechanically extracted outlets shall have a height not less than three times the thickness of the branch tube wall.~~

~~**1203.3.8.1 Full flow assurance.** Branch tubes shall not restrict the flow in the run tube. A dimple/depth stop shall be formed in the branch tube to ensure that penetration into the outlet is of the correct depth. For inspection purposes, a second dimple shall be placed 1/4 inch (6.4 mm) above the first dimple. Dimples shall be aligned with the tube run.~~

~~**1203.3.8.2 Brazed joints.** Mechanically formed tee fittings shall be brazed in accordance with Section 1203.3.1.~~

~~**1203.4 ABS plastic pipe.** Joints between ABS plastic pipe or fittings shall be solvent-cemented or threaded joints conforming to Section 1203.3.~~

~~**1203.5 Brass pipe.** Joints between brass pipe or fittings shall be brazed, mechanical, threaded or welded joints conforming to Section 1203.3.~~

~~**1203.6 Brass tubing.** Joints between brass tubing or fittings shall be brazed, mechanical or soldered joints conforming to Section 1203.3.~~

~~**1203.7 Copper or copper-alloy pipe.** Joints between copper or copper-alloy pipe or fittings shall be brazed, mechanical, soldered, threaded or welded joints conforming to Section 1203.3.~~

~~**1203.8 Copper or copper-alloy tubing.** Joints between copper or copper-alloy tubing or fittings shall be brazed, mechanical or soldered joints conforming to Section 1203.3, flared joints conforming to Section 1203.8.1, push-fit joints conforming to Section 1203.8.2 or press-type joints conforming to Section 1203.8.3.~~

~~**1203.8.1 Flared joints.** Flared joints shall be made by a tool designed for that operation.~~

~~**1203.8.2 Push-fit joints.** Push-fit joints shall be installed in accordance with the manufacturer's instructions.~~

~~**1203.8.3 Press joints.** *Press joints* shall be installed in accordance with the manufacturer's instructions.~~

Add new standard to Chapter 15 as follows:

<u>ASTM B828 - 02(2010)</u>
<u>Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings</u>

Reason: The above proposal adds important language from the applicable standards, relocated, renumbered, and deleted other redundant sections to help the end user.

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

Analysis: A review of the standard proposed for inclusion in the code, [ASTM B828 - 02(2010)], with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1203.3.1-M-FEEHAN.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The code is not an instruction manual for piping installation. Workmanship cannot be enforced. The Air Diffusion Council installation guide for flex duct is not in the code and likewise, this proposed text should not be in the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Pennie L. Feehan, Pennie L. Feehan Consulting, representing CDA – Copper Development Association, requests Approval as Modified by this Public Comment.

Replace original proposal as follows:

1203.3.1 Brazed joints. Joint surfaces shall be cleaned <u>bright by manual or mechanical means</u>. An approved flux shall be applied where required. The joint shall be brazed with ~~a~~ filler metal<u>s having a melting point range between 1,100°F (593°C) and 1500°F (815°C) and</u> conforming to AWS A5.8.

1203.3.2 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

1203.3.3 Soldered joints. <u>Solder joints shall be made in accordance with the methods of ASTM B 828. All cut ends shall be cut square and reamed to the full inside diameter of the tube end.</u> <u>All</u> joint surfaces shall be cleaned <u>bright by manual or mechanical means</u>. ~~A~~ Flux conforming to ASTM B 813 shall be applied <u>to all joint surfaces</u>. The joint shall be soldered with a solder conforming to ASTM B 32.

Commenter's Reason: This proposal adds language that provides clear directions to the end user, adds the ASTM B 828 standard to the IMC and provides uniformity with the IPC.

M199-12

Final Action: AS AM AMPC____ D

M209-12
1303.3 through 1303.7

Proposed Change as Submitted

Proponent: Pennie L. Feehan, Pennie L. Feehan Consulting, representing Copper Development Association (penniefeehan@me.com)

Revise as follows:

1303.3 Joint preparation and installation. Where required by Sections 1303.4 through 1303.10, the preparation and installation of brazed, mechanical, threaded and welded joints shall comply with Sections 1303.3.1 through 1303.3.~~4~~5.

1303.3.1 Brazed joints. ~~All~~ Brazed joint between copper pipe or tubing and fittings shall be made with brazing alloys having a liquid temperature above 1000˚F (538˚C). All joints surfaces to be brazed shall be cleaned. An *approved* brazing flux shall be applied to the joint surfaces where required by manufacturer's recommendation. The joints shall be brazed with a brazing filler metal conforming to AWS A5.8. Brazing filler metal shall be applied at the point where the pipe or tubing enters the socket of the fitting.

1303.3.5 Flared joints. Flared joints shall be made by a tool designed for that operation.

~~**1303.4 Brass pipe.** Joints between brass pipe or fittings shall be brazed, mechanical, threaded or welded joints complying with Section 1303.3.~~

~~**1303.5 Brass tubing.** Joints between brass tubing or fittings shall be brazed or mechanical joints complying with Section 1303.3.~~

~~**1303.6 Copper or copper-alloy pipe.** Joints between copper or copper-alloy pipe or fittings shall be brazed, mechanical, threaded or welded joints complying with Section 1303.3.~~

1303.7 ~~**Copper or copper-alloy tubing.** Joints between copper or copper-alloy tubing or fittings shall be brazed or mechanical joints complying with Section 1303.3 or flared joints.~~ ~~Flared joints shall be made by a tool designed for that operation.~~

Reason: The proposed removes unnecessary language and adds important language from the applicable standards.

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

1303.3-M-FEEHAN.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal has merit but needs to be reworked and brought forward in a public comment.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Pennie L. Feehan, Pennie L. Feehan Consulting, representing CDA – Copper Development Association, requests Approval as Modified by this Public Comment.

Replace original proposal as follows:

1303.3.1 Brazed joints. All joint surfaces shall be cleaned bright by manual or mechanical means. An approved flux shall be applied where required. The joints shall be brazed with ~~a~~ filler metals having a melting point range between 1,100°F (593°C) and 1500°F (815°C) and conforming to AWS A5.8.

Commenter's Reason: This proposal adds language that provides clear directions to the end user and provides uniformity with the IPC.

M209-12

Final Action: AS AM AMPC____ D

M214-12
1404.2.1 (New)

Proposed Change as Submitted

Proponent: Timothy Burgos, InterCode Incorporated, Representing Rectorseal Corporation and Ken Sagan, NRG Code Advocates, representing self (ken@nrgcodeadvocates.com)

Add new text as follows:

<u>**1404.2.1 Protection of piping insulation**. Piping insulation exposed to the weather shall be protected from damage, including that caused by sunlight, moisture, equipment maintenance and wind. The means of protection shall provide shielding from solar radiation that can cause degradation of the material. Adhesive tape shall not be permitted as a means of such protection.</u>

1404.2.1(NEW)-M-BURGOS-SAGAN.DOC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The method of protection is not specified. "Exposed to the weather" is vague. The text only applies where insulation is exposed to weather. This belongs in the IECC. Prescriptive text or standards are needed. The reference to wind damage is unclear.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Vickie Lovell, InterCode Incorporated, representing Rectorseal Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~1404.2.1~~ <u>1204.3</u> Protection of piping insulation. Piping insulation exposed to the weather shall be protected from damage, including that caused by sunlight, moisture, equipment maintenance and wind. The means of protection shall provide shielding from solar radiation that can cause degradation of the material. Adhesive tape shall not be permitted as a means of such protection.

Commenter's Reason: This public comment is necessary because the original code change proposal was proposed for Chapter 14 rather than appropriately placed in Chapter 12.

The rest of the text should be approved as submitted. Currently, the International Energy Conservation Code (IECC) contains the language for protection of piping insulation, but this language needs to be in the International Mechanical Code (IMC).

Protection of piping insulation is not only an energy conservation issue. Piping insulation is in place to ensure the proper function and operation of the mechanical system. A requirement for the protection of piping insulation is consistent with the intent of the IMC.

The language for protection of piping insulation was taken directly from Section C403.2.8.1 of the 2012 IECC so it is already accepted code language by the membership of the International Code Council. Additionally, Section 603.16 of the IMC speaks to weather protection of ducts. A requirement for protection of pipe insulation from weather is appropriate.

M214-12
Final Action: AS AM AMPC____ D

M215-12
307.3 (New) (IPC [M]314.3 New)

Proposed Change as Submitted

Proponent: Guy McMann, MCP, Jefferson County Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

Add new text as follows:

307.3 (IPC [M] 314.3) Condensate pumps. Condensate pumps located in uninhabitable spaces, such as attics and crawl spaces, shall be connected to the appliance or equipment served such that when the pump fails, the appliance or equipment will be prevented from operating. Pumps shall be installed in accordance with the manufacturers' installation instructions.

Reason: Pumps that are not connected in this fashion will permit the appliances to keep operating, spilling waste water where ever the appliance is located. When this condition continues over time, it could result in damage to building components or other property. This overflow condition may result in mold issues among other things. Most pump manufacturers already have this feature incorporated into the pump but the code does not require it to be connected. Damage as a result of not connecting this feature could prove to be very costly. This is not as much of a concern when appliances are readily accessible to occupants where leakage may be noticed in a timely manner.

Cost Impact: None

307.6 (NEW)-FG-MCMANN

Public Hearing Results

This code change was contained in the Updates to the 2012 Proposed Changes posted on the ICC website. Please go to http://www.iccsafe.org/cs/codes/Pages/12-13-ProposedChanges-A.aspx

Committee Action: **Approved as Submitted**

Committee Reason: Approval is based on the proponent's published reason.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dan Buuck, Dipl.-Ing. (FH), representing National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: Because Section 307.2.3, Auxiliary and secondary drain systems, already addresses situations where building components can be damaged by condensate, this proposal would only apply to uninhabitable spaces with concrete or other impervious floor surfaces. The proposal is overly restrictive, because it does not take into account situations where floor drains are present or regular maintenance will prevent prolonged spillage—effectively avoiding the damage that this proposal is meant to prevent.

Also, there are facilities which need to have uninterrupted cooling, for processes, storage or health reasons. The occupants of these buildings cannot afford to have the cooling system shut down just because some water might drain on the floor. They would have to have a duplicate system installed at great cost for the small possibility of condensate spillage. This is not a one-size-fits-all solution.

M215-12
Final Action: AS AM AMPC____ D

FS3-12
703.2.3

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc, representing North American Insulation Manufacturers Association (NAIMA) (tcrimi@sympatico.ca)

Revise as follows:

703.2.3 Restrained classification. Fire-resistance-rated assemblies tested under ASTM E 119 or UL 263 shall not be considered to be restrained unless evidence satisfactory to the *building official* is furnished by the *registered design professional* showing that the construction qualifies for a restrained classification in accordance with ASTM E119 or UL 263. <u>Where an assembly is deemed to be restrained, the rating of beams shall also have a restrained beam classification in accordance with ASTM E 119 or UL 263. Otherwise, fire-resistance rated assemblies shall be considered unrestrained.</u> Restrained construction shall be identified on the plans.

Reason: The purpose of this proposal is to clarify that if an assembly is not considered to be restrained by the building official, it must be treated as an unrestrained assembly. A restrained classification yields higher fire-resistance ratings than unrestrained; therefore, the code takes the conservative approach by defaulting to the lesser rating by assuming the in-place conditions to be unrestrained unless structural documentation is provided that supports a restrained condition.

Because even restrained assembly ratings do not include restrained beams, the criteria for the beams used in restrained assemblies needs to comply with the restrained beam designs tested in order to comply with Table 601 of the IBC. The conditions of acceptance in ASTM E119 and ANSI/UL 263 provide criteria for Restrained Beam Ratings and Unrestrained Beam Ratings. A greater thickness of protection material is typically required for the Unrestrained Beam Rating as compared to the protection material thickness required for the Restrained Beam Rating based on the differences in the rating criteria. Accordingly, Unrestrained Beam Ratings may be used for beams designed for either restrained or unrestrained conditions. Restrained Beam Ratings may be used for beams designed for restrained conditions.

Floor-ceiling and roof-ceiling assemblies include fire-resistance ratings for use in both restrained or unrestrained conditions. It is up to the designer and Authority Having Jurisdiction to determine if an assembly is being used in a restrained or unrestrained application, as required by the IBC. Because of their more onerous criteria, Unrestrained Assembly Ratings may be used for floors and roofs designed for either restrained or unrestrained conditions.

Cost Impact: This proposal should not increase the cost of construction.

703.2.3-FS-CRIMI

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proponents attempt to clarify restrained and unrestrained assemblies was too confusing and that the testing reports would cover this issue. Further, the committee indicated that restrained assemblies do not always have higher fire resistance ratings and is therefore more complicated to deal with than the proposal attempts.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dave Dratnol, Isolatek International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

703.2.3 Restrained classification. Fire-resistance-rated assemblies tested under ASTM E 119 or UL 263 shall not be considered to be restrained unless evidence satisfactory to the *building official* is furnished by the *registered design professional* showing that the construction qualifies for a restrained classification in accordance with ASTM E119 or UL 263. ~~Where an assembly is deemed to be restrained, the ratings of the beams shall also have~~ In order to be considered as a restrained assembly, beams installed in the assembly shall have a restrained beam classification in accordance with ASTM E 119 or UL 263. Otherwise, fire-resistance rated assemblies shall be considered unrestrained. Restrained construction shall be identified on the plans.

Commenter's Reason: The purpose of this proposal is to clarify that a beam installed as part of a floor or roof system is part of the floor or roof assembly, and should not be considered otherwise. Consequently, when a beam is installed within a fire resistance rated assembly, the beam must be evaluated the same way as the remainder of the floor construction. In other words, restrained assemblies should use beam designs tested as restrained beams, and unrestrained assemblies should have unrestrained beams installed. ASTM E119 recognizes the positive effects of restraint by allowing more liberal failure criteria for restrained assemblies than for unrestrained ones. The main difference in the acceptance criteria for the two types of assemblies. While it may be possible for unrestrained beams to be installed in restrained assemblies, the opposite would not be permitted.

As a result, when a fire resistance rated beam is installed within a restrained assembly, it must also be protected as a restrained beam. Conversely, when the beam is not thermally restrained as described in ASTM E119 or UL263, then the entire assembly should not be considered restrained. Even restrained assembly ratings do not typically include restrained beams, therefore, the criteria for the beams used in restrained assemblies needs to comply with the restrained beam designs tested in order to comply with Table 601 of the IBC.

FS3-12

Final Action: AS AM AMPC____ D

FS5-12
703.2.4 (New)

Proposed Change as Submitted

Proponent: Jason Thompson, National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards

Add new text as follows:

703.2.4 Load-bearing wall assemblies. Fire-resistance-rated wall assemblies tested under ASTM E 119 or UL 263 shall not be considered to be load-bearing unless evidence satisfactory to the *building official* is furnished by the *registered design professional* showing that the construction qualifies as a load bearing element in accordance with ASTM E 119 or UL 263. The load-bearing fire-resistance-rated wall construction shall be identified on the plans.

Reason: Many times designers will submit wall assemblies to me fire resistance requirements in the IBC without considering whether the assemblies were tested and passed ASTM E119 or UL 263 requirements as load-bearing. This proposal places this requirement in the code to make the code user aware of this important criterion for fire rated wall assemblies.

Cost Impact: This change should not increase the cost of construction.

703.2.4 (NEW)-FS-THOMPSON

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that determination of loads could lead to interpretation based on the requirements specific to the construction materials. Further, the committee felt that Chapter 7 was not the correct place for these provisions and that Chapter 6 already covered this situation.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jason Thompson, National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards, requests Approval as Submitted.

Commenter's Reason: This proposal adds a new section 703.2.4, Load-bearing wall assemblies in Chapter 7 of the IBC to require documentation for the fire resistance of tested wall assemblies that are load bearing. The purpose of the requirement is to bring to the attention of the designer and code official that fire rated wall assemblies tested according to ASTM E119 or UL 263 must be fire tested under load if they are to be used as load-bearing assemblies in a building. All tested fire rated wall assemblies presented under Section 703.2 should be assumed to be non-load-bearing unless proven otherwise. This requirement is similar to the requirement in Section 703.2.3 whereby all tested fire rated assemblies are considered unrestrained unless satisfactory evidence is submitted to the building official by the registered design professional that the assembly qualifies for a restrained condition when subjected to the code prescribed fire test.

In the reasoning statement given by the Fire Safety Code Development Committee for disapproval of FS5 it states *"that determination of loads could lead to interpretation based on the requirements specific to the construction materials. Further, the committee felt that Chapter 7 was not the correct place for these provisions and that Chapter 6 already covered this situation."* These reasons are insufficient justification for the action of disapproval for this proposal. The following are offered to respond to these statements.

"*Determination of loads could lead to interpretation based on the requirements specific to the construction materials"* is a meaningless statement. It gives the reader no technical information or reason why evidence to document that fire rated wall assemblies that are to be used as load-bearing assemblies should not be submitted to the code official.

The second statement, "*the committee felt that Chapter 7 was not the correct place for these provisions and that Chapter 6 already covered this situation"* is an incorrect statement. Chapter 7, and more specifically Section 703.2, Fire resistance ratings, is the section of the code where the code user presently goes to determine the specific requirements that must be met for building assemblies to be used to the meet fire resistance requirements of the code. As mentioned above, in Section 703.2.3 the code considers tested fire rated assemblies to be unrestrained unless satisfactory evidence is submitted to the building official by the registered design professional that the assembly qualifies for a restrained condition when subjected to the code prescribed fire test. The evidence required in this new Section 703.2.4 is very similar to that required for documenting restrained conditions.

Regarding Chapter 6, if you look at the provisions outlined in that chapter you will find that the purpose of the chapter is to specify what the fire resistance ratings for building elements including load-bearing walls shall be. In Section 602.1 the code user is directed to Section 703.2 for documentation on how the fire resistance rating is met. This new section 703.2.4 is the appropriate place for these additional requirements.

FS5-12

Final Action: AS AM AMPC____ D

FS6-12
703.3

Proposed Change as Submitted

Proponent: Bob Eugene, representing Underwriters Laboratories (Robert.Eugene@ul.com)

Revise as follows:

703.3 Alternative methods for determining fire resistance. The application of any of the alternative methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E 119 or UL 263. The required fire resistance of a building element, component or assembly shall be ~~permitted to be~~ established by ~~any~~ one of the following methods ~~or procedures~~:

1. Fire-resistance designs tested by an *approved agency* ~~documented in sources~~.
2. Prescriptive designs in accordance with ~~of fire-resistance-rated building elements, components or assemblies as prescribed in~~ Section 721.
3. Calculations in accordance with Section 722.
4. Engineering analysis based on a comparison of building element, component or assemblies designs having fire-resistance ratings as determined by the test procedures set forth in ASTM E 119 or UL 263.
5. Alternative protection methods as allowed by Section 104.11.

Reason: This proposal simplifies two of the options for establishing fire resistance. Concerning item 1, “Fire resistance designs in sources” could cover anything from a design from the UL Fire Resistance Directory to a sketch on a cocktail napkin. The intent appears to be designs tested to ASTM E119 or UL 263 by an approved agency, a defined term. The actual source of the design, whether in a publication or online, is irrelevant. The revision to item 2 is editorial only.

Cost Impact: None

703.3 #1-FS-EUGENE

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal eliminated viable options of establishing the fire resistance rating of assemblies by mandating one of the methods of compliance and by requiring assemblies to be tested by an approved agency rather than simply providing assemblies from documented sources.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Bob Eugene, representing UL LLC, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

703.3 Alternative methods for determining fire resistance. The application of any of the alternative methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E 119 or UL 263. The required fire resistance of a building element, component or assembly shall be permitted to be established by any of the following methods or procedures:

1. Fire-resistance designs documented in approved sources.
2. Prescriptive designs of fire-resistance-rated building elements, components or assemblies as prescribed in Section 721.

3. Calculations in accordance with Section 722.
4. Engineering analysis based on a comparison of building element, component or assemblies designs having fire-resistance ratings as determined by the test procedures set forth in ASTM E 119 or UL 263.
5. Alternative protection methods as allowed by Section 104.11.
6. Fire-resistance designs certified by an approved agency

Commenter's Reason: The original proposal used the text, "tested by an approved agency" in Item #1. This text was too narrow in scope, because some assemblies are sufficiently similar to others that an engineering decision can be made regarding conformance with the test standard without supplemental testing based on existing test data. The Item # 1 is retained as previously published, but the word "approved" as added before the term "source". The word approved was originally in item #1, but was inadvertently omitted by staff in the publication of the IBC. The membership never voted to delete the word "approved".

The Item 6 is added because the term "certified by an approved agency" should provide both the intended flexibility and confidence that the design conforms to the test standard based on scientific data.

Public Comment 2:

Bob Eugene, representing UL LLC, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

703.3 ~~Alternative methods~~ Methods for determining fire resistance. The application of any of the ~~alternative~~ methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E 119 or UL 263. The required fire resistance of a building element, component or assembly shall be permitted to be established by any of the following methods or procedures:

1. Fire-resistance designs documented in sources.
2. Prescriptive designs of fire-resistance-rated building elements, components or assemblies as prescribed in Section 721.
3. Calculations in accordance with Section 722.
4. Engineering analysis based on a comparison of building element, component or assemblies designs having fire-resistance ratings as determined by the test procedures set forth in ASTM E 119 or UL 263.
5. Alternative protection methods as allowed by Section 104.11.

Commenter's Reason: The term "alternative" in the title and the first sentence of this section can be misleading. The intent of the IBC is that any of the methods identified in the list are suitable for determining the applicable level of fire resistance prescribed by the code.

FS6-12

Final Action: AS AM AMPC____ D

FS8-12
703.4

Proposed Change as Submitted

Proponent: Joe Pierce, Dallas Fire Department, TX, representing the ICC Fire Code Action Committee

Delete without substitution:

~~**703.4 Automatic sprinklers.** Under the prescriptive fire-resistance requirements of the International Building Code, the fire-resistance rating of a building element, component or assembly shall be established without the use of automatic sprinklers or any other fire suppression system being incorporated as part of the assembly tested in accordance with the fire exposure, procedures, and acceptance criteria specified in ASTM E 119 or UL 263. However, this section shall not prohibit or limit the duties and powers of the building official allowed by Sections 104.10 and 104.11.~~

Reason: IBC Section 703.3 currently addresses alternative methods for determining fire resistance. Section 703.3 allows:

1. Prescriptive design according to Section 721
2. Engineering analysis based on ASTM E119 and UL 263 fire tests and reports
3. Alternative methods and materials according to Section 104.10

Section 703.4 specifies that sprinklers cannot be used as part of analyzing a fire-resistance requirement, but then it goes on to say that if you qualify the design under Section 104.10 as an alternate method then it is acceptable. Essentially, this section says "sprinklers cannot be included as providing any protection, but if you approve it under Section 104.10, then sprinklers can count."

In essence, this section provides no guidance for either the designer or code official, and it is nearly redundant of the provisions found in Section 703.3.

This proposal will delete this section since it is not needed in the code.

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

703.4-FS-PIERCE-FCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee preferred the existing language and agreed that sprinkler protection should not be used to provide a fire resistance rating to an assembly. Also, reference to Section 104.11 is reasonable because this is applicable to all requirements in the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jeffrey M. Shapiro, P.E., FSFPE, International Code Consultants, representing Tyco Fire Protection Products, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

703.4 Automatic sprinklers. ~~Under the prescriptive fire-resistance requirements of the International Building Code,~~ Tests using the fire exposure and acceptance criteria specified in ASTM E 119 or UL 263 to determine the fire-resistance rating of a building element, component or assembly shall be ~~established without the use of automatic sprinklers or any other~~ permitted to rely on a fire suppression system ~~being incorporated as part of the assembly tested in accordance with the fire exposure, procedures, and acceptance criteria specified in ASTM E 119 or UL 263. However, this section shall not prohibit or limit the duties and powers of the~~ only when approved by the building official ~~allowed by~~ in accordance with Sections 104.10 and 104.11.

Commenter's Reason: Section 703.4 was added in the 2012 IBC. The current code text resulted from Code Change FS4-09/10, which was modified by Public Comment 1, which I authored. The modification proposed by this comment is needed to resolve misunderstandings regarding the intent of the 2012 edition text. This comment seeks only to clarify the existing provisions with no change in how the code is intended to apply.

Background: Proponents of FS4-09/10 initially sought to disallow the use of fire suppression systems in fire-resistance tests but acknowledged in their support of Public Comment 1 that the longstanding authority of the building official to permit a modified test protocol as an alternate method in accordance with Section 104 should be retained. Section 703.3, which covers alternate methods for fire resistance, has always applied the code in this fashion, so the addition of Section 703.4 was truly more for clarification and emphasis than for technical change.

The Fire Code Action Committee recognized the redundancy between Sections 703.3 and 703.4 when they proposed to delete Section 703.4 in Proposal FS8-12 (as submitted), but the code development committee nevertheless chose to retain 703.4. In deference to the committee's decision and in the spirit of cooperation, this comment recommends retaining the section while eliminating ambiguity in the current text.

The proposed revisions are urgently needed because ICC-ES repealed longstanding acceptance criteria and an associated evaluation report after the 2012 code was published based on misunderstandings involving the current text in Section 703.4. The revisions recommended by this comment should resolve that issue.

FS8-12

Final Action: AS AM AMPC____ D

FS15-12
Table 705.2

Proposed Change as Submitted

Proponent: Don Davies and Larry Lincoln, Salt Lake City Corporation, representing Utah Chapter of ICC (don.davies@slcgov.com)

Revise as follows:

TABLE 705.2
MINIMUM DISTANCE OF PROJECTION

FIRE SEPARATION DISTANCE (FSD)	MINIMUM DISTANCE FROM LINE USED TO DETERMINE FSD
0 feet to less than 2 feet	Projections not permitted
2 feet to less than 5 feet	24 inches
5 feet or greater	40 inches[a]

For SI: 1 foot = 304.8 mm; 1 inch = 25.4 mm

a. The minimum distance from the line used to determine FSD shall be allowed to be 24 inches (61 mm) where the building is equipped throughout with an automatic sprinkler system in accordance with section 903.3.1.1 or 903.3.1.2, including the underside of the projecting element.

Reason: This new table in the International Building Code (IBC) has simplified the rationale and approach to providing a reasonable level of safety to building projections and balconies. However, we have a concern with the new table:

- Buildings placed further from the property line are seemingly penalized with a greater fire separation distance requirement Including our proposed footnote (a) provides justification for reducing the fire separation distance from the projection for logical reasons. This also creates an incentive for sprinkler protection for the projections. (This is particularly compelling in situations involving decks and balconies, which pose a greater fire hazards due to the possible storage and use of fire wood and barbeque grills).

Further rationale for the proposed change is an increased interest in maximizing the building footprint on small lots. Balcony projections can be common on all sides of buildings designed for these small lots; even those sides which are close to the lot line. This provision is tied to I.B.C. Table 705.8 which allows openings in the exterior wall up to 36” from the lot line if the building is equipped with (‘sprinkler protection’). Also, a higher percentage of the wall is allowed unprotected openings if the building is so equipped. Our contention is, that for such buildings, a reduction in the fire separation distance would be justified especially if the balcony was sprinkler protected. In addition, the ‘sprinkler protected’ exception three and four for balconies and similar projections in I.B.C. Section 1406.3 insinuates that sprinkler protection of balconies is the preferred alternative, as opposed to fire-retardant treated wood or one-hour construction.

In conclusion, we feel that providing sprinkler protection on balconies and similar projections would be the preferred solution as opposed to passive fire-protective measures to provide fire-resistance, since fire-resistance rated construction will not suppress a fire nor lessen the fire exposure to a building from the same lot or from adjoining lots**.**

Cost Impact: None

Analysis: FS15, FS16, FS17 and FS18 provide different options for Table 705.2. The committee needs to make its intent clear with respect to these provisions.

T705.2-FS-DAVIES-LINCOLN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The installation of sprinklers to allow a reduction in the distance of projection relative to a lot line has not been substantiated. Further, the reason statement appears to say that this change is specific to balcony projections; therefore the footnote should be revised to indicate this.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Don Davies, Salt Lake City Corporation, representing Utah Chapter of I.C.C., requests Approval as Submitted.

Commenter's Reason: The committee had two objections; the first one was that the installation of fire sprinklers to reduce the fire separation distance has not been substantiated. The code already allows an increase of the percentage of the length of balconies on the perimeter of the exterior of the building from 50% for non sprinklered building to 100% for fire sprinklered building in I.B.C. Section 1406.3 Exceptions: 4. "Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited". This should be sufficient substantiation.

The second objection was that the reason statement seemed to be specific to balconies so the code change proposal should indicate that. I don't see any reason to limit this exception to just balconies. Because of site constraints an eave on one side of a building may need to be trimmed off to meet the projection limitations. If fire sprinklers are provided under the eave the eave should be allowed to project an additional 16" as allowed by the proposed exception. I have included the same wording under the heading of 1406.3 "balconies and similar projections" in my amended reason statement.
rated construction will not suppress a fire nor lessen the fire exposure to a building from the same lot or from adjoining lots.

Analysis: Public Comments to FS15, FS16, and FS17 provide different options for Table 705.2. The membership needs to make its intent clear with respect to these provisions.

FS15-12
Final Action: AS AM AMPC____ D

FS16-12
Table 705.2

Proposed Change as Submitted

Proponent: Homer Maiel, PE, CBO, Town of Atherton, representing ICC Tri-Chapter (Peninsula, East Bay, and Monterey Bay)

Revise as follows:

705.2 Projections. Cornices, eave overhangs, exterior balconies and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways and ramps shall also comply with Sections 1019 and 1026, respectively. Projections shall not extend any closer to the line used to determine the fire separation distance than shown in Table 705.2.

Table 705.2
MINIMUM DISTANCE OF PROTECTION

FIRE SEPARATION DISTANCE (FSD)	MINIMUM DISTANCE FROM LINE USED TO DETERMINE FSD
0 feet to less than ~~2~~ 3 feet	Projections not permitted
~~2 feet to less than 5 feet~~ 3 feet	24 inches
~~5 feet or~~ greater than 3 feet	~~40 inches~~ 24 inches plus 8 inches for every foot thereafter

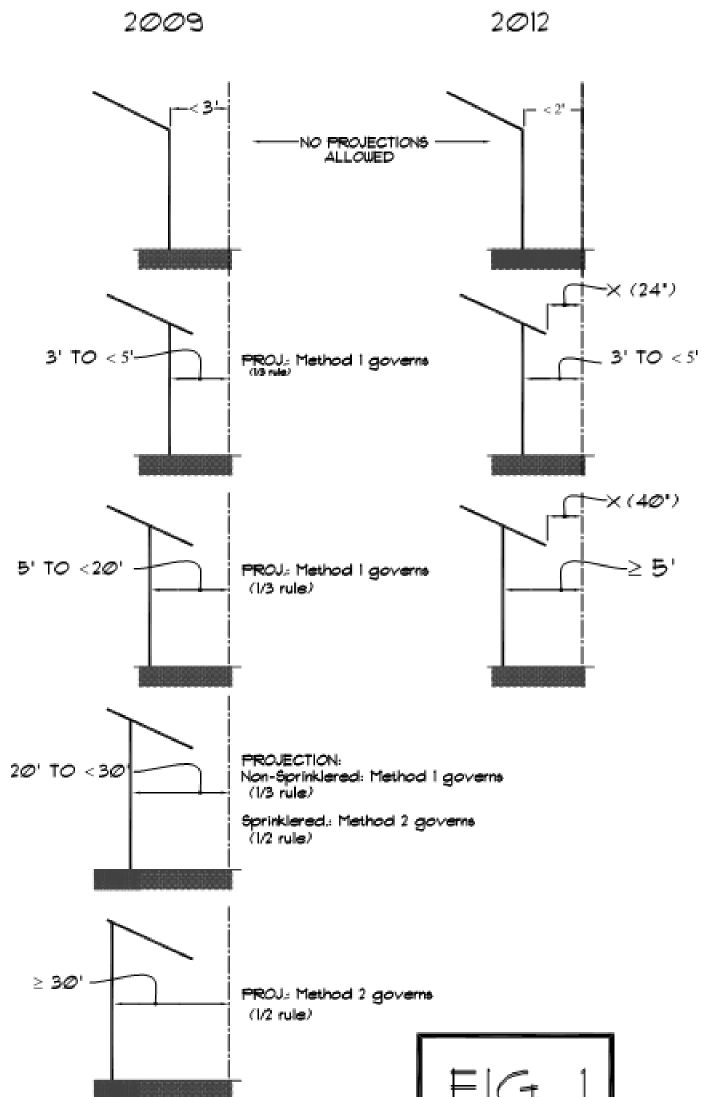
Exception: Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this section.

Reason: The current code language which was changed as the result of approval of FS12-09/10 in Baltimore, has simplified the projection requirements a great deal. However, there is a flaw in Table 705.2.

In Fig.1, I am trying to compare 2009 requirements with 2012. In 2009 code, the projection was a function of, 1) distance of exterior face of the wall to the lot line where protected openings or a combination of protected and unprotected openings are required, 2) automatic sprinkler systems. The 2012 code simplifies Section 705.2 by eliminating both of those requirements. In 2012, the only function is FSD. Once FSD is determined, then the projection is measured from FSD. This is shown in Fig. 1.

In Table 705.2, the third row is where the flaw appears. For example, if the FSD is 4 feet, then the minimum distance for projection to FSD is 24 inches. That means the maximum allowable projection can be 24 inches (48" – 24"). On the other hand, if FSD is 5 feet, then the minimum distance from the line used to determine FSD is 40". That means that projection can only be 20" (60"- 40"). Less projection is allowed for 5' FSD than 4' FSD!! This is clearly shown in Fig. 2. Also Fig. 3 shows this flaw and at the same time 2009 and 2012 have been compared graphically.

The new proposal still maintains the simplicity that is introduced in 2012 along with incorporating 2009 numbers.



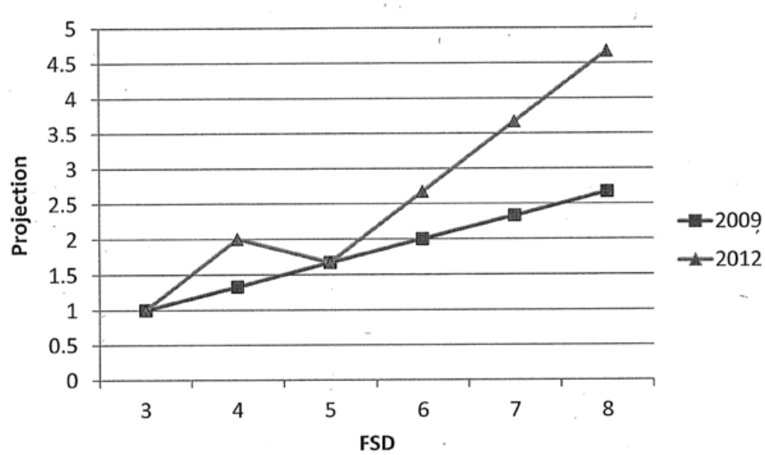
2009
2012
< 3'
< 2'
NO PROJECTIONS ALLOWED
X (24")
3' TO < 5'
PROJ.: Method 1 governs
(1/3 rule)
3' TO < 5'
X (40")
5' TO < 20'
PROJ.: Method 1 governs
(1/3 rule)
≥ 5'
20' TO < 30'
PROJECTION:
Non-Sprinklered: Method 1 governs
(1/3 rule)
Sprinklered.: Method 2 governs
(1/2 rule)
≥ 30'
PROJ.: Method 2 governs
(1/2 rule)

FIG. 1

Fig. 2

<table>
<tr><th>FSD</th><th colspan="4">2009</th><th colspan="2">2012</th></tr>
<tr><td>< 2'</td><td colspan="4">NP</td><td colspan="2">NP</td></tr>
<tr><td rowspan="2">2' - < 3'</td><td colspan="4" rowspan="2">NP</td><td>Proj.</td><td>From Edge of Proj. to PL (x)</td></tr>
<tr><td>0.9'</td><td>2'</td></tr>
<tr><td rowspan="2">3'</td><td colspan="2">Proj.</td><td colspan="2">X</td><td rowspan="2">1'</td><td rowspan="2">2'</td></tr>
<tr><td colspan="2">1'</td><td colspan="2">2'</td></tr>
<tr><td>4'</td><td colspan="2">1.33</td><td colspan="2">2.67</td><td>2'</td><td>2'</td></tr>
<tr><td>5'</td><td colspan="2">1.67</td><td colspan="2">3.33 (40")</td><td>1.67</td><td>3.33 (40")</td></tr>
<tr><td>6'</td><td colspan="2">2</td><td colspan="2">4</td><td>2.67</td><td>3.33 (40")</td></tr>
<tr><td>7'</td><td colspan="2">2.33</td><td colspan="2">4.67</td><td>3.67</td><td>3.33 (40")</td></tr>
<tr><td>8'</td><td colspan="2">2.67</td><td colspan="2">5.33</td><td>4.67</td><td>3.33 (40")</td></tr>
<tr><td>…</td><td colspan="2">…</td><td colspan="2">…</td><td>…</td><td>…</td></tr>
<tr><td rowspan="3">20'</td><td colspan="2">Sprk.</td><td colspan="2">Non-Sprk.</td><td rowspan="3">16.67</td><td rowspan="3">3.33 (40")</td></tr>
<tr><td>Proj</td><td>X</td><td>Proj</td><td>X</td></tr>
<tr><td>10</td><td>10</td><td>6.67</td><td>13.3</td></tr>
</table>

Fig. 3



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

Analysis: FS15, FS16, FS17 and FS18 provide different options for Table 705.2. The committee needs to make its intent clear with respect to these provisions.

T705.2-FS-MAIEL

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee agreed that this proposal did not provide clarity to the projections requirements. There was no substantiation provided to increase the distance where no projections were allowed. Further, with construction tolerances basing requirements on an exact measurement of 3 feet seems unrealistic. Lastly, clarification is needed in the "greater than 3 feet" row to properly apply and enforce the minimum distance required from the lot line.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Homer Maiel, PE, CBO, Town of Atherton, representing ICC-Tri Chapter (Peninsula, East Bay, Monterey Bay Chapter), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Table 705.2
MINIMUM DISTANCE OF PROTECTION

FIRE SEPARATION DISTANCE (FSD)	MINIMUM DISTANCE FROM LINE USED TO DETERMINE FSD
0 feet to ~~less than~~ 2 ~~3~~ feet	Projections not permitted
More than 2 feet to ~~less than 5~~ 3 feet	24 inches
~~5 feet or~~ greater than 3 feet to less than 30 feet	24" plus 8" for every foot ~~thereafter~~ of FSD beyond 3' or fraction thereof.
30 feet or greater	20 feet

Exception: Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this section.

Commenter's Reason: In Dallas the committee and original proponent of the code change from 2009 to 2012, agreed that there was an anomaly to this section of the code. The committees concern for projections over 3 feet has been addressed in this modification Also the last row was added to address any distance at FSD of 30 feet or greater. The 30-foot criteria is consistent with Table 705.8 where no wall protection is needed.

Analysis: Public Comments to FS15, FS16, and FS17 provide different options for Table 705.2. The membership needs to make its intent clear with respect to these provisions.

FS16-12
Final Action: AS AM AMPC____ D

FS17-12

705.2, Table 705.2

Proposed Change as Submitted

Proponent: Ali M. Fattah, P.E., City of San Diego, representing the San Diego Area Chapter of ICC (afattah@sandiego.gov)

Revise as follows:

705.1 General. *Exterior walls* shall comply with this section.

705.2 Projections. Cornices, eave overhangs, exterior balconies and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways and ramps shall also comply with Sections 1019 and 1026, respectively. Projections shall not ~~extend any closer to the line used to determine~~ encroach into the fire separation distance more than the distance determined from ~~than shown~~ ~~in~~ Table 705.2.

TABLE 705.2
MINIMUM DISTANCE OF PROJECTION

FIRE SEPARATION DISTANCE (FSD)	**MINIMUM DISTANCE TO PROJECTION FROM LINE USED TO DETERMINE (FSD)**	
	Sprinkler Protected (S)	Non-sprinkler Protected (NS)
0 feet to less than 2 feet	Projections not permitted	Projections not permitted
~~2 feet to less than 5~~	~~24 inches~~	
~~5 feet or greater~~	~~40 inches~~	
2 feet to less than 20	2/3 of the fire separation distance	2/3 of the fire separation distance
20 feet to less than 30 ft	½ of the fire separation distance	2/3 of the fire separation distance
30 feet or greater	10 ft	15 ft

For SI: 1 foot = 304.8 mm; 1 inch = 25.4 mm.

Reason: This proposed change to modify Table 705.2 is necessary due to consequences of approval and adoption of FS 12-09/10 into the table. The 2012 IBC permits a large outdoor seating area of restaurant that includes seating or other useable space below to be located a distance of up to 40inch from a lot line. This same condition under a legacy code would have resulted in distances such as 13.33 ft or 6.67 ft depending on the type of construction. While the 2006 IBC implied that a projection projects beyond the building areas, the 2009 IBC and subsequent edition changed the description to be beyond the exterior wall. As a consequence a post and beam supported attached deck or cantilevered balconies can be considered to be projections and often include useable space beneath them.

As an example the 2012 IBC allows a 5 stories plus mezzanine R-2 occupancy constructed of Type III A Sprinkler protected construction can be located 15 ft from a lot line and can include a 11 ft 8 inch deep balcony on the side of the building stacked on every level and 75% of the exterior wall can include unprotected openings. The projection should be limited to 5 ft to allow 10 ft (2/3 of the fire separation distance to be unobstructed).

- Sprinkler protection of the useable space beneath the projection does not adequately protect the hazard; if it did the code would have permitted enclosed sprinkler protected space.
- What would occur if the resident chooses to glaze the balcony by adding windows on top of the guard, would that constitute an opening and if so will that make the condition worse to cause non-compliance? Does not including a window above the guard make the condition better?

The limitation on the length of projections encroaching into the fire separation distance is to limit combustibles in the building construction and furnishings that can expose adjacent buildings. Table 705.2 and Section 705.2 do not differentiate between combustible and non-combustible construction. This code change attempts to make that differentiation and includes the requirements in 2009 IBC Section 705.2 in tabular form.

- Exterior exit balconies are required in Section 1019.4 to be 10 ft away from unprotected openings in adjacent buildings or from lot lines to allow occupants to safely egress through exterior egress balconies.

- It makes no sense to protect the exterior walls of a building per TABLE 602 and to allow elements that bring the fire loading closer to a neighboring building.
- Exterior walls are protected to prevent their collapse and thereby preventing larger openings in collapsed walls that would expose neighboring buildings.
- Section 1406.3 does not adequately address the issues of balconies since it is mainly concerned with flammability of the construction and impacts the exterior of the building.

Technical justification is not available through the activities of the various code drafting and code development committees to substantiate the reason for the limitations and to facilitate engineering based justification. It seems reasonable to expect that 2/3 or 1/2 of the fire separation remain clear to prevent the spread of fire to neighboring structures and buildings.

Determination of the permissible length for projections based on fire separation distance has been problematic since the development of the IBC working draft in 1997. At that time the drafting committee adopted the UBC's permissible projection measurement methodology and triggered it based the IBC's opening protection table (opening limitation and size control table) initially for combustible projections and then in the final draft projections in general. The problem arises due to the fact that IBC Table 705.8 limits the area of exterior wall openings as a percentage of the exterior wall area based on fire separation distance, whether or not the opening is fire resistance rated and whether the building is protected throughout with an automatic fire sprinkler system.

- The legacy code from which Section 705.2 was developed offered fewer options and triggered opening protection at 3 ft, 10 ft or 20ft fire separation distance based on occupancy and type of construction. Openings were limited to a maximum of 50% of the area of the wall per story.
- Projection limitations were simpler to determine under the legacy code since only a limited number of distances based on the occupancy and type of construction of the building. Furthermore, most legacy code users considered the edge of the project to create an exterior wall opening since the area below the projection created building area.

Several code change proposals in the last three code cycles sought to remedy this situation and were submitted by groups that had used the same legacy code.

- FS 70-03/04 was submitted but not approved to account to limit projections in locations due to requirements in other than Section 704.
- FS 16-06/07 Section 704.2 was proposed without limitations to the separation to a lot line or imaginary line for non-combustible projections. Section 704.2.3 proposed to require that combustible projections be protected for 1 hour when located closer than 6 ft from a lot line or imaginary line. This proposed code change was not approved.
- FS 14-07/08 and FS 15-07/08 were submitted and the latter code change was published in the 2009 IBC. The 2009 IBC includes two triggers that differentiate between whether opening protection is required or not by 2009 IBC Table 705.8.
- FS 11-09/10 and FS 12-09/10 sought to simplify Section 705.2 of the 2009 IBC by displaying the projection limitations in tabular form. The latter code change was approved and published in the 2012 IBC after approval of public comment. The first code change sought limit the projections based on occupancy, type construction and fire separation distance.

As an example of the differences to what a legacy code the Uniform Building Code would have required I have attached a summary table showing the projection limitations.

TABLE 705.2
MINIMUM DISTANCE TO PROJECTION
Based on 1997 UBC

FIRE SEPARATION DISTANCE X (feet)	TYPE OF CONSTRUCTION	MINIMUM DISTANCE TO PROJECTION FROM LINE USED TO DETERMINE (FSD)				
		OCCUPANCY GROUP A-1, A-2, A2.1, A-3, A-4	OCCUPANCY GROUP B, F-1, M, S-1, S-3	OCCUPANCY GROUP E-1, E-2, E-3, F-2, S-2, H-2, H-3, H-4, H-6, H-7 A, B, E, F-2, I, R, S-2, U	OCCUPANCY GROUP I1.1, I1.2, I-2, I-3, R-1	OCCUPANCY GROUP R-3
X ≤ 3 ft	All	NP	NP	NP	NP	1 ft
3 < X ≤ 5	I A, IB	NP	NP	NP (F-2, S-2 2/3)	NP (R-1 2/3)	2/3
	II A, IIB	NP	NP	NP	NP	2/3

FIRE SEPARATION DISTANCE X (feet)	TYPE OF CONSTRUCTION	MINIMUM DISTANCE TO PROJECTION FROM LINE USED TO DETERMINE (FSD)				
		OCCUPANCY GROUP A-1, A-2, A2.1, A-3, A-4	OCCUPANCY GROUP B, F-1, M, S-1, S-3	OCCUPANCY GROUP E-1, E-2, E-3, F-2, S-2, H-2, H-3, H-4, H-6, H-7 A, B, E, F-2, I, R, S-2, U	OCCUPANCY GROUP I1.1, I1.2, I-2, I-3, R-1	OCCUPANCY GROUP R-3
	III, IV	NP	NP	NP	NP (R-1 2/3)	2/3
	V	NP	NP	NP	NP	2/3
5 < X ≤ 10	I A, IB	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)
	II A, IIB	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)
	III, IV	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)
	V	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)
10 < X ≤ 20	I A, IB	2/3 (A-2, A2.1 A-3 A-4 6.7ft) (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)
	II A, IIB	2/3 (A-2, A2.1 A-3 A-4 13.33 ft) (H-5 NP)	6.7 ft (H-5 NP)	2/3 (E 13.33 ft (H-5 NP)	2/3 (I-2 13.33 ft) (H-5 NP)	2/3 (H-5 NP) (R-1 3.33 ft, R-3 2 ft)
	III, IV	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP)
	V	2/3 (A-4 6.7ft) (H-5 NP)	6.7 ft (H-5 NP)	2/3 (H-5 NP)	2/3 (H-5 NP) (I-2 13.33 ft)	2/3 (H-5 NP) (R-1 3.33 ft, R-3 2 ft)
20 < X ≤ 60	I A, IB	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)
	II A, IIB	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)
	III, IV	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)
	V	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP) (R-1 3.33 ft, R-3 2 ft)
20 < X ≤ 60	I A, IB	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)
	II A, IIB	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)
	III, IV	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)

FIRE SEPARATION DISTANCE X (feet)	TYPE OF CONSTRUCTION	MINIMUM DISTANCE TO PROJECTION FROM LINE USED TO DETERMINE (FSD)				
		OCCUPANCY GROUP A-1, A-2, A2.1, A-3, A-4	**OCCUPANCY GROUP B, F-1, M, S-1, S-3**	**OCCUPANCY GROUP E-1, E-2, E-3, F-2, S-2, H-2, H-3, H-4, H-6, H-7 A, B, E, F-2, I, R, S-2, U**	**OCCUPANCY GROUP I1.1, I1.2, I-2, I-3, R-1**	**OCCUPANCY GROUP R-3**
	V	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP)	13.33 ft (H-5 NP) (R-1 3.33 ft, R-3 2 ft)
X ≥ 60	I A, IB	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)
	II A, IIB	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)
	III, IV	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)
	V	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)	13.33 ft (H-5 2/3 > 60 ft)

Reason: This proposed This code change to Table 705.2 is necessary since the table allows a 4 story Type VB building required to have protected exterior walls and exterior wall openings to include balconies used in restaurants or as a projection from dwellings to be located 40 inches from a lot line and thereby introducing a fire load that exposes a neighboring building. Exterior exit balconies are required in Section 1019.4 to be 10 ft away from unprotected openings in adjacent buildings or from lot lines to allow occupants to safely egress through exterior egress balconies. It makes no sense to protect the exterior walls of a building per TABLE 602 and to allow elements that bring the fire loading closer to a neighboring building. Section 1406.3 does not adequately address the issues of balconies since it is mainly concerned with flammability of the construction as to impacts the exterior of the building. The code change that resulted in the table was well intentioned and resulted in a simplified table and sought to establish a single line beyond which projection could not be closer to a lot line. However the IBC's fire separation concept involves triggering requirements based on the actual location of the building and establishing a uniform line may be less restrictive for larger buildings constructed of higher types of construction and housing higher hazard occupancies.

Code changes FS11–09/10 and FS12-09/10 http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/FAA/IBC-FS_%20FS2-FS100.pdf , the latter of which was approved after public comment and adopted into the 2012 IBC, sought to address an issue that arose from combining projection requirements driven through opening protection that was developed under a legacy code with the revised opening protection philosophy of the IBC that limits the size of openings within fire separation distance ranges. Legacy codes required opening protection for openings located in walls located at a fire separation distance less than a predetermined distance. As a consequence the length of projections was limited when based on the distance where opening protection was first required. Projections, especially projections providing shelter for useable spaces such as patios used typically in residential occupancies and drinking and dining establishments as well as offices and educational occupancies. I

BC Section 1019.4 requires that exterior egress balconies be located not less than 10 ft from a lot line or a building to protect occupants in the means of egress from unprotected exposures, and this separation is required regardless of whether sprinkler protection is provided. It therefore makes no sense to permit a balcony located on a hi-rise building with a fire separation distance of 20 ft to be located up to 44 inches from a lot line even if sprinkler protection is provided for.

The useable balcony whether cantilevered or supported extends beyond the exterior wall and allows for combustible furnishings to be located in close proximity to a neighboring building. The IBC intends for fire separation to occur through distance, 30 ft or more to a lot line or imaginary line, or through exterior wall and opening protection. By protecting exterior walls and limiting the amount of exterior wall openings the IBC seeks to contain fire within the area of origin and to limit exposure to neighboring buildings due to the premature collapse of the exterior wall resulting in larger exterior wall openings or due to large unprotected openings that allow fire to spread to adjacent buildings and areas. Projections were proportioned to allow 2/3 of the space between the building and the lot line/imaginary line to be open and therefore allow for heat, flame and products of combustion to disperse. The 2009 IBC gave credit for sprinklers to allow for a level of protection and allowed a reduction to ½ the distance when the building is protected throughout with a fire sprinkler system.

FIRE SEPARATION DISTANCE X (feet)	MINIMUM DISTANCE TO PROJECTION FROM LINE USED TO DETERMINE (FSD)	
	Sprinkler Protected (S)	Non-sprinkler Protected (NS)
X ≤ 2 ft	NP	NP
X ≤ 3 ft	1 ft	NP
2 < X < 5	1.67 ft	1.67 ft
5 ≤ X < 10	6.67 ft	6.67 ft
10 ≤ X < 15	10 ft	10 ft
15 ≤ X < 20	13.3 ft	13.3 ft
20 ≤ X < 30	15 ft	20 ft
30 feet or greater	15 ft	20 ft

Reason: This code change is necessary to allow storage rooms and closets located in any occupancy to not be considered an S occupancy. The revisions to the incidental uses Table 509 over the last two code cycles removed small storage rooms as a consequence they need to be classified as Group S and considered accessory use or a separated or non-separated occupancy.

Closets and storage rooms located in occupancies located in multistory buildings permitted otherwise to be of non-rated construction will be limited to buildings constructed of Type VA, IIIA or IIA construction or better. For example storage rooms and closets located above the second floor in a Group R-1 or Group R-2 occupancy four stories in height will require one-hour construction throughout or will not be permitted above the second story. Another example is a janitor's closet in a common area or a janitors closet located within a multi-tenant building. Proposed exception 4 seeks to address this issue.

A small electrical/mechanical room located on the 5th floor of a type IIB building would not be permitted as accessory uses since Section 508.2.3 requires that the allowable height be established without increase for the accessory use. The electrical code and mechanical code and incidental use requirements will require the appropriate separation from the remainder of the building where appropriate. Proposed exception 5 addresses this issue.

Cost Impact: None. The code change proposal will not increase the cost of construction.

Analysis: FS15, FS16, FS17 and FS18 provide different options for Table 705.2. The committee needs to make its intent clear with respect to these provisions.

T705.2 #1-FS-FATTAH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that this proposal was more restrictive than current language with no justification. Further, the sprinkler design requirements (NFPA 13, NFPA 13R…etc.) need to be clarified.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., representing City of San Diego Development Services Department, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

202
DEFINITIONS

BALCONY, EXTERIOR. An exterior floor projecting from, and supported by, the exterior wall of a building or structure without other additional supports.

705.1 General. *Exterior walls* shall comply with this section.

705.2 Projections. Cornices, eave overhangs, exterior balconies and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways and ramps shall also comply with Sections 1019 and 1026, respectively. Projections shall not ~~extend any closer to the line used to determine~~ encroach into the fire separation distance more than the distance determined from ~~than shown~~ ~~in~~ Table 705.2.

TABLE 705.2
MINIMUM DISTANCE OF PROJECTION

FIRE SEPARATION DISTANCE (FSD)	MINIMUM DISTANCE FROM LINE USED TO DETERMINE (FSD)
0 feet to less than 2 feet	Projections not permitted
2 feet to less than 5	24 inches
5 feet ~~or greater~~ to less than 10	40 inches
10 feet or greater	76 inches

Commenter's Reason: The original code change proposal was correctly disapproved by the Fire Safety Committee because it demonstrated the flaws in Section 705.2 of the 2009 IBC. The original proposal merely sought to return the code to the way it was prior to approval into the 2012 IBC with the more user friendly tabular format of the 2012 IBC with set distances.

After detailed analysis of the issues raised with the code change it is clear that the projection limit in sprinkler protected buildings should be larger and not smaller. Additionally, it is clear that a constantly changing distance as proposed in the original code change added complexity. As a consequence, the sprinkler limit has been deleted from the proposal and the set distances in the 2012 IBC have been retained. The proposal now adds a row for distances 10 ft or greater for parity with what existed in legacy codes and code editions prior to the 2012 IBC.

Figure A shows the results of applying the 2012 IBC to a 5 story Type IIIA fully sprinklered residential building with cantilevered balconies. Figure B shows the results of applying the 2012 IBC to a multi level restaurant with exterior dining. Figure C shows the desired outcome of the code change.

Exterior balcony is a term that is no longer defined since its deletion from Chapter 16 of the 2006 IBC. We are proposing to insert the definition as a general definition in chapter 2 to make clear the intent of 705.2 that as projection is basically a cantilever. Without adding this definition one can argue that an attached deck can be a projection or that a supported balcony can be a projection. While not intending to have the method of support for the projection to be a determining factor, it is clear that "cornices" and "eave overhangs" cantilever from the face of the building and do not create useable space beneath them. It should therefore follow that "balconies and similar projections" should also be cantilevered and offer limited opportunity for useable space and combustible beneath them. Supported construction allows floors and roofs of attached/supported balconies to project large distances from the face of a building and thereby creates building area and useable space.

An additional row has been added to the table to allow for a differentiation between locations at or greater than 10 and less than 10 feet in similar fashion to prior editions of the IBC. The legacy Uniform Building Code limited projections to 1/3 of 3 ft, 5ft, 10 ft or 20 ft fire separation distances based on exterior wall opening protection limited by occupancy and type of construction. 76 inches is 1/3 of 19 ft.

Included in the remainder of the justification is a tabulation comparing the proposed code change based on a tabulation of the projection distances based on the 2009 IBC as was originally proposed/submitted and the 2012 IBC as it is published. At a fire separation distance of 20 ft or more the sprinkler impact of the 2009 IBC begins.

Analysis: Public Comments to FS15, FS16, and FS17 provide different options for Table 705.2. The membership needs to make its intent clear with respect to these provisions.

Fire Separation distance ft	Proposed In Original Code Change FS17-12				2012 IBC			
	Sprinklered		Not Sprinklered		Sprinklered		Not Sprinklered	
	Projection Length (ft)	Distance to line (ft)	Projection Length (ft)	Distance to line (ft)	Projection Length (ft)	Distance to line (ft)	Projection Length (ft)	Distance to line (ft)
1	Not Permitted	1	Not Permitted	1	Not Permitted	1	Not Permitted	1
2	Not Permitted	2	Not Permitted	2	Not Permitted	2	Not Permitted	2
3	1.00	2.00	1.00	2.00	1.00	2.00	1.00	2.00
4	2.67	1.33	2.67	1.33	2.00	2.00	2.00	2.00
5	3.33	1.67	3.33	1.67	1.67	3.33	1.67	3.33
6	4.00	2.00	4.00	2.00	2.67	3.33	2.67	3.33
7	4.67	2.33	4.67	2.33	3.67	3.33	3.67	3.33
8	5.33	2.67	5.33	2.67	4.67	3.33	4.67	3.33
9	6.00	3.00	6.00	3.00	5.67	3.33	5.67	3.33
10	**6.67**	**3.33**	**6.67**	**3.33**	6.67	3.33	6.67	3.33
11	7.33	3.67	7.33	3.67	7.67	3.33	7.67	3.33
12	8.00	4.00	8.00	4.00	8.67	3.33	8.67	3.33
13	8.67	4.33	8.67	4.33	9.67	3.33	9.67	3.33
14	9.33	4.67	9.33	4.67	10.67	3.33	10.67	3.33
15	10.00	5.00	10.00	5.00	11.67	3.33	11.67	3.33
16	10.67	5.33	10.67	5.33	12.67	3.33	12.67	3.33
17	11.33	5.67	11.33	5.67	13.67	3.33	13.67	3.33
18	12.00	6.00	12.00	6.00	14.67	3.33	14.67	3.33
19	12.67	6.33	12.67	6.33	15.67	3.33	15.67	3.33
20	**10.00**	**10.00**	**13.33**	**6.67**	16.67	3.33	16.67	3.33
21	10.50	10.50	14.00	7.00	17.67	3.33	17.67	3.33
22	11.00	11.00	14.67	7.33	18.67	3.33	18.67	3.33
23	11.50	11.50	15.33	7.67	19.67	3.33	19.67	3.33
24	12.00	12.00	16.00	8.00	20.67	3.33	20.67	3.33
25	12.50	12.50	16.67	8.33	21.67	3.33	21.67	3.33
26	13.00	13.00	17.33	8.67	22.67	3.33	22.67	3.33
27	13.50	13.50	18.00	9.00	23.67	3.33	23.67	3.33
28	14.00	14.00	18.67	9.33	24.67	3.33	24.67	3.33

29	14.50	14.50	19.33	9.67	25.67	3.33	25.67	3.33
30	20.00	10.00	20.00	10.00	26.67	3.33	26.67	3.33

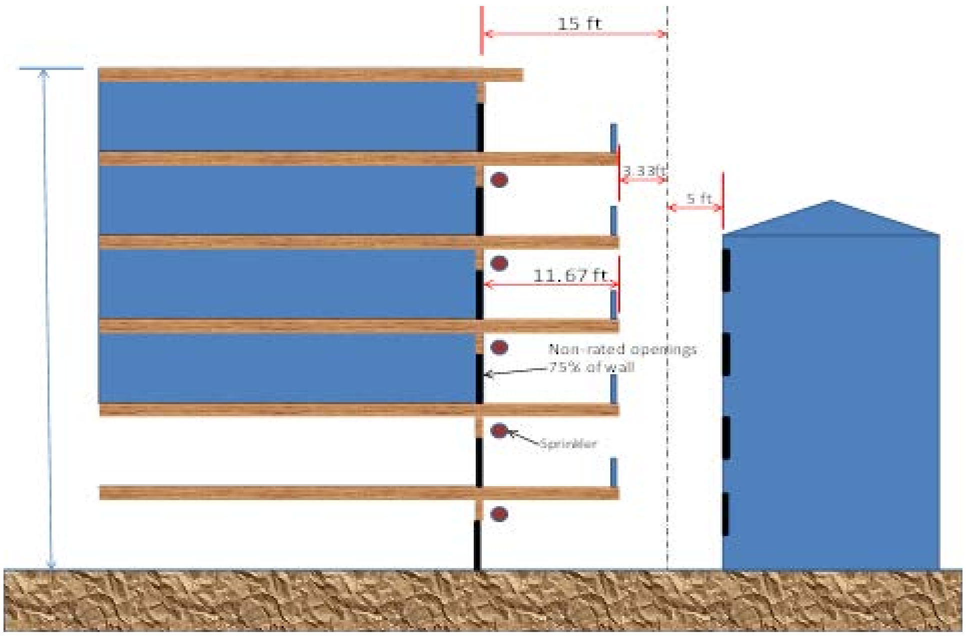


Figure A – Large cantilevered balconies permitted by

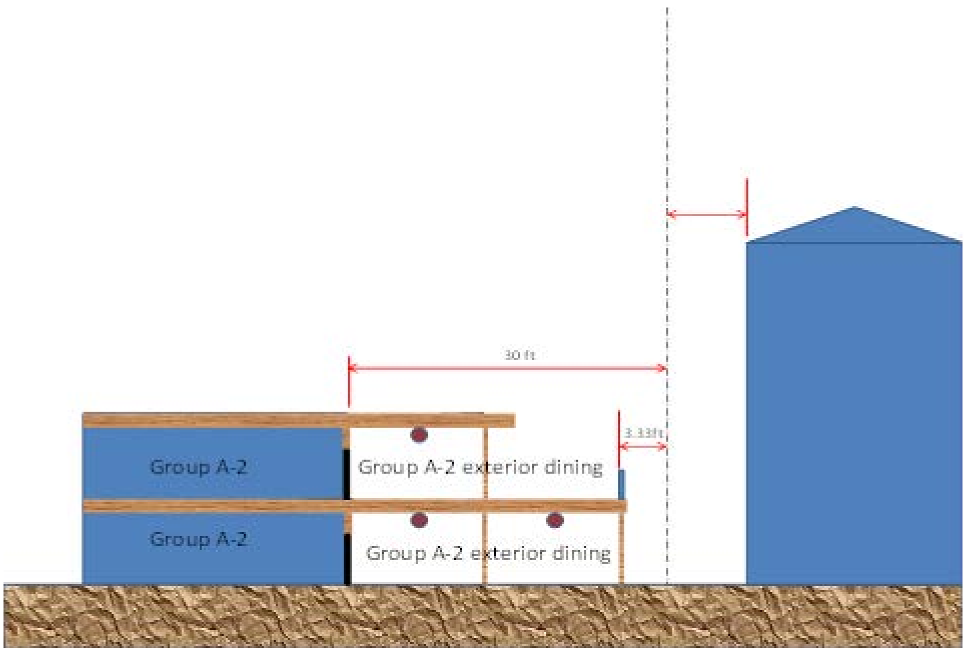


Figure B – Large deck projections permitted by 2012 IBC

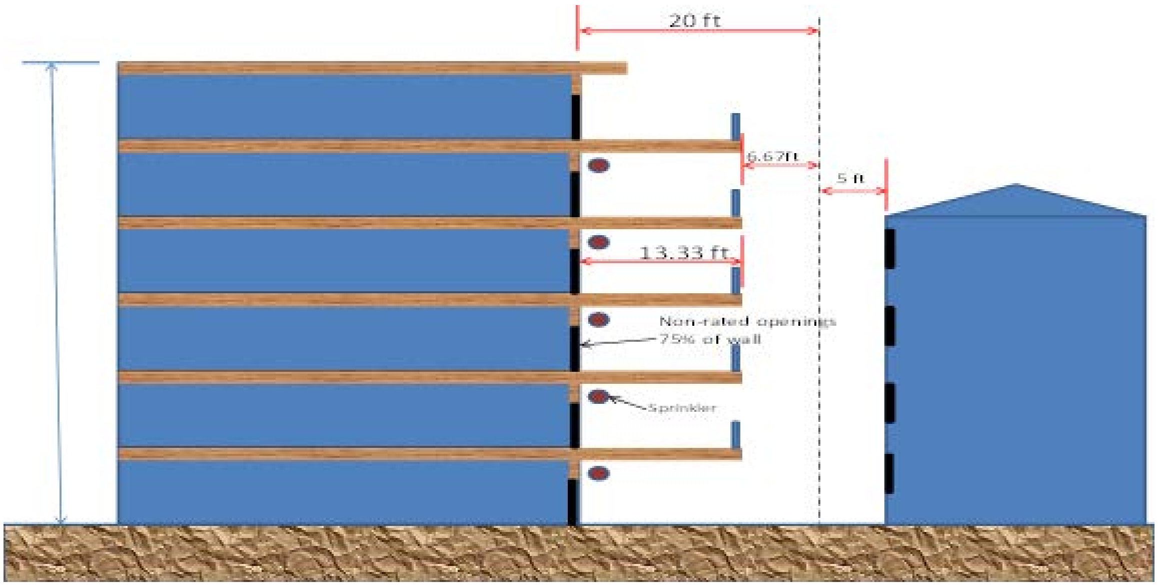


Figure C – Result of proposed public comment

FS17-12
Final Action: AS AM AMPC____ D

FS20-12

705.3, Table 705.8

Proposed Change as Submitted

Proponent: Marshall A. Klein, P.E., Marshall A. Klein & Associates, Inc., representing National Multi-Housing Council

Revise as follows:

705.3 Buildings on the same lot. For the purposes of determining the required wall and opening protection, projections and roof-covering requirements, buildings on the same lot shall be assumed to have an imaginary line between them. Space where a new building is to be erected on the same lot as an existing building, the location of the assumed imaginary line with relation to the existing building shall be such that the *exterior wall* and opening protection of the existing building meet the criteria as set forth in Sections 705.5 and 705.8.

Exceptions:

1. Two or more buildings on the same lot shall either be regulated as separate buildings or shall be considered as portions of one building if the aggregate area of such buildings is within the limits specified in Chapter 5 for a single building. Where the buildings contain different occupancy groups or are of different types of construction, the area shall be that allowed for the most restrictive occupancy or construction.
2. Where an S-2 parking garage is erected on the same lot as a Group R-2 building, and there is no fire separation distance between these buildings, then the adjoining exterior walls between the buildings are permitted to have occupant use openings in accordance with Section 706.8. However, opening protectives in such openings shall only be required in the exterior wall of the S-2 parking garage, not in the exterior wall openings in the R-2 building, and these opening protectives in the exterior wall of the S-2 parking garage shall be a minimum of 1½ hours fire protection rating.

TABLE 705.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON
FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]
0 to less than 3[b,c,k]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted[k]
	Unprotected, Sprinklered (UP, S)[l]	Not Permitted[k]
	Protected (P)	Not Permitted[k]

(Portions of table not shown remain unchanged)

(Footnotes a through j remain unchanged)

k. For openings between S-2 parking garage and Group R-2 building, see Section 705.3 Exception #2.

Reason: This code proposal attempts to resolve a practical design issue that is extremely common in the design of apartment projects in major urban areas.

The great majority of multi-family projects are being built with parking garages beside the apartment buildings. Access from the parking garage into the apartment unit's floor is provided at each garage floor onto the apartment's floor for convenience as well as for safety for the apartment dwellers. Many designs have one or more of the exterior walls of the parking garage and the apartment building at a 0' fire separation distance. The literal text of the first row of Table 705.8 would prohibit any openings in these exterior walls between the parking garage and the apartment building. However, if these exterior walls were replaced with a fire wall then openings are permitted under Table 705.8 Footnote "c". However, since the parking garage is usually constructed first, and then the apartment building is built next to it, the design and application of a fire wall present major design problems.

The parking garages are usually a minimum of Type I or Type II construction type, whereas the apartment buildings are usually Type III or Type V construction type. The design and tying together two buildings of two different construction types on the same lot is more complicated structurally than designing both buildings with their own exterior walls.

From a life safety/fire protection standpoint, the sprinklered apartment buildings (R-2 use) have one of the best fire safety records of all the occupancies types. The fire history for parking garages shows that most fires are contained to a single vehicle fire.

Since the parking garage and the apartment building are on the same lot there should be no logical reason why opening protectives can not be installed in the exterior walls between these two buildings the same as permitted for openings in a fire wall between two buildings. The only technical reason is that there is no fire door manufacturer that has details on how to install a listed fire door assembly in such walls that would stay in place if one of the exterior walls collapsed. To resolve this dilemma in a reasonable and practical manner, since the apartment building is required to be sprinklered under Section 903.2.8), the fire door assembly would be placed in the exterior wall of the S-2 Parking Garage. If by some chance the R-2 sprinklered building burned to the ground, the openings into the parking garage would still be protected. If by chance the S-2 parking garage burned down to the ground, the sprinklers near the openings in the exterior wall of the R-2 building would provide adequate protection. As mentioned above, based on the past fire history of sprinklered R-2 occupancies and S-2 parking garages the likelihood of either building type burning down to the ground is not very probable.

Cost Impact: Cost savings with no decrease in fire protection or life safety

705.3-FS-KLEIN

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that the differences between the protection afforded by fire walls and exterior walls and their openings are significant and should be supported by substantiating data. Further, the change seems to assume a construction type and should really require Type I or Type IIA for the parking garage.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Marshall A. Klein, P.E., Marshall A. Klein & Associates, Inc., representing National Multi-Housing Council (NMHC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

705.3 Buildings on the same lot. For the purposes of determining the required wall and opening protection, projections and roof-covering requirements, buildings on the same lot shall be assumed to have an imaginary line between them. Space where a new building is to be erected on the same lot as an existing building, the location of the assumed imaginary line with relation to the existing building shall be such that the *exterior wall* and opening protection of the existing building meet the criteria as set forth in Sections 705.5 and 705.8.

Exceptions:

1. Two or more buildings on the same lot shall either be regulated as separate buildings or shall be considered as portions of one building if the aggregate area of such buildings is within the limits specified in Chapter 5 for a single building. Where the buildings contain different occupancy groups or are of different types of construction, the area shall be that allowed for the most restrictive occupancy or construction.
2. Where an S-2 parking garage of Construction Type I ot Type IIA is erected on the same lot as a Group R-2 building, and there is no fire separation distance between these buildings, then the adjoining exterior walls between the buildings are permitted to have occupant use openings in accordance with Section 706.8. However, opening protectives in such openings shall only be required in the exterior wall of the S-2 parking garage, not in the exterior wall openings in the R-2 building, and these opening protectives in the exterior wall of the S-2 parking garage shall be a minimum of 1½ hours fire protection rating.

(Portions of code change not shown remain unchanged.)

Commenter's Reason: To resolve any concerns noted in the Committee's reason for "disapproval", there is considerable supporting data for this Public Comment in the following national publications:

1. 2006 NFPA Fire Data Report, "Structure and Vehicle Fires in General Vehicle Parking Garages"
2. 2008 Parking Consultants Council Fire Safety Committee Report, "Parking Structure Fire Facts

These fire reports provide the following justifications for support of this public comment:

1. There is an average of only 660 fire/year in all types of parking structures in the US. This represents only 0.006% of all the annual fires/year in the US in all occupancy classifications. Therefore, fires in parking garages occur very infrequently.
2. Out of this low average number of fires/year (660) in parking structures, only 160 fires/year are in parking structures of Type I or Type IIA construction type.
3. No structural damage occurred in 98.7% of vehicle fires in parking structures.

As stated by many of the Committee members at the Dallas Hearing and noted in the Committee reason, if the code proposal clearly stated that it was limited to parking garages of Type I or Type IIA construction, it would have been acceptable.

Therefore, this Public Comment has now clearly limited the application to only Construction Type I or IIA parking garages, and the fire data shows a very low number of fires in these parking garages as well as an extremely low probability of a fire leaving the parking garage. The protection provide by this Exception #2 is more than adequate meet the intent of the code to provide life safety/fire protection between a parking garage and a sprinklered Group R-2 building built on the same lot.

FS20-12

Final Action: AS AM AMPC____ D

FS22-12
705.6, 706.2

Proposed Change as Submitted

Proponent: Jonathan Siu, representing City of Seattle Department of Planning & Development (jon.siu@seattle.gov)

Revise as follows:

705.6 Protection required for structural stability. ~~The wall~~ Exterior walls shall extend to the height required by Section 705.11 ~~and shall have sufficient structural stability such that it will remain in place for the duration of time indicated by the required *fire-resistance rating*~~. Where exterior walls have a minimum *fire separation distance* of not less than 30 feet (9144 mm), interior structural elements which brace the exterior wall but which are not located within the plane of the exterior wall shall have the minimum *fire-resistance rating* required in Table 601 for that structural element. Structural elements which brace the exterior wall but are located outside of the exterior wall or within the plane of the exterior wall shall have the minimum *fire-resistance rating* required in Tables 601 and 602 for the exterior wall.

706.2 Protection required for structural stability. ~~Fire walls shall have sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall for the duration of time indicated by the required *fire-resistance rating*~~ Structural elements which brace the fire wall but are located outside of the fire wall or within the plane of the fire wall shall have the minimum *fire resistance rating* required for the fire wall, or the wall shall be constructed as double fire walls in accordance with NFPA 221.

Reason: The purpose of this code change proposal is to delete the requirements that an exterior walls or fire walls must maintain their stability under real fire conditions for a real-time 1, 2, 3, or 4 hours. This is an inappropriate performance standard for the following reasons:

1. This requirement is unenforceable. It is a common misconception that a given fire-resistance rating means the rated assembly will stand for the stated period of time (in real time) under real fire conditions. However, while the test that establishes the rating provides a common standard (or level playing field) for tested assemblies, it does not necessarily represent the behavior of a real wall under real fire conditions. Stated another way, the test is only meant to measure performance in the given test environment, not to reflect real-world conditions. Because the test standard does not tell you how long in real time the assembly will stand under real fire conditions, there is no method for a design professional (or code official) to determine ahead of time how these assemblies should be constructed given the code requirement—nobody will know until a real fire occurs in the building and someone times how long the wall stands (if it collapses) or if it withstands the fire for the required (real-time) time period.
2. These elements (exterior and fire walls) are being held to a much higher standard than any other element, with no justification. That is, no other element is required to remain in place for the required real time under real-world fire conditions, whether they be horizontal assemblies, or fire barriers protecting an interior exit stair, for example. There is no reason why exterior walls and fire walls should be treated differently than these other equally important elements.
3. If the intent of the deleted text is to require exterior and fire walls to meet the required fire resistance rating, then the text is redundant.
4. If the intent of the requirement in these sections is to require a specific structural design, Chapter 16 doesn't provide sufficient guidance for structural design of wall anchorage that would withstand collapse of a portion of a building. In addition, Chapter 7 is an inappropriate location for structural design requirements.

It is to be noted that this proposal does not take away fire protection. Part of the reason why fire-resistant rated construction is required is to protect the structure. The apparent intent of the text being proposed to be deleted is that the stability of the element (exterior or fire wall) matches the required fire-resistance rating of the assembly. However, this intent is covered by the last sentence in Section 705.6 and the added text to 706.2—the floors and roof stabilize the wall, and they are protected to the same degree the walls are. This text is being proposed to be added to Section 706.2 in order to replace the requirement for real-time structural stability, and retain the parallel requirement.

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

Analysis: FS21 and FS22 provide different requirements for exterior wall structural stability. The committee needs to make its intent clear with respect to these provisions. FS22 and FS27 provide different requirements for fire wall structural stability. The committee needs to make its intent clear with respect to these provisions.

705.6-FS-SIU

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal did not add anything to the current requirements and was not needed. The committee also felt that the performance criteria currently in the code for fire walls should remain as it provides for the overarching intent related to fire walls. Lastly, the committee felt that Section 704 sufficiently addresses protection of structural members.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Jonathan Siu representing City of Seattle Dept of Planning & Development, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

705.6 Structural stability. ~~The wall~~ Exterior walls shall extend to the height required by Section 705.11 ~~and shall have sufficient structural stability such that it will remain in place for the duration of time indicated by the required *fire-resistance rating*.~~ Where exterior walls have a minimum *fire separation distance* of not less than 30 feet (9144 mm), interior structural elements which brace the exterior wall but which are not located within the plane of the exterior wall shall have the minimum *fire-resistance rating* required in Table 601 for that structural element. Structural elements which brace the exterior wall but are located outside of the exterior wall or within the plane of the exterior wall shall have the minimum *fire-resistance rating* required in Tables 601 and 602 for the exterior wall.

Commenter's Reason: As stated in the reason statement for the original code change proposal, the provision that an exterior wall be required to remain in place for a time period indicated by the required fire resistance rating is unenforceable. As was recognized in testimony from the floor in Dallas on at least one other proposal, a given fire resistance rating does not indicate how long an assembly will last under real fire conditions—the standardized tests are not intended to produce that sort of information. Therefore, under the current code language, there is no method by which the building official can determine what the wall construction is required to be, since neither test standards nor listed assemblies on which to base an approval exist.

The last two sentences in Section 705.6 address the required fire resistance rating for the bracing. If the bracing fails, it is unlikely the exterior wall will remain standing. For exterior walls, stability under fire conditions is generally provided by the floor structure. According to Section 705.6, the protection for the floors is based on the fire resistance ratings required in Tables 601 and 602. Note that floors do not necessarily have the same rating as the exterior wall—and this is acceptable under the current code language. But compliance with the fire resistance ratings in those tables is based on the standardized tests, which do not reflect actual performance under real fire conditions. Therefore, a building official cannot determine at plan review or during inspections whether the exterior wall and its bracing will comply with the current code text—the only method to determine compliance is to light a real fire in the building and watch the results.

However, if the intent is to make sure the exterior wall has the correct fire resistance rating, compliance with Chapter 6 and the additional requirements in the last two sentences in Section 705.6 can be verified by the building official. We would contend that this is the actual practice of building officials—that the fire resistance ratings of the exterior wall and floors are verified as conforming to the tables and Section 705.6, and if they do, that is deemed to satisfy the structural stability requirements in Section 705.6. Deleting the text as shown in this public comment does not change normal practice, and aligns the code with that intent.

Analysis: Public Comments to FS22 and FS27 provide different requirements for fire wall structural stability. The membership needs to make its intent clear with respect to these provisions.

Public Comment 2:

Jonathan Siu representing City of Seattle Dept of Planning & Development, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

706.2 Structural stability. Fire walls shall ~~have sufficient structural stability under fire conditions~~ be designed and constructed to allow collapse of ~~construction~~ the structure on either side without collapse of the wall under fire conditions. ~~for the duration of time indicated by the required *fire-resistance rating*, or shall be~~ Fire walls designed and constructed ~~as double fire walls~~ in accordance with NFPA 221 shall be deemed to comply with this section.

Commenter's Reason: As noted in the reason statement for the original proposal, the current code language requiring a fire wall to stand for a period of time "indicated by the required fire resistance rating" without collapse is unenforceable. As was recognized in testimony from the floor in Dallas on at least one other proposal, a given fire resistance rating does not indicate how long an assembly will last under real fire conditions.

Comments from the committee and the floor on the original proposal indicated a preference to retain the performance language in the code for fire walls. We have responded to these comments by rewriting the performance language to preserve the intent (a fire on one side doesn't cause collapse on the other side), but remove the unenforceable portion relating to how long the wall is required to stand.

It is worth noting we have not carried forward the requirement in the original proposal to provide fire-resistant rated protection for the wall bracing. The current code does not require bracing on the non-fire exposed side of the fire wall to be protected by fire-resistance rated construction. After discussion with other interested parties, we agreed it would not be appropriate to add a requirement for such protection, since the fire wall itself provides the protection from fire exposure.

NFPA 221 actually has two other methods of fire wall construction besides double wall construction—tied and cantilevered. It appears the intent of the requirements for all three methods in NFPA 221 is to result in structural behavior that is consistent with the guidance given in Section 706.2—the wall remains standing if the structure on the fire-exposed side fails. There does not appear to be a reason to limit the code to the use of only one of the three methods. The modified text in this public comment allows the use of NFPA 221 as a deemed-to-comply standard in order to give building officials and designers at least three known methods by which the requirements of this section can be met.

The bottom line with this proposal is the wall still has its required fire-resistance rating, and it is still required to be designed to remain in place if the structure on one side collapses in a fire. We have stated the performance objective, and have provided a pointer to a standard that is deemed to comply with that performance objective.

Analysis: Public Comments to FS22 and FS27 provide different requirements for fire wall structural stability. The membership needs to make its intent clear with respect to these provisions.

Public Comment 3:

Sam Francis, American Wood Council, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

705.6 Structural stability. ~~The wall~~ Exterior walls shall extend to the height required by Section 705.11 ~~and shall have sufficient structural stability such that it will remain in place for the duration of time indicated by the required *fire-resistance rating*. Where exterior walls have a minimum *fire separation distance* of not less than 30 feet (9144 mm),~~ ~~i~~Interior structural elements which brace the exterior wall but which are not located within the plane of the exterior wall shall have the minimum *fire-resistance rating* required in Table 601 for that structural element. Structural elements which brace the exterior wall but are located outside of the exterior wall or within the plane of the exterior wall shall have the minimum *fire-resistance rating* required in Tables 601 and 602 for the exterior wall.

Commenter's Reason: Last cycle, AWC introduced FS17which was intended to make clear the fire resistance rating required for interior wall assemblies as they relate to the exterior wall. The sentence "Where exterior walls have a minimum fire separation distance of not less than 30 feet,…" only makes sense in the context of the previous sentence. Modifying the paragraph as others have suggested seems reasonable and we support than modification. But since the sentence referenced above only makes sense in the context of the text which is proposed for deletion by others, we encourage keeping the requirements for Interior Walls within the context of this section. We also encourage staff to correct the section title which becomes even more confusing with the possible change to the paragraph.

Analysis: Public Comments to FS22 and FS27 provide different requirements for fire wall structural stability. The membership needs to make its intent clear with respect to these provisions.

FS22-12

Final Action: AS AM AMPC____ D

FS24-12
705.8.5

Proposed Change as Submitted

Proponent: Steve Pfeiffer representing City of Seattle, Dept of Planning & Development (steve.pfeiffer@seattle.gov)

Revise as follows:

705.8.5 Vertical separation of openings. Openings in *exterior walls* in adjacent *stories* shall be separated vertically to protect against fire spread on the exterior of the buildings where the openings are within 5 feet (1524 mm) of each other horizontally and the opening in the lower *story* is not a protected opening with a *fire protection rating* of not less than 3/4 hour. Such openings shall be separated vertically at least 3 feet (914 mm) by spandrel girders, *exterior walls* or other similar assemblies that have a *fire-resistance rating* of at least 1 hour, rated for exposure to fire from both sides, or by flame barriers that extend horizontally at least 30 inches (762 mm) beyond the *exterior wall*. Flame barriers shall also have a *fire-resistance rating* of at least 1 hour. The unexposed surface temperature limitations specified in ASTM E 119 or UL 263 shall not apply to the flame barriers or vertical separation unless otherwise required by the provisions of this code.

Exceptions:

1. This section shall not apply to buildings that are three *stories* or less above *grade plane*.
2. This section shall not apply to buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Open parking garages.

Reason: This change is intended to clarify that provisions of Section 705.5, requiring an exterior wall with a fire separation distance of greater than 10 feet to only consider exposure to a fire from the inside, do not apply to Section 705.8.5. Fire separation distance, the critical factor in Section 705.5, to prevent spread of fire from property to property or building to building, plays no role in Section 705.8.5. The hazard, in Section 705.8.5, is of a fire within the building moving from floor to floor via exterior wall openings. It is critical that where a fire-resistive rated spandrel is used in prevention of the spread of fire from floor to floor, the assumed exposure to fire be from both sides of the wall spandrel.

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

705.8.5-FS-PFEIFFER

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that rating the spandrel girders or exterior wall assembly for exposure from both sides was appropriate to deter fire and products of combustion from leaving one floor level to the exterior and entering the floor level above from the exterior.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

705.8.5 Vertical separation of openings. Openings in *exterior walls* in adjacent *stories* shall be separated vertically to protect against fire spread on the exterior of the buildings where the openings are within 5 feet (1524 mm) of each other horizontally and the opening in the lower *story* is not a protected opening with a *fire protection rating* of not less than 3/4 hour. Such openings shall be separated vertically at least 3 feet (914 mm) by spandrel girders, *exterior walls* or other similar assemblies that have a *fire-resistance rating* of at least 1 hour<u>. The wall shall be</u> rated for exposure to fire from both sides <u>for 30 inches on each side of the opening,</u> or by flame barriers that extend horizontally at least 30 inches (762 mm) beyond the *exterior wall*. Flame barriers shall also have a *fire-resistance rating* of at least 1 hour. The unexposed surface temperature limitations specified in ASTM E 119 or UL 263 shall not apply to the flame barriers or vertical separation unless otherwise required by the provisions of this code.

Exceptions:

1. This section shall not apply to buildings that are three *stories* or less above *grade plane*.
2. This section shall not apply to buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Open parking garages.

Commenter's Reason: The original change indicated that the wall must be rated from both sides, but didn't indicate how far that rating must extend raising the question as to whether the entire wall must be so rated.

The flame barrier is only required to extend 30 inches beyond the exterior wall, and the openings are required to have protection when they are within 5 feet (60 inches) of each other. By adding the limit on the rated wall from both sides to the same 30 inch limitation, the equivalent protections should be provided by the wall rating.

FS24-12

Final Action: AS AM AMPC____ D

FS26-12
705.8.6, 705.8.6.1 (New), 705.8.6.2 (New)

Proposed Change as Submitted

Proponent: Homer Maiel, PE, CBO, Town of Atherton**,** representing self.

Revise as follows:

705.8.6 Vertical exposure. <u>Opening protectives of buildings shall comply with this section.</u>

<u>705.8.6.1 Vertical exposure for buildings on the same lot</u>. For buildings on the same lot, opening protectives having a *fire protection rating* of not less than 3/4 hour shall be provided in every opening that is less than 15 feet (4572 mm) vertically above the roof of an adjacent building or structure based on assuming an imaginary line between them. The opening protectives are required where the *fire separation distance* between the imaginary line and the adjacent building or structure is less than 15 feet (4572 mm).

Exceptions:

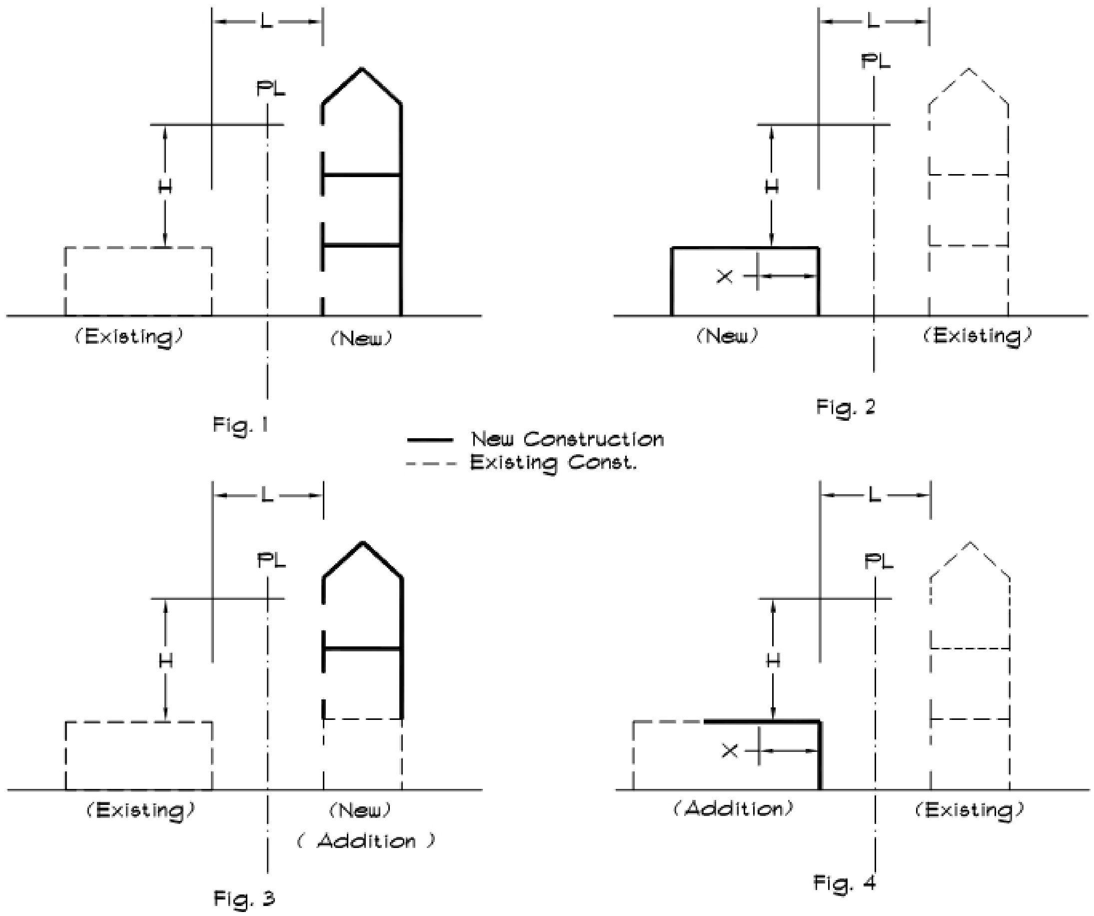
1. Opening protectives are not required where the roof assembly of the adjacent building or structure has a *fire-resistance rating* of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the *exterior wall* facing the imaginary line and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly has a *fire-resistance rating* of not less than 1 hour.
2. Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with Section 705.8.6<u>.1</u>.

<u>705.8.6.2 Vertical exposure for buildings on separate lots.</u> <u>When a new building or an addition is to be erected adjacent to an existing building, all openings in the exterior wall of the new building or addition are required to be not less than ¾ hour protectives when these openings are less than 15' vertically above the roof of existing building or structure. The opening protections are required where the distance between buildings or structures is less than 15' feet. When the roof of the new building or an addition is at lower elevation from the existing building, the roof construction of the new building or the addition shall have fire-resistance rating of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the exterior wall facing the existing building and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly shall have a fire-resistance rating of not less than 1 hour. The roof protections are required where the distance between the buildings or structures is less than 15' feet.</u>

Reason: A fire in a lower building that is adjacent to a taller building can be a source of fire exposure to openings in the taller building. Since fire does not differentiate between buildings on same lot or separate adjacent lots, the existing provisions for buildings on the same lot need to be expanded to cover buildings on separate lots too. The requirements for the buildings on the separate lots should not be different from those on the same lot. The buildings on the same lots are under one ownership and the imaginary property lines can be moved so that it will serve all buildings in the most efficient way.

On the other hand, the buildings on separate lots are under different ownerships. The property lines are legal property lines and can not be moved around. An existing building on one site should not dictate the design and construction of the future building nor a future building should not alter the design and construction of an existing building. In other words, between two neighboring buildings, whichever is built last will need to comply with requirements of this section. The 15-foot separation requirement between buildings on the separate lots, is consistent with the same requirement for buildings on the same lot.

Also not to leave out the additions to existing buildings, additions are also included in these requirements. So for the sake of argument, imagine that there are two existing buildings, with same height, on separate lots. If one building is adding more stories, then these requirements could apply to the windows of new stories.



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

705.8.6-FS-MAIEL

<u>Public Hearing Results</u>

Committee Action: Disapproved

Committee Reason: The committee disapproved this proposal for several reasons as follows: Verifying construction on adjacent lots can be difficult for design professionals and code officials because this would require coordination with the building owner who has nothing to do with the construction on the adjacent lot; Also, it appears that portions of the proposal conflict with other requirements of the code for exterior walls of buildings as related to occupancy and fire separation distance; lastly, multiple vertical additions over time could make this section confusing and difficult to comply with.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gary Lampella, City of Redmond representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**705.8.6 Vertical exposure.** Opening protectives of buildings shall comply with this section~~.

705.8.6.~~1~~ Vertical exposure for adjacent buildings ~~on the same lot~~.~~For buildings on the same lot, o~~Opening protectives having a *fire protection rating* of not less than 3/4 hour shall be provided in every opening in a building that is less than 15 feet (4572 mm) vertically above the roof of an adjacent building or structure ~~based on assuming an imaginary line between them. The opening protectives are required~~ where the ~~*fire separation*~~ *distance* between the ~~imaginary line and the~~ adjacent building**s** or structure**s** is less than 15 feet (4572 mm).

Exceptions:

1. Opening protectives are not required where the roof assembly of either of the adjacent building**s** or structure**s** has a *fire-resistance rating* of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the *exterior wall* facing the other building or structure ~~imaginary line~~ and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly has a *fire-resistance rating* of not less than 1 hour.
2. Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with Section 705.8.6.~~1.~~

~~**705.8.6.2 Vertical exposure for buildings on separate lots.** When a new building or an addition is to be erected adjacent to an existing building, all openings in the exterior wall of the new building or addition are required to be not less than ¾ hour protectives when these openings are less than 15' vertically above the roof of existing building or structure. The opening protections are required where the distance between buildings or structures is less than 15' feet. When the roof of the new building or an addition is at lower elevation from the existing building, the roof construction of the new building or the addition shall have fire-resistance rating of not less than 1 hour for a minimum distance of 10 feet (3048 mm) from the exterior wall facing the existing building and the entire length and span of the supporting elements for the fire-resistance-rated roof assembly shall have a fire-resistance rating of not less than 1 hour. The roof protections are required where the distance between the buildings or structures is less than 15' feet.~~

Commenter's Reason: The purpose of this submittal is clean up inconsistent provisions between buildings on the same lot with an imaginary line for fire separation distance and the lack of the same provision for buildings on adjacent lots with real property lines. The purpose of assuming an imaginary line between buildings on the same lot is to mirror the fire separation distance of those buildings with actual property lines and determining opening and wall protection. Currently, the provisions of buildings on the same lot with an imaginary line have more restrictive requirements than those buildings with a real line.

If one is concerned about fire spread from one building to another, should the provisions be the same for a real lot line as opposed to an imaginary one? Yes, we believe so. The probability of a fire spreading from one building to another via openings and fire separation distance to other buildings is the same regardless of real or imaginary lines. Based on the current code language, we can only assume that a recorded property line somehow adds an additional level of protection over and above an imaginary one.

We have taken the proponent's code change and modified it so it does not distinguish between buildings with an imaginary line and those with a real property line. Fire spread reacts the same exact way whether there is an imaginary or real property line. We have taken out the reference to imaginary lines and simply used the 15 foot measurement to determine the opening protection. So if there are two buildings on the same lot that do not qualify as one building in accordance with Section 705.3, and the total separation between them is less than 15 feet, then openings have to be taken into consideration. On the other hand, if a new building is constructed and there is another building on an adjacent lot, and the total distance between the two buildings is less than 15 feet, then openings have to be taken into consideration.

In the case of two buildings on the same lot, either option could be easily used – either opening protectives could be installed or 1-hour protection could be utilized, whichever was more practical to the owner. In the case of new construction on adjacent lots, the new building would have to comply with whichever method was applicable. For instance, if the distance was less than 15 feet and the new building had openings less than 15 feet above the building on the adjacent lot, opening protectives would be required. If it was lower and the building on the adjacent lot had opening less than 15 feet above the new building roof, the new building would have to provide the 1-hour fire-resistive construction identified in Exception 1 of this section.

Unless I am mistaken and an actual property line has some magical powers that an imaginary line doesn't to repel fire and smoke, then this code change is not needed.

Cost Impact: The code change proposal will increase the cost of construction, but most likely very minimal.

FS26-12

Final Action: AS AM AMPC____ D

FS27-12
706.2

Proposed Change as Submitted

Proponent: Edwin Huston represents National Council of Structural Engineers Associations- Code Advisory Committee - General Requirements Subcommittee (huston@smithhustoninc.com)

Revise as follows:

706.2 Structural stability. Firewalls shall be designed to meet the requirements of Chapter 16 under non-fire conditions. Fire walls shall be designed to have sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall for a lateral design wind load of 8 lb/ft^2 for the duration of time indicated by the required fire-resistance rating or shall be constructed as double fire walls in accordance with NFPA 221.

Reason: Section 706.2 is proposed for revision to provide a standard set of structural design requirements. Chapter 16 has requirements for structural walls, so a pointer to Chapter 16 is proposed. Without a specified wind design force, different jurisdictions have suggested different loading requirements to structural engineers. The 8 psf proposed is the current design load for interior partitions. It is the 5 psf load which has been used for many code cycles updated to a strength level load to agree with ASCE 7-10.

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

Analysis: FS22 and FS27 provide different requirements for fire wall structural stability. The committee needs to make its intent clear with respect to these provisions.

706.2-FS-HUSTON

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee was unclear on how a wall assembly could be tested in accordance with ASTM E119 with the lateral load. Therefore, the committee felt that this type of requirement should be considered as a revision to the ASTM E119 test method, rather than in the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

706.2 Structural stability. ~~Firewalls shall be designed to meet the requirements of Chapter 16 under non-fire conditions.~~ Fire walls shall ~~be designed to~~ have sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall ~~for a lateral design wind load of 8 lb/ft^2~~ for the duration of time indicated by the required fire-resistance rating or shall be constructed as double fire walls in accordance with NFPA 221.

Firewalls shall be designed to meet the requirements of Chapter 16 under non-fire conditions. Fire walls shall be designed for a minimum lateral design wind load of 8 lb/ft^2.

Commenter's Reason: Section 706.2 is proposed for revision to provide a standard set of structural design requirements. Chapter 16 has requirements for structural walls, so a pointer to Chapter 16 is proposed. Without a specified wind design force, different jurisdictions have suggested different loading requirements to structural engineers.

The modification includes a horizontal load in keeping with Code requirements. The load is consistent with the provisions in Section 1607.14. The 8 psf proposed is the current design load for interior partitions, updated to a strength level load to agree with ASCE 7-10. Because a fire wall will be interior to the building for most of, if not its entire life, the interior partition load is most appropriate. If a fire occurs and one side collapses, the fire service will determine what will be necessary under Section 110.1.2 of the Fire Code.

At the 2015 Code Development hearings in Dallas opposition centered on the assumption that we were modifying NFPA 221 and the ASTM E119 test. That was not our intent. In fact, we are aligning the load to NFPA 221 and Section 1607.14, but updating the load to agree with the change in the 2012 IBC and the move to ultimate map values for wind in ASCE 7-10. To clarify this, we have changed the proposal and separated the proposed change from the existing text.

Analysis: Public Comments to FS22 and FS27 provide different requirements for fire wall structural stability. The membership needs to make its intent clear with respect to these provisions.

FS27-12

Final Action: AS AM AMPC____ D

FS31-12
707.9, 715.6 (New), 715.6.1 (New), Chapter 35

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc, representing International Firestop Council (tcrimi@sympatico.ca)

Revise as follows:

707.9 Voids at intersections. The voids created at the intersection of a *fire barrier* and a non-fire-resistance-rated roof assembly shall comply with Section 715. ~~be filled. An approved material or system shall be used to fill the void, shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.~~

715.6 Joints between fire resistance rated walls and non-fire resistance rated Floors or Roofs. Joints at the intersection of *fire barriers* with the underside of a non-fire resistance rated floor or roof sheathing, slab or deck above shall be protected by an approved continuity head of wall joint system installed as tested in accordance with ASTM E2837 and designed to resist the passage of fire for a time period not less than the required fire resistance rating of the wall in which it is installed.

715.6.1 Installation. Continuity head of wall joint systems shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.

(Renumber subsequent section)

Add new standard to Chapter 35 as follows:

ASTM E 2837-11 *Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies*.

Reason: Chapter 7 of the IBC has numerous requirements for continuity of vertical and horizontal assemblies. In 2011 ASTM published its new ASTM Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies, ASTM E 2837-11. Referencing this Standard will help code enforcers and manufacturers by alleviate the need to use Engineering Judgements for many of these conditions.

Wall continuity is required by the IBC at joint openings, which are typically linear voids, gaps, openings, or other discontinuities within or at the junction of a rated wall assembly and nonrated horizontal assemblies, to ensure that the protected joint opening has the same fire resistance rating as the rated wall assembly and provides continuity to the underside of the roof, slab or deck.

Section 707.9 of the IBC requires the joint opening at the termination at the top of the rated fire barrier wall assembly below the nonrated horizontal assembly to be protected. The new ASTM E 2837 Standard evaluates continuity head-of-wall joint systems for this specific application. They are used in order to maintain continuity established by the rated wall assembly.

A continuity head-of-wall joint system is particular type of fire-resistive joint system that provides fire resistance to prevent passage of fire from compartment to compartment within the building at the joint opening between a rated wall assembly and a nonrated horizontal assembly. A continuity head-of-wall joint system is a unique building construction detail not addressed by other fire test methods such as Test Method E 1966 that tests joint systems installed between two assemblies that are fire resistance rated.

To achieve the F-Rating, the joint system must remains in the opening during the fire resistance test and the hose stream test, and will have withstood the fire resistance test for the rating period equal to the rated wall assembly by preventing flaming on the unexposed side of the test specimen and on the underside of the nonrated horizontal assembly on the unexposed side. The Integrity test also ensures no occurrence of ignition of the cotton pad, which is related to the passage of hot gases in the current IBC 707.9 requirements.

Cost Impact: This proposal should reduce affect the cost of construction

Analysis: FS31 and FS32 provide different requirements for the same joint condition (715.6). The committee needs to make its intent clear with respect to these provisions. A review of the standard proposed for inclusion in the code, ASTM E2837-11 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

707.9 #1-FS-CRIMI

Public Hearing Results

For staff analysis of the content of ASTM E2837-011 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf.

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was no safety hazard identified for these types of joints and that the new testing requirements were not justified by the proponent. Also, it was felt that this would increase the cost of construction based on additional testing being required. Lastly, this may affect existing non-rated assemblies and cause them to be modified to meet the test requirements.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council, requests Approval as Submitted.

Commenter's Reason: This proposal can reduce the cost of construction by standardizing the methods used to protect top-of-wall joint systems.

Section 707.9 of the IBC already requires the joint opening at the termination at the top of the rated fire barrier wall assembly below the nonrated horizontal assembly to be protected, but does not give any information on how to do it, or what level of protection to provide. This has resulted in a wide range of solutions being used. Occasionally, enhancements to the roof structure are being required by code officials in order to utilize UL 2079 (ASTM E1966) tested and Listed systems that were designed for intersections between fire resistance rated floors or roofs and fire rated walls. In other cases, solutions are being implemented that would allow fire and/or smoke passage within a very short period of time, due to the lack of good information regarding what type of joint construction is needed to prevent from creating a weak point at the top of the wall.

The ASTM E 2837 Standard evaluates continuity head-of-wall joint systems for this exact application, the joint at the top of a rated wall, at the point where it intersects a non-rated floor or roof. The ASTM standard was developed over a 5-year period specifically to meet the minimum continuity requirements established by the Code. Similarly, ICC's IBC interpretation 34-08 discusses this condition and indicates which code requirements such top-of-wall joints should meet., A copy is available at:

http://www2.iccsafe.org/cs/committeeArea/pdf_file/BU_06_34_08.pdf.

Section 707.9, which deals with the need for continuity of fire resistance for rated walls, regulates joints or linear openings created between building assemblies, which are sometimes referred to as construction, expansion or seismic joints. These joints are most often created where the structural or functional needs of a building necessitate some finite separation between the fire-resistance rated wall assembly and the underside of the floor or roof sheathing, slab or deck above. This joint space is most typically provided to accommodate anticipated structural displacements caused by the live loads on the floor or roof above, thermal expansion and contraction, seismic activity, wind or other loads. The linear top-of-wall openings create a "weak link" in fire-resistance-rated assemblies that can compromise the integrity of the vertical tested assembly by allowing an avenue for the passage of fire and the products of combustion through the assembly far earlier than anticipated by the required fire resistance rating of the wall. In order to maintain the function of the fire-resistance-rated assembly, the joint construction should provide a fire resistance equal to the assembly in the same plane (i.e. the wall assembly).

Analysis: FS31 and FS32 provide different requirements for the same joint condition (715.6). The membership needs to make its intent clear with respect to these provisions.

FS31-12

Final Action: AS AM AMPC____ D

FS32-12
707.9, 715.6 (New), Chapter 35

Proposed Change as Submitted

Proponent: John Valiulis, representing Hilti, Inc.(john.valiulis@hilti.com)

Revise as follows:

707.9 Voids at intersections. The voids created at the intersection of a *fire barrier* and a non-fire-resistance-rated roof assembly shall comply with Section 715. ~~be filled. An approved material or system shall be used to fill the void, shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.~~

715.6 Fire-Resistance rated wall/nonfire-resistance-rated floor or roof assembly intersections.. The voids created at the intersection of a fire-resistance rated vertical wall assembly and a non-fire-resistance-rated floor or roof assembly shall be installed and tested in accordance with ASTM E 2837 to prevent the passage of flame for the time period at least equal to the *fire-resistance rating* of the wall assembly and prevent the passage of heat and hot gases sufficient to ignite cotton waste.

Add new standard to Chapter 35 as follows:

ASTM E 2837-11 *Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies*.

Reason: Chapter 7 of the IBC has numerous requirements for continuity of vertical and horizontal assemblies. Wall continuity is required at joint openings, which are typically linear voids, gaps, openings, or other discontinuities within or intersecting rated wall assembly and nonrated horizontal assemblies, to ensure that the protected joint opening has the same fire resistance rating as the rated wall assembly. In 2011 ASTM published its new ASTM Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies, ASTM E 2837-11.

Section 707.9 of the IBC already requires the joint opening at the termination at the top of the rated fire barrier wall assembly below the nonrated horizontal assembly to be protected. The new ASTM E 2837 Standard evaluates continuity head-of-wall joint systems for this specific application. They are used in order to maintain continuity established by the rated wall assembly.

A continuity head-of-wall joint system is particular type of fire-resistive joint system that provides fire resistance to prevent passage of fire from compartment to compartment within the building at the joint opening between a rated wall assembly and a nonrated horizontal assembly. A continuity head-of-wall joint system is a unique building construction detail not addressed by other fire test methods such as Test Method E 1966 that tests joint systems installed between two assemblies that are fire resistance rated.

To achieve the F-Rating, the joint system must remains in the opening during the fire resistance test and the hose stream test, and will have withstood the fire resistance test for the rating period equal to the rated wall assembly by preventing flaming on the unexposed side of the test specimen and on the underside of the nonrated horizontal assembly on the unexposed side. The Integrity test also ensures no occurrence of ignition of the cotton pad, which is related to the passage of hot gases in the current IBC 707.9 requirements.

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

Analysis: FS31 and FS32 provide different requirements for the same joint condition (715.6). The committee needs to make its intent clear with respect to these provisions. A review of the standard proposed for inclusion in the code, ASTM E2837-11 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

707.9-FS-VALIULIS

Public Hearing Results

For staff analysis of the content of ASTM E2837-011 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf.

Committee Action: **Disapproved**

Committee Reason: The committee based disapproval on their action on FS31-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

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

Replace the proposal as follows:

707.9 Voids at intersections. The voids created at the intersection of a *fire barrier* and a non-fire-resistance-rated roof assembly shall be filled. An approved material or system shall be used to fill the void, shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases, or installed as tested in accordance with ASTM E2837 for the time period at least equal to the fire-resistance rating of the wall assembly.

Add new standard to Chapter 35 as follows:
ASTM E 2837-11 *Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies*.

Commenter's Reason: This modification simply adds an alternative method of protecting voids created at the intersection of a *fire barrier* and a non-fire-resistance-rated roof assembly. Section 707.9 of the IBC already requires the joint opening at the termination at the top of the rated fire barrier wall assembly below the nonrated horizontal assembly to be protected.

These joints are most often created where the structural design of a building necessitates a separation between the fire-resistance rated wall assembly and the underside of the floor or roof sheathing, slab or deck above in order to accommodate anticipated structural displacements caused by thermal expansion and contraction, seismic activity, wind or other loads. All of these linear openings create a "weak link" in fire-resistance-rated assemblies that can compromise the integrity of the vertical tested assembly by allowing an avenue for the passage of fire and the products of combustion through the assembly. In order to maintain the efficacy of the fire-resistance-rated assembly, these openings need to have the joint filled with a material or system that will provide a fire resistance that is equal to the assembly in the same plane (i.e. the wall assembly). As proposed above, the installer can either aim to meet the performance requirements enumerated in thwe 2012 code, but the code unfortunately does not provide a method by which to evaluate whether the criteria has been satisfied or not. Alternatively, this code change would allow the installer to use a tested joint detail that has been shown to last as long as the wall, thus helping to provide certainty that the installation meets the code. This code change does not eliminate the previously allowed option of using an untested solution, and allowing the code official to determine whether the installation meets code or not. .

Where two assemblies intersect, the fire rating of the joint must be the same as the fire rating of the assembly (or assemblies) of the same plane as the assembly where the joint occurs. The ASTM E 2837 Standard evaluates continuity head-of-wall joint systems for this exact application, the joint at the top of a rated wall, at the point where it intersects a non-rated floor or roof. The ASTM standard was developed over a 5-year period specifically to meet the minimum continuity requirements established by the Code. Similarly, ICC's IBC interpretation 34-08 discusses this condition and indicates which code requirements such top-of-wall joints should meet., A copy is available at: http://www2.iccsafe.org/cs/committeeArea/pdf_file/BU_06_34_08.pdf.

This proposal can reduce the cost of construction by standardizing the methods used to protect these joint systems.

Analysis: FS31 and FS32 provide different requirements for the same joint condition (715.6). The membership needs to make its intent clear with respect to these provisions.

FS32-12
Final Action: AS AM AMPC____ D

FS37-12
709.4

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

709.4 Continuity. *Smoke barriers* shall form an effective membrane continuous from outside wall to outside wall and from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, deck or slab above, including continuity through concealed spaces, such as those found above suspended ceilings, and interstitial structural and mechanical spaces. The supporting construction shall be protected to afford the required *fire-resistance rating* of the wall or floor supported in buildings of other than Type IIB, IIIB or VB construction.

Exceptions:

1. Smoke-barrier walls are not required in interstitial spaces where such spaces are designed and constructed with ceilings that provide resistance to the passage of fire and smoke equivalent to that provided by the smoke-barrier walls.
2. Smoke barriers used ~~for~~ to enclose elevator lobbies in accordance with Section 405.4.3, 1007.6.2, 3007.7.2 or 3008.7.2 shall be permitted to terminate at the elevator hoistway shaft enclosure. ~~not required to extend from outside wall to outside wall.~~ A smoke and draft control door assembly as specified in Section 716.5.3.1 shall not be required at each elevator hoistway door opening.
3. Smoke barriers used for areas of refuge in accordance with Section 1007.6.2 are not required to extend from outside wall to outside wall.

Reason: This proposal is one of several proposals submitted by the CTC dealing with elevator lobbies. The ICC Executive Board directed the Code Technology Committee (CTC) to study the issue of elevator lobby separations in November 2010 due to the number of code change proposals submitted addressing this issue over a number of code change cycles. The Code Technology Committee formed a study group on the elevator lobby separation issue in December 2010. Note that this subject had been previously addressed by CABO/BCMC in 1986 with a similar conclusion. The code change proposals submitted are the result of the CTC's study of the issue. Note that the scope of the activity was as follows:

Scope

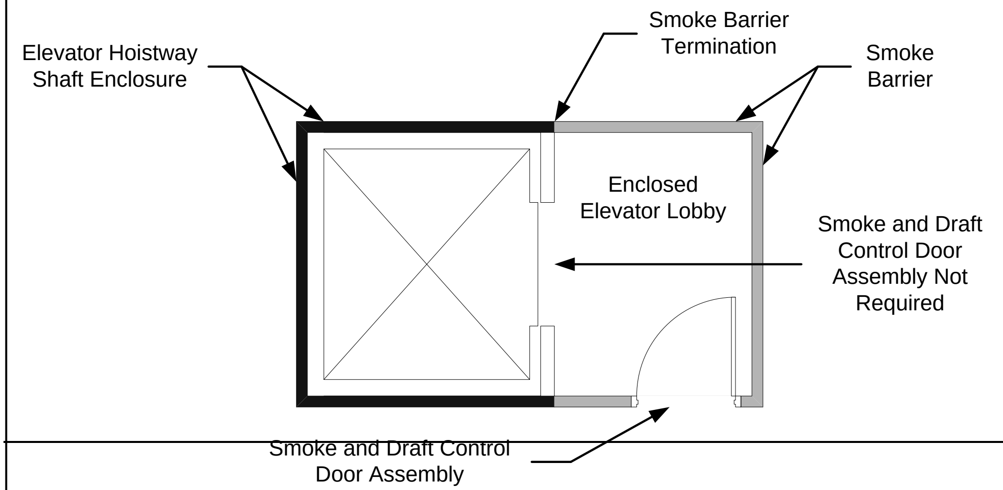
- ☐ Review the need for elevator lobbies,; with emphasis on building use, building and hoistway height, active and passive fire protection features associated with the aforementioned.
- ☐ Review the differences and specific needs when dealing with elevator lobbies of traditional-use elevators, fire service elevators, and occupant evacuation elevators.
- ☐ Review related code provisions, such as egress from and through elevator lobbies.
- ☐ Review the appropriate use of alternatives including pressurization of hoistways, additional doors, roll-down style barriers, and gasketing systems.
- ☐ Review with members of elevator industry to scope the requirements of applicable elevator reference standards as it deals with elevator lobby design, use and construction.
- ☐ Review design and construction requirements for elevator lobbies, including but not limited to dimensions, location and separation.
- ☐ Review applicable code change history, technical studies and loss statistics as part of this review.

Based upon the extensive nature of this area of study**,** 5 Task Groups were formed during the process to provide in-depth review and to manage the number of issues. These task groups developed a number of proposals that were coordinated throughout the process.

More information on this CTC area of study can be found at the following link.
http://www.iccsafe.org/cs/CTC/Pages/ElevatorLobbies.aspx

This proposal provides clarification of the smoke barrier continuity requirements. Provisions are necessary to clarify that opening protection at the hoistway opening is not necessary when an enclosed elevator lobby is provided in accordance with Section 405.4.3, 3007.7.2, or 3008.7.2. An enclosed elevator lobby protects the hoistway from smoke migration, therefore the hoistway is already protected. In addition the shaft walls provide sufficient smoke and draft protection to allow the smoke barriers to terminate at those walls.

This proposal does not require correlation with other CTC Elevator Lobby SG lobby proposals. See discussion on CTC elevator lobby proposal coordination in code change FS##-12



SEC 709.4, EXCEPTION 2 - SMOKE BARRIER TERMINATION AT ELEVATOR HOISTWAY SHAFT ENCLOSURE

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

Analysis: FS37, FS38 and FS39 provide different requirements for smoke barriers enclosing elevator lobbies. The committee needs to make its intent clear with respect to these provisions.

709.4-FS-Baldassarra-CTC

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

709.4 Continuity. *Smoke barriers* shall form an effective membrane continuous from outside wall to outside wall and from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, deck or slab above, including continuity through concealed spaces, such as those found above suspended ceilings, and interstitial structural and mechanical spaces. The supporting construction shall be protected to afford the required *fire-resistance rating* of the wall or floor supported in buildings of other than Type IIB, IIIB or VB construction.

Exceptions:

1. Smoke-barrier walls are not required in interstitial spaces where such spaces are designed and constructed with ceilings that provide resistance to the passage of fire and smoke equivalent to that provided by the smoke-barrier walls.
2. Smoke barriers used to enclose elevator lobbies in accordance with Section 405.4.3, 1007.6.2, 3007.7.2 or 3008.7.2 shall be permitted to terminate at the elevator hoistway shaft enclosure. A smoke and draft control door assembly as specified in Section 716.5.3.1 shall not be required at each elevator hoistway door opening.
3. Smoke barriers used for areas of refuge in accordance with Section 1007.6.2 ~~are not required to extend from outside wall to outside wall~~ shall be permitted to terminate at the exit stairway shaft enclosure. A smoke and draft control door assembly as specified in Section 716.5.3.1 shall not be required at each exit doorway between an area of refuge and the exit enclosure.

Committee Reason: The committee agreed that smoke barriers need not always terminate at exterior walls and termination could be at the elevator hoistway enclosure. The modification recognizes that this allowance should also pertain to smoke barrier terminations at areas of refuge.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Dave Frable, representing U.S. General Services Administration, Public Buildings Service, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

709.4 Continuity. *Smoke barriers* shall form an effective membrane continuous ~~from outside wall to outside wall and~~ from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, deck or slab above, including continuity through concealed spaces, such as those found above suspended ceilings, and interstitial structural and mechanical spaces. The supporting construction shall be protected to afford the required *fire-resistance rating* of the wall or floor supported in buildings of other than Type IIB, IIIB or VB construction. Smoke barrier walls used to separate smoke compartments shall comply with Section 709.4.1. Smoke barrier walls used to enclose areas of refuge in accordance with Section 1007.6.2 or to enclose elevator lobbies in accordance with Section 405.4.3, 3007.7.2, or 3008.7.2 shall comply with Section 709.4.2.

Exceptions:

1. Smoke-barrier walls are not required in interstitial spaces where such spaces are designed and constructed with ceilings or exterior walls that provide resistance to the passage of fire and smoke equivalent to that provided by the smoke-barrier walls.
2. ~~Smoke barriers used to enclose elevator lobbies in accordance with Section 405.4.3, 1007.6.2, 3007.7.2 or 3008.7.2 shall be permitted to terminate at the elevator hoistway shaft enclosure. A smoke and draft control door assembly as specified in Section 716.5.3.1 shall not be required at each elevator hoistway door opening.~~
3. ~~Smoke barriers used for areas of refuge in accordance with Section 1007.6.2 shall be permitted to terminate at the exit stairway shaft enclosure. A smoke and draft control door assembly as specified in Section 716.5.3.1 shall not be required at each exit doorway between an area of refuge and the exit enclosure.~~

709.4.1 Smoke barrier walls separating smoke compartments. Smoke barrier walls used to separate smoke compartments shall form an effective membrane continuous from outside wall to outside wall.

709.4.2 Smoke barrier walls enclosing areas of refuge or elevator lobbies. Smoke barrier walls used to enclose areas of areas of refuge in accordance with Section 1007.6.2, or to enclose elevator lobbies in accordance with Section 405.4.3, 3007.7.2, or 3008.7.2, shall form an effective membrane enclosure that terminates at a fire barrier wall having a level of fire protection rating not less than 1-hour, another smoke barrier wall or an outside wall. A smoke and draft control door assembly as specified in Section 716.5.3.1 shall not be required at each elevator hoistway door opening or at each exit doorway between an area of refuge and the exit enclosure.

Commenter's Reason: The intent of this code change proposal is to revise and provide clarification to FS37 with regard to when smoke barrier walls are used to create smoke compartments versus when smoke barrier walls are used to create enclosures for elevator lobbies and areas of refuge.

a. Section 709.4 has been revised to delete "from outside wall to outside wall and" since termination of a smoke barrier wall at an outside wall is not required in all situations and also to provide references to two requirements (709.4.1 and 709.4.2) to clarify the distinction between smoke barrier walls separating smoke compartments and smoke barrier walls separating areas of refuge and elevator lobbies.
b. Exception 1 has been revised based on actions taken on FS36.
c. Exceptions 2 and 3 have been deleted based on the revisions in Section 709.4. The existing text in the subject two exceptions have been consolidated into new Section 709.4.2 since the requirements for areas of refuge and elevator lobbies are identical.
d. New requirement 709.4.1 makes it clear that smoke barrier walls used to form smoke compartments are required to be continuous from outside wall to outside wall.
e. New requirement 709.4.2 makes it clear that smoke barrier walls used to enclose elevator lobbies and areas of refuge are required to terminate at another smoke or fire barrier, or an outside wall if desired.

Lastly, it should be noted that the language approved by the Fire Safety Code Committee for FS37 has not been changed, other than to incorporate the correct references to sections 3007.7.2 and 3008.7.2, since the previous references (to 3007.4.2 and 3008.11.2) were incorrect.

FS37-12

Final Action: AS AM AMPC____ D

FS41-12
404.6, 710.1, 710.5.2, 710.5.2.1, 710.5.2.2, 710.5.2.3, 713.14.1

Proposed Change as Submitted

Proponent: Joe Pierce, Dallas Fire Department, TX, representing the ICC Fire Code Action Committee

Revise as follows:

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 711, or both.

Exception: A fire barrier is not required where a glass wall forming a smoke partition is provided. The glass wall shall comply with all of the following:

1. Automatic sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the atrium side. The sprinklers shall be located between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and at intervals along the glass not greater than 6 feet (1829 mm). The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction;
   1.1. The glass wall shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates; and
   1.2. Where glass doors are provided in the glass wall, they shall be either self-closing or automatic-closing <u>upon detection of smoke in accordance with Section 716.5.9.3</u>.
2. A fire barrier is not required where a glass-block wall assembly complying with Section 2110 and having a 3/4-hour fire protection rating is provided.
3. A fire barrier is not required between the atrium and the adjoining spaces of any three floors of the atrium provided such spaces are accounted for in the design of the smoke control system.

Revise as follows:

SECTION 710
SMOKE PARTITIONS

710.1 General. ~~Smoke partitions installed as required elsewhere in the code shall comply with this section.~~ <u>The following wall assemblies shall comply with this section:</u>

<u>1. Walls separating atrium spaces as required by Section 404.6 Exception #1.</u>
<u>2. Group I-2 corridor walls as required by Section 407.3.</u>
<u>3. Group I-2 care suite separations as required by Section 407.4.3.2.</u>
<u>4. Elevator lobby walls as required by Section 713.14.1 Exception #5.</u>

~~**710.5.2 Doors.** Doors in smoke partitions shall comply with Sections 710.5.2.1 through 710.5.2.3.~~

710.5.2.~~1~~ Louvers <u>in Doors</u>. Doors in smoke partitions shall not include louvers.

~~**710.5.2.2 Smoke and draft control doors.** Where required elsewhere in the code, doors in smoke partitions shall meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.015424 m3/(s • m2)) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient~~

~~temperature test and the elevated temperature exposure test. Installation of smoke doors shall be in accordance with NFPA 105.~~

~~**710.5.2.3 Self- or automatic-closing doors.** Where required elsewhere in the code, doors in smoke partitions shall be self- or automatic-closing by smoke detection in accordance with Section 716.5.9.3.~~

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 708 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the level(s) of exit discharge, provided the level(s) of exit discharge is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 712.1 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall comply with the smoke and draft control door assembly requirements in Section 716.5.3.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   4.1. Group I-2 occupancies;
   4.2. Group I-3 occupancies; and
   4.3. Elevators serving floor levels over 75 feet (22 860 mm) above the lowest level of fire department vehicle access in high-rise buildings.
5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. ~~In addition to the requirements in Section 710 for smoke partitions, doors~~ <u>Doors</u> protecting openings in the smoke partitions shall <u>be self- or automatic-closing upon detection of smoke in accordance with Section 716.5.9.3 and</u> also comply with Section~~s 710.5.2.2~~ <u>716.5.3.1.</u>, ~~710.5.2.3, and 716.5.9 and duct~~ <u>Duct</u> penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21.
7. Enclosed elevator lobbies are not required where the elevator serves only open parking garages in accordance with Section 406.5.

Reason: The intent of this proposal is to format the requirements for smoke partitions to clarify the application of the various features of smoke partitions.

Smoke partitions are required in only 4 sections of the code. Those sections are 404.6, 407.3, 407.4.3.2 and 713.14.1.

Section 710.1 is revised to list the 4 sections rather than state “elsewhere in the code” and then expect the code user to go find the sections.

Section 710.5.2.2 is deleted. Elevator lobbies are the only locations where smoke control doors are required. Since this is the only section where smoke control doors are required, rather than state “elsewhere in the code” it is clearer to revise Section 713.14.1 to contain the requirements and make reference directly to Section 716.5.9.3.

Section 710.5.2.3 is also deleted. Since doors in smoke partitions in elevator lobbies are handled in the revision to Section 713.4.1, there are only two sections which meet the “elsewhere in the code” criteria. The Sections are 404.6 and 407.3.1. Section 407.3.1 already makes the requirement for corridor walls in Group I-2. A minor revision to Section 404.6 and a reference directly to Section 716.5.9.3 covers the issue.

Within all of these revisions, the code requirements remain the same; the proposal does not change the current technical requirements in the code. Most importantly, Section 710 is simplified, and the occupancy or use specific requirements are located with other requirements for those occupancies and uses.

Section 710.3 was not revised since a smoke partition may be required to have a fire-resistance rating such as with a fire barrier or a horizontal assembly. In these cases, the design profession will need to comply with the other provisions in IBC Chapter 7 as well as the requirements for smoke partitions.

NOTE: The table below lists every subsection of 710 in the left column and the four locations where smoke partitions are required in the header. Each specific requirement is identified as either applying to those specific sections, or revisions are suggested to correlate the code requirements. The revisions shown in the table are the same revisions contained in this proposal, but you can see how each section was reviewed and evaluated.

Smoke Partition requirements in Section 710 with proposed revisions	**Where smoke partitions are required under the IBC**				**Comments**
	404.6 Exception: For Atrium enclosure	**407.3: I-2 corridor wall construction**	**407.4.3.2: I-2 care suite separation**	**713.14.1 Exception #5: Elevator lobby**	
710.1 General. ~~Smoke partitions installed as required elsewhere in the code shall comply with this section.~~ The following wall assemblies shall comply with this section: 1. Walls separating atrium spaces as required by Section 404.6 Exception #1 2. Group I-2 corridor walls as required by Section 407.3. 3. Group I-2 care suite separations as required by Section 407.4.3.2. 4. Elevator lobby walls as required by Section 713.14.1 Exception #5.	✓	✓	✓	✓	Revision Section 710.1 to identify where smoke partitions are used. This revision makes Section 710.1 user-friendly and clarifies where the 4 locations in the Code smoke partitions are required. Similar to existing Section 708.1 format that is for fire partitions.
710.2 Materials. The walls shall be of materials permitted by the building type of construction.	✓	✓	✓	✓	
710.3 Fire-resistance rating. Unless required elsewhere in the code, s partitions are not required to have a *fire-resistance rating*.	Non-fire rated	Non-fire rated	Non-fire rated	Non-fire rated	Smoke partitions are designed to resist the passage of smoke. If a wall that is a smoke partition is also required to be a fire partition or fire barrier, then it would need to comply with both requirements.

Smoke Partition requirements in Section 710 with proposed revisions	Where smoke partitions are required under the IBC				Comments
	404.6 Exception: For Atrium enclosure	407.3: I-2 corridor wall construction	407.4.3.2: I-2 care suite separation	713.14.1 Exception #5: Elevator lobby	
710.4 Continuity. Smoke partitions shall extend from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke.	✓	✓	✓	✓	
710.5 Openings. Openings in smoke partitions shall comply with Sections 710.5.1 and 710.5.2.	Only a pointer section to requirements in following subsections	Only a pointer section to requirements in following subsections	Only a pointer section to requirements in following subsections	Only a pointer section to requirements in following subsections	
710.5.1 Windows. Windows in smoke partitions shall be sealed to resist the free passage of smoke or be automatic-closing upon detection of smoke.	✓	✓	✓	✓	
~~**710.5.2 Doors.** Doors in smoke partitions shall comply with Sections 710.5.2.1 through 710.5.2.3.~~	Only a pointer section to requirements in following subsections	Only a pointer section to requirements in following subsections	Only a pointer section to requirements in following subsections	Only a pointer section to requirements in following subsections	No longer needed since the requirements under Sections 710.5.2.2 & 710.5.2.3 are placed directly into the sections of Code that use these requirements. See Comments below.
710.5.2.~~1~~ Louvers <u>in Doors</u>. Doors in smoke partitions shall not include louvers.	✓	✓	✓	✓	Revised code section since Section 710.5.2 was not needed as a pointer if Sections 710.5.2.2 & 710.5.2.3 will be placed directly in the two places where the code requirements is actually required. See Comments below.

Smoke Partition requirements in Section 710 with proposed revisions	Where smoke partitions are required under the IBC				Comments
	404.6 Exception: For Atrium enclosure	**407.3: I-2 corridor wall construction**	**407.4.3.2: I-2 care suite separation**	**713.14.1 Exception #5: Elevator lobby**	
~~**710.5.2.2 Smoke and draft control doors.**~~ ~~Where required elsewhere in the code, doors in smoke partitions shall meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.015424 m3/(s • m2)) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature test and the elevated temperature exposure test. Installation of smoke doors shall be in accordance with NFPA 105.~~	**Not Required**	**Not Required**	**Not Required**	✓ **713.14.1 Elevator lobby.** **Exceptions:** 5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. ~~In addition to the requirements in Section 710 for smoke partitions,~~ ~~d~~<u>D</u>oors protecting openings in the<u>se walls</u> ~~smoke partitions~~ shall <u>be self- or automatic-closing upon detection of smoke in accordance with Section 716.5.9.3 and</u> also comply with Section~~s 710.5.2.2~~ <u>716.5.3.1.</u>, ~~710.5.2.3, and 716.5.9 and~~ ~~d~~<u>D</u>uct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 717.5.4.1.	Since on the elevator lobby exception requires smoke control doors, directly reference this requirement in Section 713.14.1 Exception #5 to Section 716.5.3.1 that is the same wording and requirement for "opening protectives" In addition, instead of referencing Sections 710.5.2.3 and 716.5.9, go directly to the requirement for self or automatic closing doors in Section 716.5.9.3.

Smoke Partition requirements in Section 710 with proposed revisions	Where smoke partitions are required under the IBC				Comments
	404.6 Exception: For Atrium enclosure	**407.3: I-2 corridor wall construction**	**407.4.3.2: I-2 care suite separation**	**713.14.1 Exception #5: Elevator lobby**	
~~**710.5.2.3 Self- or automatic-closing doors.**~~ ~~Where required elsewhere in the code, doors in smoke partitions shall be self- or automatic-closing by smoke detection in accordance with Section 716.5.9.3.~~	✓ **404.6 Exceptions:** A *fire barrier* is not required where a glass wall forming a smoke partition is provided. The glass wall shall comply with all of the following: 1.2. Where glass doors are provided in the glass wall, they shall be either *self-closing* or automatic closing <u>upon detection of smoke in accordance with Section 716.5.9.3.</u>	**Not needed. Already covered by Section 407.3.1:** **407.3.1 Corridor doors.** Corridor doors, other than those in a wall required to be rated by Section 509.4 or for the enclosure of a vertical opening or an exit, shall not have a required fire protection rating and shall not be required to be equipped with self-closing or automatic-closing devices, but shall provide an effective barrier to limit the transfer of smoke and shall be equipped with positive latching. Roller latches are not permitted. Other doors shall conform to Section 716.5.	**Not Required**	✓ **See recommended revision to Exception #5 above and the comment.**	For the two places in the Code that require the self or automatic closing doors for its smoke partitions it is more user friendly and more direct just to incorporate the reference to Section 716.5.9.3 for the atrium and elevator exceptions then to go through Section 710.5.2.3 to get to Section 716.5.9.3.
710.6 Penetrations. The space around penetrating items shall be filled with an *approved* material to limit the free passage of smoke.	✓	✓	✓	✓	
710.7 Joints. Joints shall be filled with an *approved* material to limit the free passage of smoke.	✓	✓	✓	✓	

Smoke Partition requirements in Section 710 with proposed revisions	Where smoke partitions are required under the IBC				Comments
	404.6 Exception: For Atrium enclosure	407.3: I-2 corridor wall construction	407.4.3.2: I-2 care suite separation	713.14.1 Exception #5: Elevator lobby	
710.8 Ducts and air transfer openings. The space around a duct penetrating a smoke partition shall be filled with an *approved* material to limit the free passage of smoke. Air transfer openings in smoke partitions shall be provided with a *smoke damper* complying with Section 717.3.2.2. **Exception:** Where the installation of a *smoke damper* will interfere with the operation of a required smoke control system in accordance with Section 909, *approved* alternative protection shall be utilized.	✓	✓	✓	✓	

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

710-FS-PIERCE-FCAC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that the proposed reorganization of Section 710 inadvertently eliminated the requirements for doors within smoke partitions and was therefore not simply reorganization. Further, creating a list of locations where smoke partitions is required may lead to locations being missed when added elsewhere in the code in future cycles.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Joe Pierce, Dallas Fire Department, TX, representing ICC Fire Code Action Committee requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

710.5.2 Doors. Doors in smoke partitions shall comply with Sections 710.5.2.1 through 710.5.2.2.

710.5.2.1 Louvers in Doors. Doors in smoke partitions shall not include louvers.

710.5.2.2 Self- or automatic-closing doors. Where required elsewhere in the code, doors in smoke partitions shall be self- or automatic-closing by smoke detection in accordance with Section 716.5.9.3.

716.5.9.3 Smoke-activated doors. Automatic-closing doors installed in the following locations shall be automatic- closing by the actuation of smoke detectors installed in accordance with Section 907.3 or by loss of power to the smoke detector or hold-open device. Doors that are automatic-closing by smoke detection shall not have more than a 10-second delay before the door starts to close after the smoke detector is actuated:

1. through 10. (No change)
11. Doors installed in smoke partitions in accordance with the exception to Section ~~710.5.2.3~~ 404.6 and Section 713.14.1 Exception #5.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: Resolves the concern noted in the Committee's reason statement for "disapproval". No technical changes have been made in this code proposal to the existing requirements for smoke partitions from the 2012 IBC except to correlate with Section 716.5.9.3(11).

Revised matrix below explains how and where these revisions help correlate the existing requirements for smoke partitions to be more user-friendly and easier to find in the Code:

Smoke Partition Requirements in Section 710	**Where smoke partitions are required under the IBC**				**Comments**
	404.6 Exception: For Atrium enclosure	**407.3: I-2 corridor wall construction**	**407.4.3.2: I-2 care suite separation**	**713.14.1 Exception #5: Elevator lobby**	
~~**710.1 General.** Smoke partitions installed as required elsewhere in the code shall comply with this section.~~	✓	✓	✓	✓	See revision to Section 710.1 below.
710.1 General. The following wall assemblies shall comply with this section: 1. Walls separating atrium spaces as required by Section 404.6 Exception #1 2. Group I-2 corridor walls as required by Section 407.3. 3. Group I-2 care suite separations as required by Section 407.4.3.2. 4. Elevator lobby walls as required by Section 713.14.1 Exception #5.	✓	✓	✓	✓	User friendly because it would clarify in Section 710 where the 4 locations in the Code smoke partitions are required. Similar to existing Section 708.1 format that is for fire partitions.
710.2 Materials. The walls shall be of materials permitted by the building type of construction.	✓	✓	✓	✓	

Smoke Partition Requirements in Section 710	Where smoke partitions are required under the IBC				Comments
	404.6 Exception: For Atrium enclosure	**407.3: I-2 corridor wall construction**	**407.4.3.2: I-2 care suite separation**	**713.14.1 Exception #5: Elevator lobby**	
710.3 Fire-resistance rating. ~~Unless required elsewhere in the code,~~ ~~s~~Smoke partitions are not required to have a *fireresistance rating*.	Non-fire rated	Non-fire rated	Non-fire rated	Non-fire rated	The intent of smoke partitions is just to resist the passage of smoke, not to be a fire partition or fire barrier. If one desires a fire rating, then call it a smoke BARRIER and design it under Section 709 to get a one hour fire rated by way of Section 709.1
710.4 Continuity. Smoke partitions shall extend from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke.	✓	✓	✓	✓	
710.5 Openings. Openings in smoke partitions shall comply with Sections 710.5.1 and 710.5.2.	Only a pointer section to requirements below	Only a pointer section to requirements below	Only a pointer section to requirements below	Only a pointer section to requirements below	
710.5.1 Windows. Windows in smoke partitions shall be sealed to resist the free passage of smoke or be automatic-closing upon detection of smoke.	✓	✓	✓	✓	
710.5.2 Doors. Doors in smoke partitions shall comply with Sections 710.5.2.1 through 710.5.2.~~3~~2.	Only a pointer section to requirements below	Only a pointer section to requirements below	Only a pointer section to requirements below	Only a pointer section to requirements below	Deleted existing Section 710.5.2.2. See Comment to existing Section 710.5.2.2 below.
710.5.2.1 Louvers in Doors. Doors in smoke partitions shall not include louvers.	✓	✓	✓	✓	
~~**710.5.2.2 Smoke and draft control doors.**~~ ~~Where required elsewhere in the code, doors in smoke partitions shall meet the requirements for a smoke and draft control door assembly tested in~~	Not Required	Not Required	Not Required	✓ **713.14.1 Elevator lobby.** **Exceptions:** 5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is	Since on the elevator lobby exception requires smoke control doors, directly reference this requirement in Section 713.14.1 Exception #5 to

Smoke Partition Requirements in Section 710	Where smoke partitions are required under the IBC				Comments
	404.6 Exception: For Atrium enclosure	**407.3: I-2 corridor wall construction**	**407.4.3.2: I-2 care suite separation**	**713.14.1 Exception #5: Elevator lobby**	
~~accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.015424 m3/(s • m2)) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature test and the elevated temperature exposure test. Installation of smoke doors shall be in accordance with NFPA 105.~~				equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. ~~In addition to the requirements in Section 710 for smoke partitions,~~ ~~d~~<u>D</u>oors protecting openings in the<u>se walls</u> ~~smoke partitions~~ shall <u>be self- or automatic-closing upon detection of smoke in accordance with Section 716.5.9.3 and</u> also comply with Section~~s 710.5.2.2~~ <u>716.5.3.1.</u>, ~~710.5.2.3, and 716.5.9 and~~ <u>Smoke and draft control doors complying only with UL 1784 shall be permitted to show the letter "S" on the manufacturer's labeling.</u> ~~d~~<u>D</u>uct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 717.5.4.1. **Revise IBC Section 716.5.9.3(11) as follows:** 11. Doors installed in smoke partitions in accordance with Section<u>s</u> ~~710.5.2.3~~ <u>404.6 Exception and 713.14.1 Exception #5</u>.	Section 716.5.3.1 that is the same wording and requirement for "opening protectives" In addition, instead of referencing Sections 710.5.2.3 and 716.5.9, go directly to the requirement for self or automatic closing doors in Section 716.5.9.3. Also incorporate the approved code proposal FS43-12 as shown in Section 713.14.1 Exception #5 in the cell to the immediate left and correlated with Section 716.5.9.3(11) that is also shown in cell to the immediate left.

Smoke Partition Requirements in Section 710	Where smoke partitions are required under the IBC				Comments
	404.6 Exception: For Atrium enclosure	**407.3: I-2 corridor wall construction**	**407.4.3.2: I-2 care suite separation**	**713.14.1 Exception #5: Elevator lobby**	
710.5.2.3 Self- or automatic-closing doors. Where required elsewhere in the code, doors in smoke partitions shall be self- or automatic-closing by smoke detection in accordance with Section 716.5.9.3.	✓ **404.6 Exceptions:** A *fire barrier* is not required where a glass wall forming a smoke partition is provided. The glass wall shall comply with all of the following: 1.2. Where glass doors are provided in the glass wall, they shall be either *self-closing* or automatic closing <u>upon detection of smoke in accordance with Section 716.5.9.3.</u>	Not Required. Covered by Section 407.3.1: 407.3.1 Corridor doors. Corridor doors, other than those in a wall required to be rated by Section 509.4 or for the enclosure of a vertical opening or an exit, shall not have a required fire protection rating and shall not be required to be equipped with self-closing or automatic-closing devices, but shall provide an effective barrier to limit the transfer of smoke and shall be equipped with positive latching. Roller latches are not permitted. Other doors shall conform to Section 716.5.	Not Required	✓ See recommended revision to Exception #5 above and the comment.	For the two places in the Code that require the self or automatic closing doors for its smoke partitions it is more user friendly and more direct to incorporate the reference to Section 716.5.9.3 for the atrium and elevator exceptions.
710.6 Penetrations. The space around penetrating items shall be filled with an *approved* material to limit the free passage of smoke.	✓	✓	✓	✓	
710.7 Joints. Joints shall be filled with an *approved* material to limit the free passage of smoke.	✓	✓	✓	✓	

Smoke Partition Requirements in Section 710	Where smoke partitions are required under the IBC				Comments
	404.6 Exception: For Atrium enclosure	**407.3: I-2 corridor wall construction**	**407.4.3.2: I-2 care suite separation**	**713.14.1 Exception #5: Elevator lobby**	
710.8 Ducts and air transfer openings. The space around a duct penetrating a smoke partition shall be filled with an *approved* material to limit the free passage of smoke. Air transfer openings in smoke partitions shall be provided with a *smoke damper* complying with Section 717.3.2.2. **Exception:** Where the installation of a *smoke damper* will interfere with the operation of a required smoke control system in accordance with Section 909, *approved* alternative protection shall be utilized.	✓	✓	✓	✓	

Please note that if FS41-12 is "approved as modified" and FS43-12 is "approved as submitted" by the ICC Membership then the proper place for inclusion of the requirements for FS43-12 would be in Section 713.14.1 Exception #5 and should read as follows:

> 5. Smoke partitions shall be permitted in lieu of fire partitions to separate the elevator lobby at each floor where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. Doors protecting openings in these walls shall be self- or automatic-closing upon detection of smoke in accordance with Section 716.5.9.3 and also comply with Section 716.5.3.1.<u>Smoke and draft control doors complying only with UL 1784 shall be permitted to show the letter "S" on the manufacturer's labeling</u>. Duct penetrations of the smoke partitions shall be protected as required for corridors in accordance with Section 717.5.4.1.

FS41-12

Final Action: AS AM AMPC____ D

FS42-12
710.4

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare

Revise as follows:

710.4 Continuity. Smoke partitions shall extend from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke. <u>A lay-in ceiling system that is designed to limit the transfer of smoke shall be permitted. Hold-down clips for such ceilings shall not be required where the ceiling tiles will resist an uplifting force of at least one pound per square foot of tile.</u>

Reason: This proposal is submitted by the ICC Ad Hoc Committee for Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

Current interpretation of an allowable ceiling system is to be "monolithic." This type of ceiling is not feasible in a hospital setting, because main utility and ductwork lines run in the corridor to keep them out of patient care areas. This would facilitate the need for many access panels which compromise the smoke tight nature of the monolithic ceiling. The construction of the lay-in system would basically mean no open portions or gaps in the ceiling, either as an architectural feature or between items such as louvers. Normal ceiling fixtures such as lights, sprinkler heads, and diffusers and grills (as part of a fully ducted air system) can be considered part of the smoke tight system, as there is no opportunity for smoke to travel straight through them. A tight fitting lay-in grid is defined as one with no gaps in them, which is easily enforced via visual inspection and is therefore simply maintained.

The one pound per square foot weight can handle an updraft concerns because a facility equipped with QRS sprinklers will not generate enough heat to cause the updraft to move the tile. Hold-down clips in this instance would not be necessary, as the weight of the tile itself would be sufficient. Due to the need for access to above ceiling utilities, hold-down clips would interfere with maintenance and operations, which is why an updraft limitation is considered.

Since a fully ducted air handling system is required in the I-2 hospital occupancy, plenum ceilings that compromise the ceiling system are already prohibited.

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

710.4-FS-Williams-AdHocHealthcare

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee was concerned about enforceability of this proposal. For example, it is not clear how the minimum uplift force is measured. Further, it is not clear how the code official determines if a lay in ceiling limits the transfer of smoke. Lastly, the committee felt that this requirement should be limited to Group I-2 occupancies consistent with the proponent's reason statement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

John Williams, CBO, Chair, representing ICC Ad Hoc Committee on Healthcare, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

710.4 Continuity. Smoke partitions shall extend from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke. In Group I-2 hospitals, a lay-in ceiling system ~~that is designed to limit the transfer of smoke~~ shall be permitted~~. Hold-down clips for such ceilings shall not be required~~ where the ceiling tiles ~~will resist an uplifting force of~~ weigh at least one pound per square foot of tile.

Commenter's Reason: In response to the IBC-FS code development committee's concerns regarding this proposal, the terminology "Group I-2 hospitals" is being added in response to the concern of the committee that this code change be applicable to Group I-2 hospital occupancies only. Further to the committee's concerns, the enforceability of this proposal is accomplished by simple visual inspection for any noticeable gaps in the ceiling membrane. Visual inspection can be done by routine maintenance rounds or even by any staff member in the area. Any gap around light fixtures, sprinkler heads, ducted air registers or similar would constitute breach of the membrane, and visual inspection can be accomplished without use of ladders, removing ceiling tiles, or opening access hatches.

Lay in ceiling assemblies meeting this requirement would be consistent with listed fire resistance rated floor and roof ceiling assemblies using lay-in ceilings as a component of the assembly. Enforcement of this provision including fire code maintenance inspections would be far less challenging than currently exists for the fire-resistance rated floor- and roof-ceiling assemblies which require a specific manufacture's product for each of the assemblies that are listed by an approved testing facility. This proposal would allow any manufacturer's product to be used as long as it met the 1 pound per square foot criteria and other code requirements related to combustibility or flame spread. This is also supported by UL's BXUV Guide Information - Fire Resistance Ratings - ANSI/UL 263, Section III - FLOOR-CEILINGS AND ROOF-CEILINGS, Paragraph 10 which states "Hold down clips are required for assemblies incorporating ceiling panels weighing less that 1 lb per square foot."

The ceiling tile weight is also consistent with the findings of NBSIR 81-2444 Smoke Movement Through A Suspended Ceiling System (by John H Klote, 1982, NBS/VA), as noted on page 4 which states "[t]he ceiling tiles weighed 49.6 N/m2 (1.00 lb/ft2). During plan review, a cut sheet of the desired ceiling tile (readily available from any manufacturer) can be included in the review package or the one pound per square foot criteria can be listed in the specifications. The NBSIR 81-2444 report also notes in its abstract and conclusions that "smoldering fires of the type examined in this test series are not significant problems in hospitals." This is even more true today because of the expanded use of non combustible materials in construction as well as bedding and other typically used items in the hospital.

This public comment is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed code changes and public comments. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

Public Comment 2:

John Williams, CBO, Chair, representing ICC Ad Hoc Committee on Healthcare, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

710.4 Continuity. Smoke partitions shall extend from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke. In Group I-2 Condition 2, ~~A~~ a lay-in ceiling system that is designed to limit the transfer of smoke shall be permitted. Hold-down clips for such ceilings shall not be required where the ceiling tiles will resist an uplifting force of at least one pound per square foot of tile.

Commenter's Reason: Commenter's Reason: Code change FS42-12 is a technical change which included new text dealing with the acceptable use of lay-in ceiling systems to achieve smoke partition continuity. This public comment addresses the IBC-FS code development committee's suggestion that the revised text be applicable to only Group I-2 hospitals and is limited to the editorial coordination of terminology with approved Code change G257-12 which revised the terminology for Group I-2 occupancies into two use conditions, similar to the way the current code addresses Group I-3. In this case, hospitals fall under Group I-2, Condition 2. Since G257-12 deals only with terminology, this public comment is being submitted to FS42-12 in order to focus the attention only on the coordination of terminology issue.

This public comment is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed code changes and public comments. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

Analysis: Code change G257-12 was Approved as Modified at the Code Development Hearings and a public comment has not been submitted. Accordingly, it has been placed on the consent agenda.

Public Comment 3:

Wade Rudolph, CBET, CHFM, Sacred Heart Hospital, representing Wisconsin Healthcare Engineers Association Codes & Standards Committee, requests Approval as Submitted.

Commenter's Reason: The proposal as submitted by John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare should be accepted as proposed.

The rationale of the ICC committee to reject the proposal is invalid. Test methods can easily be developed to demonstrate compliance. For example a two foot by two foot ceiling tile is equal to 4 square feet. If four pounds of force are placed across the tile surface the tile would be required to stay in place.

The rationale of the ICC committee that the proposal should be restricted to I-2 occupancies has no basis. If the ceiling system works in an I-2 occupancy, why would it not be acceptable to use in a B or R occupancy?

The rationale for my supporting this comment is based on experience with an acutal fire event at a clinic in Janesville, Wisconsin in the early 1990s. A family practice residency center was about to open on the south side of Janesville. As the final punch list was being completed, one evening, someone threw into one of the exam room through an outside window a bottle of comubsitlbe liquid that was previously ignited. This obviously set the room of origin on fire. The fire consumed the cabinets, the carpet and the wall covering. The fire did not migrate above or past the two foot by 2 foot lay in acoustical ceiling tile in the ceiling of the room of origin. The room was properly constructed such that the fire eventually put itself out because the door from the room to the corridor was closed. There was no fire sprinkler system in this buidling.

In today's hospitals with quick respnse fire sprinkler systems, staff training to close door to the room of origin, and low hazards, there is no reason to believe that the ceiling tiles will not provide adquate protection against smoke transfer, provide heat containment (to activate the fire alarm system) and will suffice for dispersal of water discharged from the fire sprinkler system.

Monothithic ceilings are cost prohibitive to install, significantly increase risk of harm to pateints, and increase maintenance costs over the life of the buidling as plant operations and maintenance programs are working above ceilings every day making adjustments and repairs to the mechical ventilation, plumbing, electrical, and data systems. The disruption to patint care with monolithic ceiiling is much greater than a lay in acoustical ceiling simply because areas are harder to access, take more time to complete repairs above ceilling, and increase risk of mold growth above the ceilings that are not acoustical because they mask leaks much longer than acoustical lay in tile.

I am submitting this request on behalf of the Wisconsin Healthcare Engineers Association Codes & Standards committee representing over 700 members in the State of Wisconsin.

Thank you for your time and consideration of my comments.

FS42-12

Final Action: AS AM AMPC____ D

FS44-12
711.4.1, 712.1.17

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company (grkeith@mac.com)

Delete without substitution:

~~**711.4.1 Nonfire-resistance-rated assemblies.** Joints in or between floor assemblies without a required fire-resistance rating shall comply with one of the following:~~

1. ~~The joint shall be concealed within the cavity of a wall.~~
2. ~~The joint shall be located above the ceiling.~~
3. ~~The joint shall be sealed, treated or covered with an approved material or system to resist the free passage of flame and the products of combustion.~~

~~**712.1.17 Nonfire-resistance-rated joints.** Joints in or between floors without a required fire-resistance rating shall be permitted in accordance with section 711.4.1.~~

(Renumber subsequent sections)

Reason: Section 711.4.1 is new to the 2012 Edition of the IBC. The provision was included as a portion of Item FS56-09/10 that was a relatively comprehensive reorganization of Chapter 7 vertical opening provisions. In its published reason statement, the proponent of FS56-09/10 stated, "Most of the changes proposed by the study group are editorial in nature and will not change how the code is applied or used." Our main proposal includes only amendments that this group feels are editorial or very minor changes."

The fact of the matter is that the proposal included substantial technical revisions without benefit of any justification or discussion. Section 711.4.1 is one such provision. Section 711 applies to "horizontal assemblies." The definition of horizontal assembly in Section 202 states, "A fire-resistance rated floor or roof assembly of materials designed to restrict the spread of fire in which continuity is maintained." Section 711.1 states, "Floor and roof assemblies required to have a fire-resistance rating shall comply with this section." Additionally, it states, "Nonfire-resistance-rated floor and roof assemblies shall comply with Section 714.4.2." Section 714.4.2 provides for the protection of penetrations in non-fire-resistance-rated floor or roof assemblies.

Section 711.4.1 introduces new joint protection requirements for nonfire-resistance-rated floor assemblies where none previously existed. There was no technical justification for these more stringent provisions for non-rated construction. Additionally, there is no charging language to cause application of Section 711.4.1. Section 711.1 states that nonfire-resistance-rated floor and roof assemblies only need comply with Section 714.4.2, with no mention of Section 711.4.1. However, a new Section 712.1.17 does provide an off-handed allowance for joints in nonfire-resistive-rated floor assemblies that comply with Section 711.4.1.

The provisions of Section 711.4.1 are very severe in that they apply regardless of the number of connected stories. Inexplicably, fire protection requirements for non-rated construction continue to appear in the IBC without benefit of technical justification or statistical fire loss substantiation. The fact of the matter is that with only three exceptions (Groups B, F-2 and S-2), in unsprinklered buildings Table 601 only permits nonfire-resistance-rated floor construction in two story buildings. The IBC generally allows for two-story atmospheric communication, even in fire-resistance-rated types of construction.

Approval of this proposal will delete 2012 IBC Sections 711.4.1 and 712.1.17 and will return details of construction in nonfire-resistance-rated floor and roof assemblies to former levels that have proven to be appropriate based on the actual risk conditions as opposed to some unfounded hypothetical concern.

Cost Impact: None

711.4.1-FS-KEITH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the current language regarding joints in nonfire-resistance rated assemblies was appropriate as a minimum level of protection is also required for these locations.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Gregory R Keith, Professional Heuristic Development, representing The Boeing Company, requests Approval as Submitted.

Commenter's Reason: FS44-12 was submitted because Sections 711.4.1 and 712.1.17 were introduced into the 2012 IBC without technical vetting. These provisions were included as a portion of an allegedly "editorial" code change intending to reorganize Chapter 7 vertical openings requirements. Please bear in mind that these requirements introduce firestopping requirements for buildings of nonfire resistance rated construction. The risk associated with historically unprotected joints in these buildings of very limited height was never discussed or demonstrated.

Nevertheless, the ICC Fire Safety Code Committee disapproved FS44 and stated, "The committee felt that the current language regarding joints in nonfire-resistance rated assemblies was appropriate as a minimum level of protection is also required for these locations." Interestingly, the same proponent that submitted FS56-09/10 that created these requirements, submitted FS50-12 for the current code development cycle. The published reason statement for FS50 declared, "This proposal reorganizes some sections of Chapter 7 in order to clarify the provisions for protection of vertical openings." It goes on to say, "This proposal corrects an inconsistency in Section 711 with regard to non-rated floor and roof assemblies." It is true that Section 711.4.1 was eliminated by FS50 that would have corrected the inconsistency. However, the provision was moved verbatim to Section 712.1.5.2 resulting in no correction whatsoever. Typically, a proponent is required to technically substantiate increased levels of fire protection based on objective analysis, testing and/or loss data. There was absolutely no discussion of the need for increased joint protection in buildings of nonfire-resistance rated construction. A vote by the ICC membership to approve FS44 as submitted will validate the fundamental system of the code development process; that is, the vetting of the merits or demerits of a proposed technical code change.

Public Comment 2:

Eirene Oliphant, MCP, BRR Architecture, requests Approval as Submitted.

Commenter's Reason: The proponent provided sufficient argument in his reason statement that there was no technical justification or evidence of substantial fire loss statistics to require protection of any non-rated construction. In the report of the public hearing, the committee felt that the current language regarding joints in nonfire-resistance rated assemblies was appropriate as a minimum level of protection is also required for these locations. When there is no fire resistance rating required, where can any previous code language be found that required any joint to be protected? There never has been until this addition to the 2012 IBC. This language should have never been permitted to be part of the IBC. Yes, a sealed joint will slow down the spread of smoke and toxic gases, but at what cost to protect the joint when the assembly itself may have already been compromised? Is protecting the joint really the answer? If not, for other than for aesthetic purposes, why do we need code language to address joints in non-rated assemblies? The building code already applies an equivalent risk to buildings which have non-rated assemblies. Why do we need to keep language that addresses "what if" conditions versus language which does address actual risk conditions? If we wrote the code to address "what if" conditions, the code book could be at least twice its current size.

FS44-12
Final Action: AS AM AMPC____ D

FS45-12
711.5

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company (grkeith@mac.com)

Revise as follows:

711.5 Penetrations. Penetrations of horizontal assemblies~~, whether concealed or unconcealed,~~ shall comply with Section 714**.**

Reason: Section 711.5 was modified in the 2012 Edition of the IBC. The provision was included as a portion of Item FS56-09/10 that was a relatively comprehensive reorganization of Chapter 7 vertical opening provisions. In its published reason statement, the proponent of FS56-09/10 stated, "Most of the changes proposed by the study group are editorial in nature and will not change how the code is applied or used." Our main proposal includes only amendments that this group feels are editorial or very minor changes."

Although 2012 Section 711.5 has no marginal reference indicating a technical change from the 2009 Edition of the IBC, the fact of the matter is that FS56-09/10 included a substantial technical revision without any justification or discussion. That was, the qualification that Section 714 penetration protection requirements apply "whether the penetration is concealed or unconcealed."

"Concealed" and "unconcealed" are terms that are neither defined in Section 202 nor used in technical context in Section 711, Horizontal Assemblies or Section 714, Penetrations. The terms will create confusion and lend to inconsistent interpretations of fundamental horizontal assembly penetration protection provisions. Some may argue that a penetration of a horizontal assembly occurring within a shaft enclosure is concealed, and therefore requires additional protection.

Section 714.4 currently adequately addresses horizontal assembly penetration conditions. The "through penetration" and "membrane penetration" concept has been in place for many IBC editions and is understood by code practitioners. There is no demonstrated need to further clarify these provisions. The 2012 language confuses the fundamental provisions.

Since there was no technical substantiation of this language as a portion of a code change represented as being editorial, it is unknown what is actually intended by this ambiguous terminology. As stated, it will create doubt and generate protection of construction features beyond those conditions currently addressed in the IBC.

Until Section 714.4 is rewritten to specifically address what concealed and unconcealed construction actually is and what is technical requirements potentially apply to these design conditions, the charging terminology should be removed from Section 711.5. It is certainly a subject area deserving of technical vetting that did not occur during the approval of FS56-09/10. Approval of this proposal will restore Section 711.5 to its former, understandable intent.

Cost Impact: None

711.5-FS-KEITH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the current language was used elsewhere in the code was appropriate to describe penetrations of horizontal assemblies.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Submitted.

Commenter's Reason: FS45-12 was submitted because Section 711.5 requirements were increased in the 2012 IBC without technical vetting. These provisions were included as a portion of an allegedly "editorial" code change intending to reorganize Chapter 7 vertical openings requirements. The provision broadened the scope of penetration protection requirements in horizontal assemblies by adding the words, "whether concealed or unconcealed." The intent or need for this more stringent requirement was never discussed or justified.

Nevertheless, the ICC Fire Safety Code Committee disapproved FS45 and stated, "The committee felt that the current language was used elsewhere in the code was appropriate to describe penetrations of horizontal assemblies." Although it is true that "concealed and unconcealed" conditions are addressed in the IBC, they are not used in the context of penetration protection for horizontal assemblies. As was pointed out in the FS45 reason statement, "Concealed" and "unconcealed" are terms that are neither defined in Section 202 nor used in technical context in Section 711, Horizontal Assemblies or Section 714, Penetrations. The terms will create confusion and lend to inconsistent interpretations of fundamental horizontal assembly penetration protection provisions. Some may argue that a penetration of a horizontal assembly occurring within a shaft enclosure is concealed, and therefore requires additional protection."

Typically, a proponent is required to technically substantiate increased levels of fire protection based on objective analysis, testing and/or loss data. There was absolutely no discussion of the need for increased scope in horizontal assembly penetration requirements. A vote by the ICC membership to approve FS45 as submitted will validate the fundamental system of the code development process; that is, the vetting of the merits or demerits of a proposed technical code change.

FS45-12

Final Action: AS AM AMPC____ D

FS47-12
711.9

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare

Revise as follows:

711.9 Smoke barrier. Where *horizontal assemblies* are required to resist the movement of smoke by other sections of this code in accordance with the definition of *smoke barrier*, penetrations and joints in such *horizontal assemblies* shall be protected as required for *smoke barriers* in accordance with Sections 714.5 and 715.6. ~~Regardless of the number of *stories* connected by elevator shaft enclosures,~~ doors located in elevator shaft enclosures that penetrate the *horizontal assembly* shall be protected <u>in accordance</u> ~~by enclosed elevator lobbies complying~~ with Section 713.14.1. Openings through *horizontal assemblies* shall be protected by shaft enclosures complying with Section 713. *Horizontal assemblies* shall not be allowed to have unprotected vertical openings.

Reason: The reason for this change is to clarify the code. This code changes addresses text new in the 2009 IBC. The new text creates in effect a hidden requirement for elevator lobbies. We are proposing to clearly direct user of the code to Section 713.14.1 for the scoping language for elevator lobbies, as well as construction methods and any exceptions.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

Cost Impact: None

Analysis: FS47 revises provisions for in elevator shaft enclosures. FS48 and FS49 delete these provisions. The committee needs to make its intent clear with respect to these provisions.

711.9-FS-Williams-Adhoc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee preferred the actions taken on FS50-12. Further, the proponent requested disapproval based on the committee's actions on FS50-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Wade Rudolph, CBET, CHFM, Sacred Heart Hospital, representing Wisconsin Healthcare Engineers Association Codes & Standards Committee, requests Approval as Submitted.

Commenter's Reason: The requirement for elevator lobbies in healthcare occupancies does not add safety or improve egress capabilty in the event of evacuation. The requirement for the lobby on each floor will increase area requirements as well as expense of new construction.

Allow me to explain. When there is need to evacuate a hospital in a timely manner, the elevators are used for patients who are not ambulatory. This is the most expeditious way to evacauate patients. Putting another set of doors between the patients and the elevators will cause an additional unneeded barrier as the buildings already have two zones on each floor. Simply moving the bed through these doors will cause the doors to be held open so any protection will be lost during this time as well as slow down the evacuation effort. Hospital colleagues are trained to immediately evacuate horizontally to the next smoke zone. This movement of patients is quick and has been demonstrated to be very efficient. If anyone on the ICC committee has not seen this drill conducted, I would encourage them to visit their local hospital to have horizontal evacuation demonstrated to them.

If for some reason there is a rare need in a new facility (with the quick response sprinklers) to move vertically, the doors to the required lobby would prohibit smooth evacuation.

As healthcare is required to provide elevators for patient bed transfer, the size of the elevator lobby would be a significant addition of space to the foot print outside each elevator. The bed would need room to move the bed into the lobby, rotate to enter the elevator (in most cases two banks) such that a lobby would required at least 195 square feet per floor for a two bank elevator that transports patients. This equates to approximately $63,000 per floor for each two bank elevator.

The quick response sprinklers in hospitals (which are low hazard occupancies) have demonstrated that the fire will be contained in the room of origin such that the need for additional "safe" areas are not justified.

I am submitting this request for the ICC to reconsider its rejection on behalf of the Wisconsin Healthcare Engineers Association Codes & Standards Committee representing over 700 members in the State of Wisconsin.

Thank you for your time and consideration of my comments.

Analysis: FS47 revises provisions for in elevator shaft enclosures. FS50 deletes these provisions. The membership needs to make its intent clear with respect to these provisions.

FS47-12

Final Action: AS AM AMPC____ D

FS50-12
711, 712, 713, 714

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

SECTION 711
FLOOR AND ROOF ASSEMBLIES ~~HORIZONTAL ASSEMBLIES~~

711.1 General. ~~Floor and roof assemblies required to have a fire-resistance rating~~ Horizontal assemblies shall comply with Section 711.2 ~~this section~~. Nonfire-resistance-rated floor and roof assemblies shall comply with Section 711.3 ~~714.4.2~~.

711.2 Horizontal assemblies. Horizontal assemblies shall comply with Sections 711.2.1 through 711.2.6.

711.2.1 ~~711.2~~ Materials. ~~The floor and roof~~ Assemblies shall be of materials permitted by the building type of construction.

711.2.2 ~~711.4~~ Continuity. Assemblies shall be continuous without vertical openings, ~~penetrations or joints~~ except as permitted by this section and Section~~s~~ 712.~~2, 714.4, 715, 1009.3 and 1022.1~~. ~~Skylights and other penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof assembly is maintained. Unprotected skylights shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 705.8.6.~~ The supporting construction shall be protected to afford the required *fireresistance rating* of the *horizontal assembly* supported.

> **Exception:** In buildings of Type IIB, IIIB or VB construction, the construction supporting the *horizontal assembly* is not required to be fire-resistance-rated at the following:
>
> 1. Horizontal assemblies at the separations of incidental uses as specified by Table 509, provided the required *fire-resistance rating* does not exceed 1 hour.
> 2. Horizontal assemblies at the separations of *dwelling units* and *sleeping units* as required by Section 420.3.
> 3. Horizontal assemblies at *smoke barriers* constructed in accordance with Section 709.

711.2.3 Supporting construction. The supporting construction shall be protected to afford the required fire-resistance rating of the horizontal assembly supported.

> **Exception:** In buildings of Type IIB, IIIB or VB construction, the construction supporting the horizontal assembly is not required to be fire-resistance-rated at the following:
>
> 1. Horizontal assemblies at the separations of incidental uses as specified by Table 509 provided the required fire-resistance rating does not exceed 1 hour.
> 2. Horizontal assemblies at the separations of dwelling units and sleeping units as required by Section 420.3.
> 3. Horizontal assemblies at smoke barriers constructed in accordance with Section 709.

711.2.4 ~~711.3~~ Fire-resistance rating. The fire-resistance rating of ~~floor and roof~~ horizontal assemblies shall comply with Sections 711.2.4.1 through 711.2.4.6 but shall not be less than that required by the building type of construction.

711.2.4.1 Separating mixed occupancies. Where the ~~floor~~ horizontal assembly separates mixed occupancies, the assembly shall have a fire-resistance rating of not less than that required by Section 508.4 based on the occupancies being separated.

711.2.4.2 Separating fire areas. Where the ~~floor~~ horizontal assembly separates a single occupancy into different fire areas, the assembly shall have a fire-resistance rating of not less than that required by Section 707.3.10.

711.2.4.3 Dwelling units and sleeping units. Where the horizontal assemblies separating dwelling units in the same building ~~and horizontal assemblies separating~~, or sleeping units in the same building, the assembly shall be a minimum of 1-hour fire-resistance-rated construction.

> **Exception:** Horizontal assemblies separating dwelling units and sleeping units shall be a minimum of ½ hour fire-resistance-rated construction ~~separations~~ in a building~~s~~ of Type IIB, IIIB and VB construction, ~~shall have fire-resistance ratings of not less than 1/2 hour in~~ when the building~~s~~ is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

711.2.4.4 Separating smoke compartments. Where the horizontal assembly is required to be a smoke barrier, the assembly shall comply with Section 709.

711.2.4.5 Separating incidental uses. Where the horizontal assembly separates incidental uses from the remainder of the building, the assembly shall have a fire-resistance rating of not less than that required by Section 509**.**

711.2.4.6 Other separations. Where a horizontal assembly is required by other sections of this code, it shall have a fire-resistance rating of not less than that required by that section**.**

711.2.5 ~~**711.3.1**~~ **Ceiling panels.** Where the weight of lay-in ceiling panels, where used as part of fire-resistance-rated floor/ceiling or roof/ceiling assemblies, is not adequate to resist an upward force of 1 pound per square foot (48 Pa), wire or other approved devices shall be installed above the panels to prevent vertical displacement under such upward force.

711.2.6 ~~**711.3.3**~~ **Unusable space.** In 1-hour fire-resistance-rated floor/ceiling assemblies, the ceiling membrane is not required to be installed over unusable crawl spaces. In 1-hour fire-resistance-rated roof assemblies, the floor membrane is not required to be installed where unusable attic space occurs above.

711.3 Nonfire-resistance rated floor and roof assemblies. Nonfire-resistance rated floor, floor/ceiling, roof and roof/ceiling assemblies shall comply with Sections 711.3.1 and 711.3.2.

711.3.1 Materials. Assemblies shall be of materials permitted by the building type of construction.

711.3.2 Continuity. Assemblies shall be continuous without vertical openings, except as permitted by Section 712.

~~**711.5 Penetrations.** Penetrations of horizontal assemblies, whether concealed or unconcealed, shall comply with Section 714.~~

~~**711.7 Ducts and air transfer openings.** Penetrations in horizontal assemblies by ducts and air transfer openings shall comply with Section 717.~~

~~**711.9 Smoke barrier.** Where horizontal assemblies are required to resist the movement of smoke by other sections of this code in accordance with the definition of smoke barrier, penetrations and joints in such horizontal assemblies shall be protected as required for smoke barriers in accordance with Sections 714.5 and 715.6. Regardless of the number of stories connected by elevator shaft enclosures, doors located in elevator shaft enclosures that penetrate the horizontal assembly shall be protected by enclosed~~

~~elevator lobbies complying with Section 713.14.1. Openings through horizontal assemblies shall be protected by shaft enclosures complying with Section 713. Horizontal assemblies shall not be allowed to have unprotected vertical openings.~~

SECTION 712
VERTICAL OPENINGS

712.1 General. ~~The provisions of this section shall apply to the~~ Each vertical opening ~~applications~~ ~~listed~~ shall comply with one of the protection methods in Sections 712.1.1through 712.1.16~~8~~.

712.1.1 Shaft enclosures. Vertical openings contained entirely within a shaft enclosure complying with Section 713 shall be permitted.

712.1.2 Individual dwelling unit. Unconcealed vertical openings totally within an individual residential dwelling unit and connecting four stories or less shall be permitted.

712.1.3 Escalator openings. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, vertical openings for ~~an~~ escalators ~~opening~~ shall be permitted when protected according to Section 712.1.3.1 or 712.1.3.2.

712.1.3.1 Opening size. Protection by a draft curtain and closely spaced sprinklers in accordance with NFPA 13 shall be permitted where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the escalator. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.

712.1.3.2 Automatic shutters. Protection of the vertical opening by approved shutters at every penetrated floor shall be permitted in accordance with this section. The shutters shall be of noncombustible construction and have a *fire-resistance rating* of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3.1 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from.

712.1.4 Penetrations. Penetrations, concealed and unconcealed, shall be permitted where protected in accordance with Section 714.

712.1.5 Joints. Joints shall be permitted where complying with Section 712.1.5.1 or 712.1.5.2, as applicable.

712.1.5.1 ~~711.6~~ Joints in or between horizontal assemblies. Joints made in or between horizontal assemblies shall comply with Section 715. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be permitted when protected in accordance with Section 715.4.

712.1.5.2 ~~711.4.1~~ Joints in or between nonfire-resistance-rated floor assemblies. Joints in or between floors without a required *fire-resistance rating* shall be permitted when they comply with one of the following:

1. The joint shall be concealed within the cavity of a wall.
2. The Joint shall be located above a ceiling.
3. The joint shall be sealed, treated or covered with an approved material or system to resist the free passage of flame and the products of combustion.

   Exception: Joints meeting one of the ~~joint~~ exceptions listed in Section 715.1.

712.1.6 ~~**712.1.5**~~ **Ducts and air transfer openings.** Penetrations by ducts and air transfer openings shall be protected in accordance with Section 717~~.6~~. Grease ducts shall be protected in accordance with the *International Mechanical Code*.

712.1.7 ~~**712.1.6**~~ **Atriums.** In other than Group H occupancies, atriums complying with Section 404 shall be permitted.

712.1.8 ~~**712.1.7**~~ **Masonry chimney.** Approved vertical openings for masonry chimneys shall be permitted where the annular space is fireblocked at each floor level in accordance with Section 718.2.5.

712.1.9 ~~**712.1.8**~~ **Two-story openings.** In other than Groups I-2 and I-3, a ~~floor~~ vertical opening that is not used as one of the applications listed in this section shall be permitted if it complies with all of the items below.

1. Does not connect more than two stories.
2. Does not contain a stairway or ramp required by Chapter 10.
3. Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments.
4. Is not concealed within the construction of a wall or a floor/ceiling assembly.
5. Is not open to a corridor in Group I and R occupancies.
6. Is not open to a corridor on nonsprinklered floors.
7. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

712.1.10 ~~**712.1.9**~~ **Parking garages.** Vertical openings in parking garages for automobile ramps, elevators and duct systems shall comply with Section 712.1.10.1, 712.1.10.2 or 712.1.10.3 as applicable.
NOTE: Editorial

712.1.10.1 Automobile ramps. Vertical openings for automobile ramps in open and enclosed parking garages shall be permitted where constructed in accordance with Sections 406.5 and 406.6, respectively.

712.1.10.2 ~~**712.1.15**~~ **Elevators** ~~**in parking garages.**~~ Vertical openings for elevator hoistways in open or enclosed parking garages that serve only the parking garage, and complying with Sections 406.5 and 406.6 respectively, shall be permitted.

712.1.10.3 ~~**712.1.16**~~ **Duct systems** ~~**in parking garages.**~~ Vertical openings for mechanical exhaust or supply duct systems in open or enclosed parking garages complying with Sections 406.5 and 406.6 respectively, shall be permitted to be unenclosed where such duct system is contained within and serves only the parking garage.

712.1.11 ~~**712.1.10**~~ **Mezzanine.** Vertical openings between a mezzanine complying with Section 505 and the floor below shall be permitted.

~~**712.1.11 Joints.** Joints shall be permitted where complying with Section 715.~~

712.1.12 Unenclosed stairs and ramps. Vertical ~~floor~~ openings created by unenclosed stairs or ramps in accordance with Sections 1009.2 and 1009.3 shall be permitted.

712.1.13 Openings. ~~**Floor fire doors.**~~ Vertical openings for floor fire doors and access doors shall be permitted where protected by Section 712.1.13.1 or Section 712.1.13.2 as applicable. ~~floor fire doors in accordance with Section 711.8~~.

712.1.13.1 ~~**711.8**~~ **Floor fire door assemblies.** Floor fire door assemblies used to protect openings in fire-resistance-rated floors shall be tested in accordance with NFPA 288, and shall achieve a fire-resistance rating not less than the assembly being penetrated. Floor fire door assemblies shall be labeled by an approved agency. The label shall be permanently affixed and shall specify the manufacturer, the test standard and the fire-resistance rating.

<u>712.1.13.2</u> ~~711.3.2~~ Access doors. Access doors shall be permitted in ceilings of fire-resistance-rated floor/ceiling and roof/ceiling assemblies provided such doors are tested in accordance with ASTM E 119 or UL 263 as horizontal assemblies and labeled by an approved agency for such purpose.

712.1.14. Group I-3. In Group I-3 occupancies, vertical openings shall be permitted in accordance with Section 408.5.

~~**712.1.17 Nonfire-resistance-rated joints.** Joints in or between floors without a required *fire-resistance rating* shall be permitted in accordance with Section 711.4.1.~~

<u>**712.1.15 Skylights.** Skylights and other penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof assembly is maintained. Unprotected skylights shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 705.8.5. The supporting construction shall be protected to afford the required fire-resistance rating of the horizontal assembly supported.</u>

<u>712.1.16</u> ~~712.1.18~~ Openings otherwise permitted. Vertical openings shall be permitted where allowed by other sections of this code.

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure <u>has an opening</u> ~~connects more than three stories~~ . The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 708 for fire partitions , doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

<u>1.</u> <u>In other than Group I-2 or I-3 occupancies, an enclosed elevator lobby shall not be required where an elevator shaft enclosure connects not more than three stories.</u>

<u>2</u>~~1~~ Enclosed elevator lobbies are not required at the level(s) of *exit discharge*, provided the level(s) of *exit discharge* is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

<u>3</u>~~2~~. Elevators not required to be located in a shaft in accordance with Section 712.1 are not required to have enclosed elevator lobbies.

<u>4</u>~~3~~. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall comply with the smoke and draft control door assembly requirements in Section 716.5.3.1 when tested in accordance with UL 1784 without an artificial bottom seal.

<u>5</u>~~4~~. Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:

<u>5.1</u>~~4.1.~~ Group I-2 occupancies;

<u>5.2</u>~~4.2~~. Group I-3 occupancies; and

<u>5.3</u>~~4.3~~. Elevators serving floor levels over 75 feet (22 860 mm) above the lowest level of fire department vehicle access in high-rise buildings.

<u>6</u>~~5~~. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 710 for smoke partitions, doors protecting openings in the smoke partitions shall also

comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 717.5.4.1.

7~~6~~. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21.

8~~7~~. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.5.

714.4 Horizontal assemblies. Penetrations of a fire-resistance rated ~~-~~floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a shaft by Section 712.1 shall be protected in accordance with Sections 714.4.1 through 714.4.4 ~~714.4.2.2~~.

~~**714.4.1 Fire-resistance-rated assemblies.** Penetrations of the fire-resistance-rated floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly shall comply with Sections 714.4.1.1 through 714.4.1.4. Penetrations in horizontal smoke barriers shall also comply with 714.5.~~

714.4.1 ~~714.4.1.1~~ Through penetrations. Through penetrations of ~~fire-resistance-rated~~ horizontal assemblies shall comply with Section 714.4.1.1 or 714.4.1.2 ~~714.4.1.1.1 or 714.4.1.1.2~~.
(exceptions to remain unchanged)

714.4.1.1 ~~714.4.1.1.1~~ Installation. Through penetrations shall be installed as tested in the approved fire-resistance-rated assembly.

714.4.1.2 ~~714.4.1.1.2~~ Through-penetration firestop system. Through penetrations shall be protected by an approved through-penetration firestop system installed and tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch of water (2.49 Pa). The system shall have an F rating/T rating of not less than 1 hour but not less than the required rating of the floor penetrated.

Exceptions:

1. Floor penetrations contained and located within the cavity of a wall above the floor or below the floor do not require a T rating.
2. Floor penetrations by floor drains, tub drains or shower drains contained and located within the concealed space of a horizontal assembly do not require a T rating.

714.4.2 ~~714.4.1.2~~ Membrane penetrations. Penetrations of membranes that are part of a horizontal assembly shall comply with Section 714.4.1.1 or 714.4.1.2 ~~714.4.1.1.1 or 714.4.1.1.2~~. Where floor/ceiling assemblies are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

(Potions of text not shown remain unchanged)

714.4.3 ~~714.4.1.3~~ Dissimilar materials. Noncombustible penetrating items shall not connect to combustible materials beyond the point of firestopping unless it can be demonstrated that the fire-resistance integrity of the horizontal assembly is maintained.

714.4.4 ~~714.5~~ Penetrations in smoke barriers. Penetrations in *smoke barriers* shall be protected by an approved *through-penetration firestop system* installed and tested in accordance with the requirements of UL 1479 for air leakage. The *L rating* of the system measured at 0.30 inch (7.47 Pa) of water in both the ambient temperature and elevated temperature tests, shall not exceed**:**

1. 5.0 cfm per square foot (0.025m3 / s · m2) of penetration opening for each *through-penetration firestop system*; or
2. A total cumulative leakage of 50 cfm (0.024m3/s) for any 100 square feet (9.3 m2) of wall area, or floor area.

<u>714.5</u> ~~714.4.2~~ Nonfire-resistance-rated assemblies. Penetrations of nonfire-resistance-rated floor or floor/ceiling assemblies or the ceiling membrane of a nonfire-resistance-rated roof/ceiling assembly shall meet the requirements of Section 713, or shall comply with Section <u>714.5.1 or 714.5.2</u> ~~714.4.2.1 or 714.4.2.2~~.

<u>714.5.1</u> ~~714.4.2.1~~ Noncombustible penetrating items. Noncombustible penetrating items that connect not more than five stories are permitted, provided that the annular space is filled to resist the free passage of flame and the products of combustion with an approved noncombustible material or with a fill, void or cavity material that is tested and classified for use in through-penetration firestop systems.

<u>714.5.2</u> ~~714.4.2.2~~ Penetrating items. Penetrating items that connect not more than two stories are permitted, provided that the annular space is filled with an approved material to resist the free passage of flame and the products of combustion.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/default.aspx. Since its inception in April/2005, the CTC has held twenty two meetings - all open to the public.
This proposed change is a result of the CTC's investigation of vertical openings through the Vertical Opening Study Group, which is part of the area of study, entitled "Balanced Fire Protection." The scope of the activity is noted as:

"To investigate what constitutes an acceptable balance between active fire protection and passive fire protection measures with respect to meeting the fire and life safety objectives of the IBC."

This proposal reorganizes some sections of Chapter 7 in order to clarify the provisions for protection of vertical openings. In the last code cycle, FS56-09/10 removed some inconsistencies, conflicts and obsolete language in Chapter 7, and eliminated some "do loops" that sent the code user in circles. This code change continues to take the code in the direction established by FS56. As with FS56-09/10, these proposed changes are editorial in nature and will not change how the code is applied. The primary change is to distinguish the different functions of Sections 711 and 712. Section 711 will contain only provisions for construction of horizontal assemblies and floor assemblies; Section 712 will contain all the initial provisions for vertical openings. In the 2012 IBC, Section 711 has a mixture of provisions related to assembly construction and to protection of vertical openings. In this proposal, all those provisions related to vertical openings are relocated to Section 712.

This proposal corrects an inconsistency in Section 711 with regard to non-rated floor and roof assemblies. The charging language in Section 711.1 of the 2012 code says that only rated horizontal assemblies are required to comply with Section 711; non-rated floor and roof assemblies are required to comply only with Section 714.4.2. However, Section 711.4.1 is titled "nonfire-resistance-rated assemblies" and contains provisions that are meant to apply to non-rated assemblies. This proposal corrects that anomaly by dividing Section 711 into separate subsections for rated and nonrated assemblies, and revising Section 711.1 to state that non-rated assemblies are required to comply with 711.3.

The specific changes include the following.
<u>Sec. 711.1</u>: The charging language is revised to clarify that rated assemblies are required to comply with Section 711.2 ("Horizontal assembly" is defined in Chapter 2 as "a fire-resistance-rated floor or roof assembly …"). Nonrated assemblies are required to comply with Section 711.3.
<u>Sec. 711.2</u>: A new subsection is created that applies only to rated horizontal assemblies. The provisions of Section 711.3 through 711.3.2 are separated into subsections with no change to the requirements. New subsections 711.2.4.4, 711.2.4.5 and 711.2.4.6 are added so that all the requirements for fire-resistance rating of horizontal assemblies are included in 711.
<u>711.2.2 & 711.2.3</u>: The language currently found in Section 711.4, Continuity, is moved closer to the beginning of the section and divided into two subsections to draw attention to the fact that the two provisions deal with separate subjects.
<u>711.3.2 (2012 IBC):</u> This section is being moved to Section 712 (712.1.13) because it applies to a vertical opening rather than a horizontal or floor assembly.
<u>711.3:</u> A new subsection is created that includes basic provisions for non-rated assemblies.
<u>Sec. 711.4 (2012 IBC)</u>: The first sentence is relocated to new Section 711.2.1. The sentence that addresses skylights is moved to Section 712 (712.1.15) because it applies to a vertical opening rather than a horizontal or floor assembly. The last sentence and the exception are relocated to new Section 711.2.3.
<u>Secs 711.5-711.8</u>: All these sections pertain to protection of vertical openings and are relocated to Section 712.
<u>Sec. 711.9</u>: The provisions related to elevator lobbies are moved to Section 713.14 except the last sentence which is deleted because it is covered by Section 712.
<u>Sec. 712.1</u>: The charging language is revised to state more clearly that all vertical openings are required to be protected with one of the methods described in Section 712.
<u>Sec. 712.1.5</u>: 2012 Section 711.4.1 is relocated to 712 because it pertains to protection of vertical openings.
<u>Sec. 712.1.10</u>: The provisions related to vertical openings in parking garages are collected in this section. 712.1.10.1 is taken from current Sec. 712.1.9; 712.1.10.2 is taken from current Sec. 714.1.15; and 712.1.10.3 is taken from current Sec. 712.1.16.
<u>Sec. 712.1.11</u>: The current section moved to Section 712.1.5.
<u>Sec. 712.1.13</u>: Provisions related to opening protectives are collected together in new subsections. Sec. 712.1.13.1 relocated the provisions for floor fire door assemblies from current Sec. 711.8; Sec. 712.1.13.2 is relocated from current Sec. 711.3.2.
<u>Sec. 712.1.15</u>: A portion of current Sec. 711.4 is relocated here.

Sec. 713.14.1: This section is revised to accommodate provisions currently found in Section 711.9. Lobbies will still be required in most buildings only if there are more than 3 stories. However, the 3-story limitation is moved to an exception in order to incorporate the provision from 711.9 that requires lobbies whenever an elevator penetrates a smoke barrier. The exception mentions Group I-2 and I-3 occupancies because that is where smoke barriers are used.
Sec. 714.4: Sec. 714.4 is separated into separate sections for horizontal assemblies and non-rated assemblies.

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

711-FS-BALDASSARRA-CTC

Public Hearing Results

Committee Action: Approved a s Modified

Modify proposal as follows:

711.2.2 Continuity. Assemblies shall be continuous without vertical openings, except as permitted by this section and Section 712. ~~The supporting construction shall be protected to afford the required *fireresistance rating* of the *horizontal assembly* supported.~~

> ~~**Exception:** In buildings of Type IIB, IIIB or VB construction, the construction supporting the *horizontal assembly* is not required to be fire-resistance-rated at the following:~~
>
> ~~1. Horizontal assemblies at the separations of incidental uses as specified by Table 509, provided the required *fire-resistance rating* does not exceed 1 hour.~~
> ~~2. Horizontal assemblies at the separations of *dwelling units* and *sleeping units* as required by Section 420.3.~~
> ~~3. Horizontal assemblies at *smoke barriers* constructed in accordance with Section 709.~~

712.1.12 Unenclosed stairs and ramps. Vertical openings created by unenclosed stairs or ramps in accordance with Section~~s~~ ~~1009.2 and~~ 1009.3 shall be permitted.

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure ~~has an opening~~ connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 708 for fire partitions , doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

> **Exceptions:**
>
> ~~1. In other than Group I-2 or I-3 occupancies, an enclosed elevator lobby shall not be required where an elevator shaft enclosure connects not more than three stories.~~
>
> *(Renumber remaining exceptions)*

(Portions of the proposal not shown remain unchanged)

Committee Reason: The committee agreed that the reorganization of portions of Chapter 7 in order to clarify the protection requirements related to vertical openings is appropriate. The modification removes redundant language from 711.2.2, removes an inappropriate section reference in Section 712.1.12 and revises Section 713.14.1 to remove conflicts with other proposals.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Robert J Davidson, Davidson Code Concepts, LLC, representing self, requests Disapproval.

Commenter's Reason: This proposal was proposed and presented as reorganizing language, removing some inconsistencies and conflicts and removal of old language. Unfortunately new language, (added last cycle), was deleted without replacement.

2012 IBC Section 711 .9 Smoke Barrier was added to make sure the horizontal assemblies protecting smoke compartments were properly constructed. The reason statement claims that the provisions from 711.9 were moved to 713.14, however, corresponding language cannot be found in the new language. One major elimination is the requirement for an elevator lobby when an elevator shaft penetrates a horizontal assembly that forms the boundary for a smoke compartment.

Analysis: FS47 revises provisions for in elevator shaft enclosures in Section 711.9. FS50 deletes Section 711.9. The membership needs to make its intent clear with respect to these provisions.

FS50-12
Final Action: AS AM AMPC____ D

FS65-12
713.14.1

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare

Revise as follows:

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 708 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the level(s) of *exit discharge*, provided the level(s) of *exit discharge* is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 712.1 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall comply with the smoke and draft control door assembly requirements in Section 716.5.3.1 when tested in accordance with UL1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   ~~4.1 Group I-2 occupancies~~
   4.1~~2~~ Group I-3 occupancies; and
   4.2~~3~~ Elevators serving floor levels over 75 feet above the lowest level of fire department vehicle access in high-rise buildings.
5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 710 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21. 7. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.5.

Reason: Previous to the 2009 version, the IBC did not require hospitals, nursing homes and boarding homes to provide elevator lobbies if the building was provided with fire sprinklers. Elevator lobbies serve no purpose on floors of facilities that "defend in place". It is a long standing practice in healthcare to evacuate patients to the adjacent smoke compartment instead of evacuating them out of the building. Group I-2 provides smoke compartmentation for an added level of protection against the spread of smoke through the building. Floors are separated into at least two smoke compartments by rated construction and provide passive protection in addition to the active protection of a sprinkler system. These compartments in effect serve the same purpose as an elevator lobby.

The addition of elevator lobbies in these facilities could complicate the movement of patients to the adjacent smoke compartment by adding doors that bedridden patients must be transferred through. While alternatives to elevator lobbies exist, all increase construction cost for facility type who have a good fire record.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx.

Cost Impact: None

713.14.1-FS-Williams-Adhoc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee disapproved this change for several reasons as follows: Exempting I-2 from lobby requirements would put too much reliance on the fire suppression system; vertical movement of smoke in an I-2 is a hazard; no limitation on the number of elevators that do not need lobby protection is not substantiated; and Groups I-2 and I-3 are similar in that occupants are not leaving the building in an emergency and therefore should afforded the same protection (lobbies).

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Wade Rudolph, CBET, CHFM, Sacred Heart Hospital, representing Wisconsin Healthcare Engineers Association Codes & Standards Committee, requests Approval as Submitted.

Commenter's Reason: The reasons for rejection of this proposal are not valid. The first reason regarding too much reliance on the fire suppression system is not valid. In our hopsitals the fire supression systems are extreemly oversized for a one or two head event (which is more than what is needed). The amount of water that can be delivered has demonstrated to be more than efficient to extinguish the low hazard fires in hospitals.

The committee's statement to justify the rejection of the proposal stating that the patients are not leaving the building in an emergency is false. There have been many documented emergency evacuations of hopsitals due to weather and fire events that dispell this logic. Hospitals do plan evacuation drills and understand that elevator lobbies will add another barrier to efficient transfer of patients.

The requirement for elevator lobbies in healthcare occupancies does not add safety or improve egress capabilty in the event of evacuation. The requirement for the lobby on each floor will increase area requirements as well as expense of new construction.

Allow me to explain. When there is need to evacuate a hospital in a timely manner, the elevators are used for patients who are not ambulatory. This is the most expeditious way to evacauate patients. Putting another set of doors between the patients and the elevators will cause an additional unneeded barrier as the buildings already have two zones on each floor. Simply moving the bed through these doors will cause the doors to be held open so any protection will be lost during this time as well as slow down the evacuation effort. Hospital colleagues are trained to immediately evacuate horizontally to the next smoke zone. This movement of patients is quick and has been demonstrated to be very efficient. If anyone on the ICC committee has not seen this drill conducted, I would encourage them to visit their local hospital to have horizontal evacuation demonstrated to them.

If for some reason there is a rare need in a new facility (with the quick response sprinklers) to move vertically, the doors to the required lobby would prohibit smooth evacuation.

As healthcare is required to provide elevators for patient bed transfer, the size of the elevator lobby would be a significant addition of space to the foot print outside each elevator. The bed would need room to move the bed into the lobby, rotate to enter the elevator (in most cases two banks) such that a lobby would required at least 195 square feet per floor for a two bank elevator that transports patients. This equates to approximately $63,000 per floor for each two bank elevator.

The quick response sprinklers in hospitals (which are low hazard occupancies) have demonstrated that the fire will be contained in the room of origin such that the need for additional "safe" areas are not justified.

I am submitting this request for the ICC to reconsider its rejection on behalf of the Wisconsin Healthcare Engineers Association Codes & Standards Committee representing over 700 members in the State of Wisconsin.

Thank you for your time and consideration of my comments.

FS65-12

Final Action: AS AM AMPC____ D

FS66-12
713.14.1 (New), 713.14.1, 713.14.1.1

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Add new text as follows:

713.14.1 General. Enclosed elevator lobbies shall be provided in accordance with Section 713.14.2 for hoistways exceeding 420 feet (128 000 mm) in height. The height of the hoistway shall be measured from the top of the lowest finished floor to the top of the highest finished floor of the floors served by the hoistway.

The height of elevator hoistways sharing a common atmosphere by elevator door openings at a common floor or by openings between hoistways shall be measured from the top of the lowest finished floor to the top of the highest finished floor of the floors served by the non separated hoistways.

Exceptions:

1. The height of elevator hoistways sharing a common atmosphere only at a level of exit discharge shall be permitted to be measured separately.
2. The height of elevator hoistways with openings at a common floor shall be permitted to be measured separately where the hoistways are separated by at least 2 sets of doors or a revolving door that maintains a separation of the atmosphere.

713.14.2~~1~~ Elevator lobby requirements. Where an enclosed elevator lobby is required they shall be provided at each ~~floor~~ hoistway entrance ~~where an elevator shaft enclosure connects more than three *stories*~~. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 708 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by air ducts and transfer openings hall be protected as required for *corridors* in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the level(s) of *exit discharge*, provided the level(s) of *exit discharge* is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a hoistway ~~shaft~~ in accordance with Section 712 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall comply with the smoke and draft control door assembly requirements in Section 716.5.3.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. ~~Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:~~
   ~~4.1 Group I-2 occupancies;~~
   ~~4.2 Group I-3 occupancies, and~~
   ~~4.3 Elevators serving floor levels over 75 feet (22 860 mm) above the lowest level of fire department vehicle access in high-rise buildings.~~

~~5~~4. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 710 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
~~6~~5. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21.
~~7~~6. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.5.

~~**713.14.1.1 Area of refuge.** Areas of refuge shall be provided as required by Section 1007.~~

Reason: This proposal is one of several proposals submitted by the CTC Elevator lobby SG. The ICC Executive Board directed the Code Technology Committee (CTC) to study the issue of elevator lobby separations in November 2010 due to the number of code change proposals submitted addressing this issue over a number of code change cycles. The Code Technology Committee formed a study group on the elevator lobby separation issue in December 2010. Note that this subject had been previously addressed by CABO/BCMC in 1986 with a similar conclusion. The code change proposals submitted are the result of the CTC's study of the issue. Note that the scope of the activity was as follows:

Scope

- ☐ Review the need for elevator lobbies,~~;~~ with emphasis on building use, building and hoistway height, active and passive fire protection features associated with the aforementioned.
- ☐ Review the differences and specific needs when dealing with elevator lobbies of traditional-use elevators, fire service elevators, and occupant evacuation elevators.
- ☐ Review related code provisions, such as egress from and through elevator lobbies.
- ☐ Review the appropriate use of alternatives including pressurization of hoistways, additional doors, roll-down style barriers, and gasketing systems.
- ☐ Review with members of elevator industry to scope the requirements of applicable elevator reference standards as it deals with elevator lobby design, use and construction.
- ☐ Review design and construction requirements for elevator lobbies, including but not limited to dimensions, location and separation.
- ☐ Review applicable code change history, technical studies and loss statistics as part of this review.

Based upon the extensive nature of this area of study**,** 5 Task Groups were formed during the process to provide in-depth review and to manage the number of issues. These task groups developed a number of proposals that were coordinated throughout the process.

More information on this CTC area of study can be found at the following link.
http://www.iccsafe.org/cs/CTC/Pages/ElevatorLobbies.aspx

This proposal is a technical shift away from what has been termed by the CTC study group "traditional elevator lobbies" as opposed to Fire Service Access Elevators and Occupant evacuation elevators. This shift is based upon background data and a technical analysis produced by the Study Group on Elevator lobbies for the CTC. An executive summary of the technical analysis is as follows:

EXECUTIVE SUMMARY

The ICC Executive Board directed the Code Technology Committee (CTC) to study the issue of elevator lobby separations in November 2010 due to the number of code change proposals submitted addressing this issue over a number of code change cycles. The Code Technology Committee formed a study group on the elevator lobby separation issue in December 2010. The code change proposals submitted are the result of the CTC's study of the issue.

This focus of the study group began with a review of technical documents and the history of the code provisions over the years. This led to extensive discussions on the intent and need for enclosed elevator lobbies and included calculations to determine the effect of stack effect in high rise buildings. This technical review resulted in a technical analysis that determined when enclosed elevator lobbies should be required.

Enclosed elevator lobbies should not be required for:

- Low-rise and mid-rise buildings not provided with sprinkler protection
- High rise buildings where the elevator hoistway is 420 feet or less in height.
  Enclosed elevator lobbies should be required for:
- Elevator hoistways exceeding 420 feet in height
- Fire Service Access Elevators regardless of building height
- Occupant evacuation elevators regardless of building height

The basis for eliminating the requirement for enclosed elevator lobby separations in low-rise and mid-rise buildings (whether or not provided with sprinkler protection) is that these buildings can be evacuated in a relatively short period of time. Hence, any hazard of the spread of smoke via the elevator hoistways in these buildings is mitigated by evacuation of the building occupants.

The basis for eliminating the requirement for enclosed elevator lobby separations in high rise buildings (where the height of the elevator hoistway is 420 feet or less) is the many fire safety features required by the building code, including automatic sprinklers, that mitigate the hazard of the spread of smoke via elevator hoistways. The cooling of the smoke by automatic sprinkler discharge also reduces its buoyancy, the principal driving force which causes migration of smoke between floors. The "stack effect", the pressure differentials between floors due to differences in indoor and outdoor temperatures, is not significant enough to cause large quantities of smoke from the floor of origin to migrate to other floors in the building.

The decision to require enclosed elevator lobbies in buildings where the elevator hoistway height exceeds 420 feet in height relates to the greater concern with stack effect in such tall shafts and the potential consequences of fires in taller buildings with larger occupant loads further from the level of exit discharge.

One of the concerns that the CTC wrestled with in developing these proposals is the reliability and effectiveness of a building's many fire safety features but most specifically automatic sprinklers. To further address these concerns the technical analysis presents a brief analysis of the various protection features available in high rise buildings and how they work together. This analysis makes it clear that sprinklers are just one of many fire safety features that are part of a holistic protection strategy in high rise buildings.

Based upon the technical analysis the requirements for enclosed elevator lobbies have been shifted to hoistway heights starting beyond 420 feet. The full recommendations are listed below:

Recommendations:

1. Unsprinklered low- and mid-rise buildings (buildings with an occupied floor less than 55 feet above the lowest level of fire department vehicle access or less than 75 feet above the lowest level of fire department access with an occupant load less than 30 on each floor)

- **No enclosed elevator lobbies required for traditional elevators.**

o *Rationale: While fire temperatures can be high, causing smoke and gas migration throughout the building, occupants traveling at the typical rate of about 150 ft/min over the maximum permitted travel distance of 200 ft can reach the safety of an egress stairway in approximately 1.3 minutes and can descend to the level of exit discharge in less than five minutes. This time frame is merely an approximation but provides an indication of the required time necessary for egress in low and mid-rise buildings.*

Additionally, code officials participating in the study group stated that lobbies have traditionally not been required in these type buildings in their jurisdictions and their experience has been good.

Sprinklers are required in any building containing Fire service access (3007) and occupant evacuation (3008) elevators so these would not be found in buildings in this category.

Elevator lobbies serving as an area of refuge in accordance with Section 1007.6 for accessible means of egress are required to be enclosed by smoke barriers

2. Sprinklered buildings with occupied floors less than or equal to 75 feet to the lowest level of fire department vehicle access:

- **No enclosed elevator lobbies required for traditional elevators**

o *Rationale: In sprinklered buildings fire temperatures are kept relatively low so hot gas expansion and buoyancy are not driving forces Traditional elevators are not to be used by occupants in fires, so any small infiltration into the hoistway is not significant. Shafts shorter than 75 feet have limited stack effect flows.*

- **Enclosed lobbies required for fire service access (3007) and occupant evacuation (3008) elevators**

o *Rationale: Fire service access and occupant egress elevators need to continue in operation during a fire. Lobbies provide a protected space to stage and to await the elevator and further provide a physical barrier to smoke that might activate a lobby smoke detector and trigger Phase I recall.*

3. Sprinklered buildings with an occupied floor more than 75 feet to the lowest level of fire department vehicle access and with elevator hoistway heights less than or equal to 420 feet.

- **No enclosed elevator lobbies required for traditional elevators.**

o *Rationale: In sprinklered buildings fire temperatures at the ceiling are kept relatively low so hot gas expansion and buoyancy are not driving forces. Traditional elevators are not to be used by occupants in fires, so any small infiltration into the hoistway is not significant. Shafts shorter than 420 feet have limited stack effect flows.*

- **Enclosed elevator lobbies required for fire service access (3007) and occupant evacuation (3008) elevators** o *Rationale: Fire service access and occupant egress elevators need to continue in operation during a fire. Lobbies provide a protected space to stage and to await the elevator and further provide a physical barrier to smoke that might activate a lobby smoke detector and trigger Phase I recall.*

4. Sprinklered buildings with hoistway heights more than 420 feet in building height

- **Enclosed elevator lobbies or pressurization of the elevator hoistways required for traditional elevators.**

o *Rationale: While traditional elevators are not permitted to be used in fires, the elevator hoistway height may result in smoke migration due to "stack effect" and spread to remote areas. Enclosed lobbies with smoke tight construction or pressurization of the hoistways will limit infiltration. The consequences of smoke spread in tall buildings with elevator hoistway heights over 420 feet was of greater concern to the Study Group.*

- **EXCEPTION:**

1. Hoistways for traditional elevators separated into vertical sections not exceeding 420 feet in height with no communication of the hoistway environment between sections shall not require enclosed lobbies or pressurization as long as the following condition is met.

2. Where connection of elevator banks is by a transfer corridor, it shall be necessary to pass through at least 2 swinging doors or a revolving door that maintains a separation of the environments to pass from one section to another.

o *Rationale: By separating the hoistways into shorter sections and limiting communication of different shaft environments, both "stack effect" and smoke migration will be limited.*

- **Enclosed elevator lobbies required for fire service access (3007) and occupant evacuation (3008) elevators**

o *Rationale: Fire service access and occupant egress elevators need to continue in operation during a fire. Lobbies provide a protected space to stage and to await the elevator and further provide a physical barrier to smoke that might activate a lobby smoke detector and trigger Phase I recall.*

5. Elevator hoistway pressurization design

- **The design of pressurization systems for elevator hoistways shall be based on a *rational analysis* in accordance with Section 909.4 that utilizes a network model approved by the AHJ and which includes an analysis of possible interactions between building shafts pressurized by different systems, and between pressurized and unpressurized shafts that exceed 420 feet in height.**

Add guidance to commentary for 909.4 that the rational analysis should show that the pressurization design will maintain the estimated Fractional Effective Dose (FED) below 0.5 and the estimated visibility distance above 25 feet within the stairway for 1.5 times the estimated evacuation time for each of the design fires selected.

o *Rationale: Taller buildings with more complex flow paths require analysis utilizing a network model that can account for these interacting flow paths. The criteria suggested for commentary represents the standard of practice for a fire hazard analysis performed as the required rational analysis.*

It is important to note that these recommendations address fire service access elevators as well as occupant evacuation elevators but such elevators are not applicable to Section 713.14. In fact the recommendation of the analysis for those types of elevators was to keep the lobbies as they provide a multitude of functions that differ from traditional elevator lobbies. Additionally it should be noted that although enclosed elevator lobbies have been eliminated in many buildings for "traditional" elevators any building containing occupied floors more than 120 feet from the lowest level of fire department access will be required to have fire service access elevators. Such elevators are required to have a lobby with several integral features. If the elevators of choice are passenger elevators in the building an enclosed elevator lobby would be required of more substantial construction as compared to what is required in Section 713.14.1. This same logic would apply in buildings that allow the use of elevators for evacuation in accordance with Section 3008. In that case lobbies would be required for the entire building regardless of building height.

Since the buildings where elevator lobbies are required by this proposal will be sprinklered and area of refuge would not be required the reference to area of refuge as it relates to elevator lobbies is no longer necessary.

If this proposal passes the other CTC proposals related to elevator lobbies may require some level of renumbering or will no longer be necessary. As this is one of several proposals from the CTC on elevator lobbies a draft assuming all the CTC elevator lobby related proposals passing is provided to show how they would integrate together. Each proposal in intent are independent with one another. There are some situations that may need approval of the CCC but the following demonstrates the intent of the CTC should all proposals pass.

Chapter 2

(G175-12) **DIRECT ACCESS.** A path of travel from a space to an immediately adjacent space through an opening in the common wall between the two spaces.

Chapter 7

(FS37-12) **709.4 Continuity.** *Smoke barriers* shall form an effective membrane continuous from outside wall to outside wall and from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, deck or slab above, including continuity through concealed spaces, such as those found above suspended ceilings, and interstitial structural and mechanical spaces. The supporting construction shall be protected to afford the required *fire-resistance rating* of the wall or floor supported in buildings of other than Type IIB, IIIB or VB construction.

Exceptions:

1. Smoke-barrier walls are not required in interstitial spaces where such spaces are designed and constructed with ceilings that provide resistance to the passage of fire and smoke equivalent to that provided by the smoke-barrier walls.
2. Smoke barriers used ~~for~~ to enclose elevator lobbies in accordance with Section 405.4.3, 1007.6.2, 300~~7~~8.7.2 or 300~~8~~9.7.2 shall be permitted to terminate at the elevator hoistway shaft enclosure. ~~not required to extend from outside wall to outside wall.~~ A smoke and draft control door assembly as specified in Section 716.5.3.1 shall not be required at each elevator hoistway door opening.
3. Smoke barriers used for areas of refuge in accordance with Section 1007.6.2 are not required to extend from outside wall to outside wall.

(FS88-12) **716.5.3.1 Smoke and draft control.** *Fire door* assemblies shall also meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.01524 $m^3/s \cdot m^2$) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature and elevated temperature tests. Louvers shall be prohibited. Installation of smoke doors shall be in accordance with NFPA 105.

Exception: Where enclosed elevator lobbies are not required by Section 3007.2 ~~713.14.1~~, elevator hoistway doors opening into a corridor are not required to meet the requirements for a smoke and draft control door assembly.

Chapter 10

(E45-12) **1007.6 Areas of refuge.** Every required area of refuge shall be accessible from the space it serves by an accessible means of egress.

1007.6.1 Travel distance. The maximum travel distance from any accessible space to an area of refuge shall not exceed the travel distance permitted for the occupancy in accordance with Section 1016.1.

1007.6.2 Stairway or elevator access. Every required area of refuge shall have direct access to a stairway ~~within an exit enclosure~~ complying with Sections 1007.3 and 1022 or an elevator complying with Section 1007.4.
~~Where an elevator lobby is used as an area of refuge , the shaft and lobby shall comply with Section 1022.9 for smokeproof enclosures except where the elevators are in an area of refuge formed by a horizontal exit or smoke barrier.~~

1007.6.~~2~~3 Separation. Each *area of refuge* shall be separated from the remainder of the story by a *smoke barrier* complying with Section 709 or a *horizontal exit* complying with Section 1025. Each *area of refuge* shall be designed to minimize the intrusion of smoke.

Exception: *Areas of refuge* located within an enclosure for *exit access stairways* or *interior exit stairways* *complying with Section 1009.3 or Section 1022*.

1007.6.~~3~~5 Two-way communication. *Areas of refuge* shall be provided with a two-way communication system complying with Sections 1007.8.1 and 1007.8.2.

(E110-12) **Add a new item 5 to section 1014.2:**

5. Exit access through an enclosed elevator lobby is permitted. Access to at least one of the required exits shall be provided without travel through the enclosed elevator lobbies required by Sections 3007.2 ~~713.14.1~~, 300~~7~~8 or 300~~8~~9.

Where the path of exit access travel passes through an enclosed elevator lobby the level of protection required for the enclosed elevator lobby is not required to be extended to the exit unless direct access to an exit is required by other sections of this code.

(E110-12) **1018.6 Corridor continuity.** Fire-resistance-rated *corridors* shall be continuous from the point of entry to an *exit*, and shall not be interrupted by intervening rooms. Where the path of egress travel within a fire-resistance-rated *corridor* to the *exit* includes travel along unenclosed *exit access stairways* or *ramps*, the *fire resistance-rating* shall be continuous for the length of the *stairway* or *ramp* and for the length of the connecting *corridor* on the adjacent floor leading to the *exit*.

Exceptions:

1. Foyers, lobbies or reception rooms constructed as required for *corridors* shall not be construed as intervening rooms.
2. Enclosed elevator lobbies as permitted by Section 1014.2 item 5 shall not be construed as intervening rooms.

(E144-12) **1022.10 Elevator Lobby identification signs.** At landings in interior exit stairways where two or more doors lead to the floor level, the door leading to the elevator lobby shall be identified by signage located on the door or directly adjacent to the door stating “Elevator Lobby.” Signage shall be in accordance with Section 1022.9.1 items 4, 5 and 6.

(G125-12) **1027.1 General.** *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel ~~access~~ to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and capacity of the required exits.

Chapter 30

(FS61-12, FS66-12, FS67-12, FS70-12, E110-12,)
SECTION 3007
ELEVATOR LOBBIES

3007.1 General. Enclosed elevator lobbies shall be provided in accordance with the following sections.

1. Section 3007.2 based upon hoistway height ~~number of stories connected by a shaft enclosure~~. (*CCC*)
2. Section 405.4.3 for underground buildings.
3. Sections 407.5.3 and 711.9 for Group I-2 occupancies.
~~4. Section 1007.4 for areas of refuge.~~ (*CCC*)
4. Section 3008.7.2 for fire service access elevators.
5. Section 3009.7.2 for occupant evacuation elevators.

3007.2 ~~713.14.1~~ General. Protection of hoistway door openings ~~Enclosed elevator lobbies~~ (CCC) shall be provided in accordance with Section 3007.3 ~~713.14.2~~ for hoistways exceeding 420 feet (128 000 mm) in height. The height of the hoistway shall be measured from the top of the lowest finished floor to the top of the highest finished floor of the floors served by the hoistway.

The height of elevator hoistways sharing a common atmosphere by elevator door openings at a common floor or by openings between hoistways shall be measured from the top of the lowest finished floor to the top of the highest finished floor of the floors served by the non separated hoistways.

Exceptions:

1. The height of elevator hoistways sharing a common atmosphere only at a level of exit discharge shall be permitted to be measured separately.
2. The height of elevator hoistways with openings at a common floor shall be permitted to be measured separately where the hoistways are separated by at least 2 sets of doors or a revolving door that maintains a separation of the atmosphere.
3. Protection of elevator hoistway door openings is not required where the elevator serves only open parking garages in accordance with Section 406.5.
4. Protection of elevator hoistway door openings is not required at the level(s) of exit discharge, provided the level(s) of exit discharge is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.
5. Elevators not required to be located in a shaft in accordance with Section 712.1 are not required to protect elevator hoistway door openings~~.~~ (*this is something that needs to be stated here but not in the original TG4 proposal* 2 CCC)
6. Enclosed elevator lobbies and protection of elevator hoistway door openings are not required where the elevator hoistway opens to the exterior.

3007.3 ~~713.14.2~~1 Elevator hoistway door opening protection ~~Lobby~~ requirements. Where Section **3007.2 ~~713.14.1~~** requires protection of the elevator hoistway door opening, one of the following protection options shall be provided .~~Where an enclosed elevator lobby is required they shall be provided~~ at each ~~floor~~ hoistway entrance ~~where an elevator shaft enclosure connects more than three *stories*~~.

1. ~~The~~ A lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 708 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by air ducts and transfer openings hall be protected as required for *corridors* in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

   ~~**Exceptions:**~~

   ~~1. Enclosed elevator lobbies are not required at the level(s) of *exit discharge*, provided the level(s) of *exit discharge* is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.~~
   ~~2. Elevators not required to be located in a~~ hoistway ~~shaft in accordance with Section 712 are not required to have enclosed elevator lobbies.~~

2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway shaft enclosure doors from each floor by smoke partitions in accordance with Section 710 where the building is equipped throughout with an automatic sprinkler system installed in accordance with 903.3.1.1 or 903.3.1.2. In addition, doors protecting openings in the smoke partitions shall comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1.

3. ~~Enclosed elevator lobbies are not required where~~ An additional door~~s~~ shall be ~~are~~ provided at ~~the~~ each elevator hoistway door opening in accordance with Section 3002.6. Such door shall comply with the smoke and draft control door assembly requirements in Section 716.5.3.1 when tested in accordance with UL 1784 without an artificial bottom seal.

~~4. Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:~~

~~4.1 Group I-2 occupancies;~~

~~4.2 Group I-3 occupancies, and~~

~~4.3 Elevators serving floor levels over 75 feet (22 860 mm) above the lowest level of fire department vehicle access in high-rise buildings.~~

~~5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 710 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 717.5.4.1.~~

~~4.~~6. ~~Enclosed Elevator lobbies are not required where the~~ The elevator hoistway ~~is~~ shall be pressurized in accordance with Section 909.21.

~~7. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.5.~~

3007.4 ~~713.14.3~~ Means of egress. Enclosed (CCC based on definition) Elevator lobbies shall be provided with at least one means of egress complying with Chapter 10 and other provisions in this code. Egress through an elevator lobby shall be permitted in accordance with Section 1014.2 item 5

~~**713.14.1.1 Area of refuge.** Areas of refuge shall be provided as required by Section 1007.~~

(note 3007 and 3008 would need to be renumbered in entirety)

(E110-12) **300~~7~~8.7 Fire service access elevator lobby.** The fire service access elevator shall open into a fire service access elevator lobby in accordance with Sections 300~~7~~8.7.1 through 300~~7~~8.7.5. Egress is permitted through the elevator lobby in accordance with Section 1014.2 item 5.

> **Exception:** Where a fire service access elevator has two entrances onto a floor, the second entrance shall be permitted to open into an elevator lobby in accordance with Section 708.14.1.

(G175-12) **300~~7~~8.7.1 Interior exit stairway access.** The fire service access elevator lobby shall have direct access from the enclosed elevator lobby to an enclosure for an interior exit stairway.

> **Exception:** Access to an interior exit stairway shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.5.3.

(G177-12) **300~~7~~8.7.4 Lobby size.** Regardless of the number of fire service access elevators served by the same elevator lobby, ~~each~~ the enclosed fire service access elevator lobby shall be a minimum of 150 square feet (14 m^2) in an area with a minimum dimension of 8 feet (2440 mm).

(E110-12) **300~~8~~9.7 Occupant evacuation elevator lobby.** The occupant evacuation elevators shall open into an elevator lobby in accordance with Sections 3008.7.1 through 3008.7.7. Egress is permitted through the elevator lobby in accordance with Section 1014.2 item 5.

(G175-12) **300~~8~~9.7.1 Interior exit stairway access.** The occupant evacuation elevator lobby shall have direct access from the enclosed elevator lobby to an interior exit stairway or ramp.

> **Exception:** Access to an interior exit stairway shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.5.3.

(Note if all proposals pass the following proposals are no longer necessary FS71-12 and FS69-12)

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

713.14.1 #1-FS-Baldassarra-CTC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this change for several reasons as follows: The proposal should not be applicable to unsprinklered buildings; the proposal should be limited to only certain Groups, such as Group B; lobby protection should not be eliminated as this puts too much reliance on the fire suppression system; and Groups I-2 and I-3 are similar in that occupants are not leaving the building in an emergency and therefore should afforded the same protection (lobbies).

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

713.14.1 General. Enclosed elevator lobbies shall be provided in accordance with Section 713.14.2 for hoistways exceeding 420 feet (128 000 mm) in height <u>and where an elevator hoistway connects more than three *stories* in buildings not protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2</u>. The height of the hoistway shall be measured from the top of the lowest finished floor to the top of the highest finished floor of the floors served by the hoistway.

The height of elevator hoistways sharing a common atmosphere by elevator door openings at a common floor or by openings between hoistways shall be measured from the top of the lowest finished floor to the top of the highest finished floor of the floors served by the non separated hoistways.

Exceptions:

1. The height of elevator hoistways sharing a common atmosphere only at a level of exit discharge shall be permitted to be measured separately.
2. The height of elevator hoistways with openings at a common floor shall be permitted to be measured separately where the hoistways are separated by at least 2 sets of doors or a revolving door that maintains a separation of the atmosphere.

713.14.2 Elevator lobby requirements. Where an enclosed elevator lobby is required they shall be provided at each hoistway entrance. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 708 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by air ducts and transfer openings hall be protected as required for *corridors* in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the level(s) of *exit discharge*, provided the level(s) of *exit discharge* is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a hoistway in accordance with Section 712 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall comply with the smoke and draft control door assembly requirements in Section 716.5.3.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 710 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
5. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21.
6. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.5.

Commenter's Reason: One of the major concerns with this proposal seemed to be the mid rise buildings that were not required to be sprinklered. This public comment will now address those buildings by requiring any building not protected throughout with an NFPA 13 or 13R system and having hoistways connecting more than three stories to have elevator lobbies.

It is important to remember that this proposal was submitted due to the numerous varying code changes being submitted in previous cycles and that a larger more detailed discussion and review was necessary outside the code development process. Given the broad membership of the study group established by the CTC a level of peer review was established and opportunity was presented for contribution. Note that this revision does not change any of the elevator lobby requirements in Chapter 30 for FSAE and for Occupant Evacuation elevators. In many cases buildings required to have FSAEs (buildings with occupied floors exceeding 120 feet from fire department vehicle access) will have an elevator lobby by default if the main passenger elevators are used for that purpose.

There were additional concerns that this proposal should only apply to Group B occupancies. This concern is one the CTC felt was not justified as occupancies such as Group R provide more compartmentation and other safety features.

In terms of the application of the rest of the proposal the CTC still feels that the justification provided in the technical analysis supports the elimination of elevator lobbies or other approved methods of protection of elevator hoistway openings in most buildings. The technical analysis addresses issues such as sprinkler reliability through a fire safety concepts tree analysis. For reference and review the Technical analysis is provided below.

The ICC Executive Board directed the Code Technology Committee (CTC) to study the issue of elevator lobby separations in November 2010 due to the number of code change proposals submitted addressing this issue over a number of code change cycles. The Code Technology Committee formed a study group on the elevator lobby separation issue in December 2010. Note that this subject had been previously addressed by CABO/BCMC in 1986 with a similar conclusion. The code change proposals submitted are the result of the CTC's study of the issue. Note that the scope of the activity was as follows:

Scope

- Review the need for elevator lobbies, with emphasis on building use, building and hoistway height, active and passive fire protection features associated with the aforementioned.
- Review the differences and specific needs when dealing with elevator lobbies of traditional-use elevators, fire service elevators, and occupant evacuation elevators.
- Review related code provisions, such as egress from and through elevator lobbies.
- Review the appropriate use of alternatives including pressurization of hoistways, additional doors, roll-down style barriers, and gasketing systems.
- Review with members of elevator industry to scope the requirements of applicable elevator reference standards as it deals with elevator lobby design, use and construction.
- Review design and construction requirements for elevator lobbies, including but not limited to dimensions, location and separation.
- Review applicable code change history, technical studies and loss statistics as part of this review.

Based upon the extensive nature of this area of study**,** 5 Task Groups were formed during the process to provide in-depth review and to manage the number of issues. These task groups developed a number of proposals that were coordinated throughout the process.

Technical Analysis of the Need for Enclosed Elevator Lobbies

Prepared for the ICC CTC by the Elevator Lobby Study Group

EXECUTIVE SUMMARY

The ICC Executive Board directed the Code Technology Committee (CTC) to study the issue of elevator lobby separations in November 2010 due to the number of code change proposals submitted addressing this issue over a number of code change cycles. The Code Technology Committee formed a study group on the elevator lobby separation issue in December 2010. The code change proposals submitted are the result of the CTC's study of the issue.

This focus of the study group began with a review of technical documents and the history of the code provisions over the years. This led to extensive discussions on the intent and need for enclosed elevator lobbies and included calculations to determine the effect of stack effect in high rise buildings. This technical review resulted in a technical analysis that determined when enclosed elevator lobbies should be required.

Enclosed elevator lobbies should not be required for:

- Low-rise and mid-rise buildings not provided with sprinkler protection
- High rise buildings where the elevator hoistway is 420 feet or less in height.

Enclosed elevator lobbies should be required for:

- Elevator hoistways exceeding 420 feet in height
- Fire Service Access Elevators regardless of building height
- Occupant evacuation elevators regardless of building height

The basis for eliminating the requirement for enclosed elevator lobby separations in low-rise and mid-rise buildings (whether or not provided with sprinkler protection) is that these buildings can be evacuated in a relatively short period of time. Hence, any hazard of the spread of smoke via the elevator hoistways in these buildings is mitigated by evacuation of the building occupants.

The basis for eliminating the requirement for enclosed elevator lobby separations in high rise buildings (where the height of the elevator hoistway is 420 feet or less) is the many fire safety features required by the building code, including automatic sprinklers, that mitigate the hazard of the spread of smoke via elevator hoistways. The cooling of the smoke by automatic sprinkler discharge also reduces its buoyancy, the principal driving force which causes migration of smoke between floors. The "stack effect", the pressure differentials between floors due to differences in indoor and outdoor temperatures, is not significant enough to cause large quantities of smoke from the floor of origin to migrate to other floors in the building.

The decision to require enclosed elevator lobbies in buildings where the elevator hoistway height exceeds 420 feet in height relates to the greater concern with stack effect in such tall shafts and the potential consequences of fires in taller buildings with larger occupant loads further from the level of exit discharge.

One of the concerns that the CTC wrestled with in developing these proposals is the reliability and effectiveness of a building's many fire safety features but most specifically automatic sprinklers. To further address these concerns the technical analysis presents a brief analysis of the various protection features available in high rise buildings and how they work together. This analysis makes it clear that sprinklers are just one of many fire safety features that are part of a holistic protection strategy in high rise buildings.

TECHNICAL ANALYSIS

Background

One of the fundamental objectives of fire safety in buildings is to limit the spread of fire and its effects (heat, smoke, and toxic gasses). This is usually accomplished by limiting the ignitability and burning rate of materials, by physical barriers (compartmentation) and by suppression (automatic and/or manual). In specific areas where it is most critical to prevent direct exposure of building occupants that might injure or interfere with evacuation, physical barriers may be supplemented by active or passive smoke control.

The driving force that causes the migration of smoke through a building is differences in temperature (and resulting differences in density) resulting from the fire and from the fact that the environment in many buildings is heated or cooled for comfort. Air flows resulting from these temperature differences increase with increasing difference in temperature and in relation to the area of openings (including visible and hidden gaps and cracks) between spaces at different temperature. It is assumed that smoke flows in a similar manner as air flows inside a building.

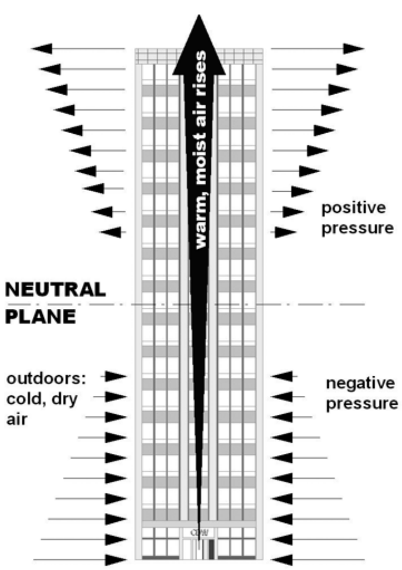
One of the early lessons learned from fire disasters is the need to protect shafts that can act as "chimneys," carrying heat, smoke, and gasses to remote areas of a building. Smoke and fire spread up hoistways and stairways accessed through non-rated doors had been implicated as early as in 1911 in the 146 fatalities at the Triangle Shirtwaist Fire [Sunderland 2011]. Other significant fires that involved smoke and fire spread up stairways and hoistways include the Equitable Building Fire, New York, NY, January 9, 1912; and the MGM Grand Hotel, Las Vegas, NV, November 21, 1980.

It should be noted that these were all unsprinklered or partially sprinklered, and the fire started in an unsprinklered area.

Stack Effect

Stack effect is defined as air flow in shafts induced by indoor-to-outdoor temperature differences that lead to density differences and flow. By convention, stack effect flows are upwards when outdoor temperatures are colder than indoors, and reverse stack effect is a downward flow observed when outdoor temperatures are warmer than indoors. The upward flow results when air from lower floors is drawn into the shaft and flows out on upper floors. Thus, there exists a height in the building at which there is no flow into or out of the shaft, which is called the "neutral plane." Flow rates increase with height above and below the neutral plane. This is illustrated for normal (upward) stack effect in Figure 1.

Figure 1 – Stack Effect Flows



Stack effect flows can be induced in any shaft in a building, including mechanical, plumbing, and electrical shafts. Stack effect creates the greatest problems in elevator hoistways because the hoistways cannot be closed at intervals as can plumbing and electrical shafts, and the landing doors at every floor at which the elevator stops are leaky because they open laterally, making them difficult to seal. Problems associated with stack effect range from annoying (strong flows blowing from openings) to safety hazards when stack effect moves smoke and gasses from fires or accidental chemical releases vertically within the building.

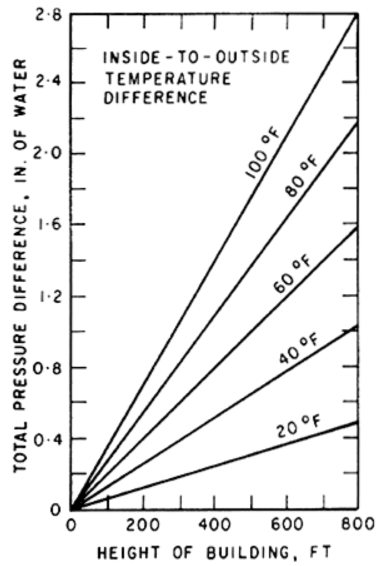


Figure 2 – Pressures Produced by Stack Effect Across Landing Doors

The pressure induced at each floor is a function of the leakage areas, the height of the shaft and the temperature difference. Stack effect pressures across elevator landing doors can range up to 3 in. water (800pa) in an 800 ft building, as shown in Figure 2. [Tamura, G., 1968] Worst case pressures are observed in winter conditions since the indoor to outdoor temperature differences are greatest.

Because elevator landing doors open laterally, excessive pressure across the door can cause the door to bind and not open or close properly. If a landing door doesn't open, people cannot get on/off and if the door doesn't close fully, the elevator cannot leave the floor. Representatives from the elevator industry have indicated that in some buildings that experience significant stack effect, elevator mechanics must come to the building to adjust landing doors at least twice a year.

In fires, the fire itself can result in shaft flows driven by large temperature differences between fire gasses and ambient air. A paper by Bukowski [Bukowski 2005] based on an analysis by Klote showed that, in a fully sprinklered building (with operational sprinklers), fire temperatures are held low enough that significant shaft flows are never observed and the generation of smoke/toxic gasses that might present a hazard to occupants is limited because of the greatly reduced burning rates. Since stack effect is present whether there is a fire or not, shaft flows during fires still occur, but there is much less smoke/toxic gases if there are operating sprinklers.

Enclosed Elevator Lobbies

Enclosed elevator lobbies are intended to address one or more of the following issues:

1. Protecting hoistways as vertical openings that could spread smoke/toxic gasses

For this to be an issue, one needs to have smoke present in sufficient quantities to be hazardous, and pressure differences to drive it to and up or down the hoistway. Smoke is only present in a fire. Pressure differences that drive flows can come from fire temperatures, stack effect, mechanical systems, or elevator piston effect. Sprinklers maintain fire temperatures at only a slightly elevated level, so there is no significant driving force. Fires in sprinklered buildings produce relatively small quantities of smoke/toxic gasses. [Klote 2004; Klote 1992; **NIST** 2010; **NISTIR 7120,** 2004; **NBSIR 80-2097,** 1980.]

Stack effect derives from building (shaft) height, leakage areas between the shaft and the inside/outside, and indoor/outdoor temperature differences. Elevator piston effect is not significant in other than single-car hoistways [Klote and Tamura 1986, Klote 1988].

Absent a fire, stack effect flows can be a nuisance but are rarely a health or safety hazard. In a fire, it is possible for stack effect forces to carry smoke up or down shafts where elevator hoistways would see the largest flows because landing doors have the largest leakage areas. However, the quantity of smoke and gas produced in a sprinkler-controlled fire is small and when distributed into the building volume the concentration, and thus the potential effect on occupants, is small. Further, in a sprinkler-controlled fire, temperatures are held only slightly above ambient, so the only force available to move smoke and gas up shafts is stack effect, and stack effect flows are low.

Using the accepted equation from the 2009 ASHRAE Fundamentals Handbook, estimates of volumetric flows due to stack effect in a 500 ft (152 m) tall hoistway range from just over 1000 CFM to just over 4000 CFM within a range of outdoor temperatures between -40 and +40 F (-40 to +4.4 C). Nuisance problems associated with stack effect are being addressed by designers of very tall buildings by interrupting the shaft height about every 40 stories, but this is not possible on elevators (especially shuttle and service cars) that need to serve every floor. A secondary effect of addressing the nuisance problems is that many shafts are no longer tall enough to yield significant stack effect.

From these facts it can be concluded that elevator lobbies are not generally necessary to prevent smoke migration via hoistways in fires for sprinklered buildings except possibly in very tall buildings with large occupant loads that would require significant time to evacuate from those very tall buildings.

2. Protecting occupants during a fire (safe place)

Since elevators are not to be used in fires except those designated explicitly for Fire Service [IBC Section 3007] and Occupant Egress [IBC Section 3008] and both these sections require lobbies, then lobbies for general use elevators should not be needed to protect occupants during a fire. Exit stairwells are provided explicitly to provide a protected means of egress in fires. One conclusion in the refuge area study for GSA [Klote 1992] was that, in a fully sprinklered building, the entire building is an area of refuge. With respect to protecting occupants in elevators, ASME A17.1 anticipates Firefighter Emergency Operation (FEO) will take the elevators out of service and return them to the level of exit discharge before smoke can enter the hoistway, regardless of whether an enclosed lobby is provided. In Sections 3007 and 3008, the required lobbies are provided to delay recall as long as possible to permit safe use, along with providing a protected space for occupants to wait or for fire fighters to stage below the fire and to operate a forward command post.

Hoistway Pressurization Instead Of Enclosed Elevator Lobbies

Enclosed elevator lobbies are permitted to be eliminated where additional doors [Section 3002.6] or pressurized hoistways [Section 708.14.2] are provided. Pressures are required by the IBC to be between 0.10 and 0.25 in. of water, with the lower limit representing the minimum necessary to prevent flow into the hoistway and the upper limit representing the value above which the landing doors might jam.

In the course of this study, the Study Group discovered that common practice for mechanical designers is to utilize unconditioned outside air to pressurize the hoistway and to pressurize stairways. Filling shafts with air near the outside temperature reduces stack effect since these flows are driven by differences in temperature between the shaft air and outside air.

However, a question has been raised as to the effect of outside air of extreme temperatures (extreme hot or extreme cold) on the safe operation of the elevators, particularly “machine-room-less” elevators, where elevator machinery is located within the hoistway. Typically, elevator manufacturers publish temperature limits in their operating instructions; 95 F (35 C) non-condensing is a common limit. More study may be required to determine how long the equipment can be exposed to extreme temperatures before performance is degraded below safe levels.

The IBC smoke control provisions state that such systems must perform for 20 minutes or 1.5 times the evacuation time, whichever is less. While 1.5 times the evacuation time is reasonable, the 20 minute maximum may not be appropriate for very tall buildings as the time to egress even with elevators may be much longer (depending on the number of floors evacuating or relocating). Occupant self-evacuation elevator systems utilizing all public-use cars (as required in Section 3008 of the IBC) are capable of evacuating 100% of the occupants of any building in 1 hour or less [Bukowski 2008]. Also, the 20 minute maximum would certainly not be appropriate for Fire Service Access Elevators which are intended to be operational for the duration of a fire, not just during building evacuation. Standby power is required to be available for both types of elevators for two hours which may indicate the intended duration of operation.

Smoke Control Systems Design

In any building, there exist complex flow paths that include construction cracks and hidden spaces not normally apparent. The larger the building, the more complex these flow paths can become. In addition, there can be strong interaction between stair and hoistway pressurization systems in buildings that have both [Miller 2008].

Section 909.4 of the IBC requires a *rational analysis* to be performed and submitted with the construction documents, accounting for a number of factors including stack effect, fire temperatures, wind, HVAC, climate and duration of operation. The scope of the required analysis for many buildings results in a complexity that can only adequately be addressed through the utilization of computer (network) models such as CONTAM, developed and distributed by NIST [NIST 2011, Black and Price 2009, Emmerich, 2001].

Due to the existence of multiple, complex flow paths, all of which interact in complex ways, and especially where some are mechanically pressurized, it is crucial that the required rational analysis utilize network models for high-rise buildings that have one or more of the following characteristics:

- Buildings in which there is more than a 40% difference in floor area between any two floors due to the potential impact of conflicting airflows in the building,
- Buildings that contain a parking garage, whether open or enclosed due to large openings to the outside and introducing large amount of outside air and wind,
- Buildings that contain pressurized stairways, pressurized hoistways, atria (in some cases stacked atria) with mechanical smoke control due to the impact of conflicting airflows and pressure differences in the building.
- Buildings containing shafts taller than 420 feet due to increased stack effect.

Stairway Pressurization

Stairway pressurization generally is outside the scope of this Study Group, but there are many elements of stairway pressurization systems that impact how the elevator hoistways will perform during a fire. One of the most important issues is how stair pressurization affects the performance of the hoistway when the option of pressurizing the hoistway is chosen.

Sprinklered Buildings

A key observation in each of the historical fires cited is that the buildings (or at least the areas where the fires occurred) were unsprinklered. The discharge of water from operating sprinklers not only suppresses or extinguishes the fire, limiting the quantities and dynamics of the smoke, but also cools the air temperatures to near ambient levels. Even in the cases of fires shielded from the sprinkler discharge, ceiling temperatures are relatively low even though smoke and fire gas release rates can be increased due to incomplete combustion. Thus, in sprinklered buildings, there is little driving force to generate and cause migration of dangerous quantities of smoke and gasses around the building by way of stairways or hoistways.

Effectiveness and Reliability of Fire Safety Systems

This section provides a more thorough review of how the features of the building, whether passive or active, interact to control the fire and protect building occupants. This is demonstrated through the use of the Fire Safety Concepts Tree (NFPA 550).

Code intent and strategy

The intent of Section 713.14.1 requirements for an elevator lobby enclosure is to protect the elevator shaft from smoke infiltration and possible smoke spread onto other (non-fire) floors. ICC's International Building Code 2012 edition requires various fire safety systems and features based upon a building's use and occupancy, height and area, and construction type. These features are part of an overall strategy to protect the building occupants and emergency responders from fire. Primary fire safety systems and features are:

- Automatic fire sprinkler system
- Automatic and manual fire detection and alarm system
- Structural fire protection
- Floor construction
- Maximum travel distance to an exit
- Egress/exit shaft enclosure
- HVAC system controls
- Elevator hoistway enclosure
- Elevator hoistway venting

Fire Safety Concepts Tree Analysis

The effectiveness and interaction of these systems and features to achieve fire safety is described by NFPA 550 *Guide to the Fire Safety Concepts Tree* (the "Tree") 2007 edition (Appendix A). Rather than considering each fire safety system and feature separately, the *Tree* provides a "systems approach" to fire safety, examines all fire safety systems holistically to determine how they influence the achievement of fire safety goals and objectives.

The *Tree* uses logic gates to show a hierarchical relationship of fire safety concepts. There are two types of logic gates in the *Tree*: "or" gates and "and" gates. An "or" gate, represented by a circle with a plus sign in it, indicates that any of the concepts below it will cause or have as an outcome based on the concept above it. An "and" gate is represented by a circle with a dot in the middle. This indicates that all of the concepts below the "and" gate are needed to achieve the concept above the gate. The *Tree* can be used to identify gaps and areas of redundancy in fire protection strategies.

As noted, elevator lobbies required by Section 713.14.1 are intended to limit smoke exposure to occupants on non-fire floors. Figure 3 illustrates the top tier gates of the *Tree* to accomplish that objective. The building code assumes the fire occurs, thus, the driving objective is to "manage fire impact" by "manage the fire" or "manage exposed."

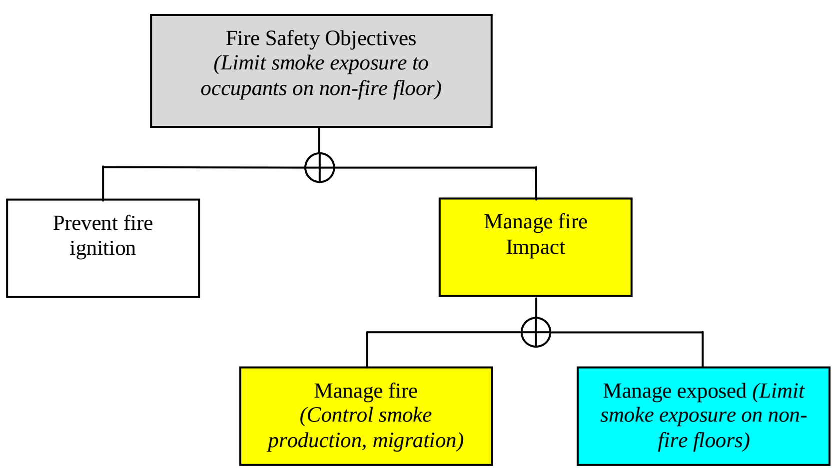


Figure 3: Top-gates of the Tree annotated with the intent of IBC §713.14.1

Figure 4 illustrates the two or three possible options to achieve "manage fire." Suppressing the fire by an automatic fire sprinkler system installed in accordance with IBC Chapter 9 **or** controlling fire (vertical migration) by construction features in accordance with IBC Sections 713 (shafts), 711 (horizontal assemblies), 716 (opening protectives) ***or*** venting fire/smoke that infiltrates into the elevator shaft in accordance with Section 3004 are each ways to limit the smoke exposure to occupants on non-fire floors. Controlling the combustion process, while identified as an option that can be used in general and used to a limited extent by the IBC's requirements for interior finish, is not practical or sufficient to solely achieve the objective in a building.

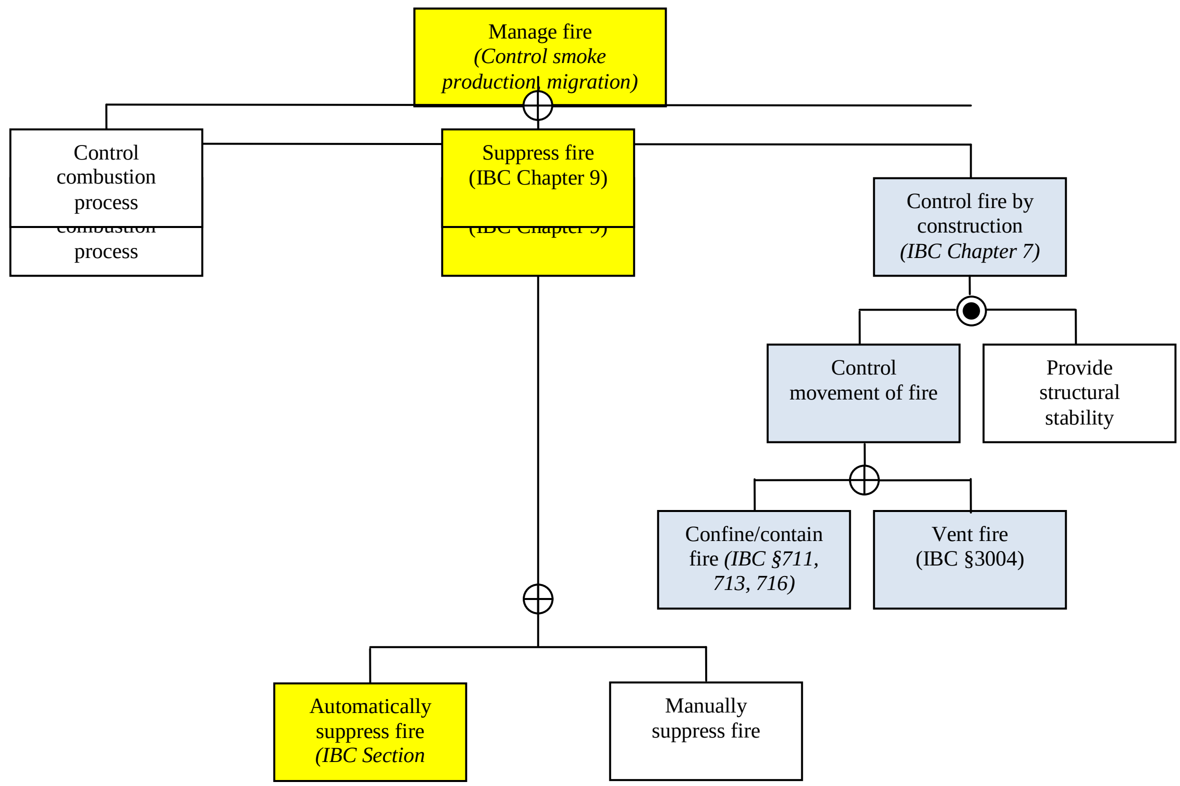


Figure 4: IBC 2012 required features and systems that contribute to limiting smoke production and migration to non-fire floors.

Figure 5 illustrates the options to achieve "manage exposed." "Safeguard exposed" is accomplished by "defend-in-place" and "move exposed." IBC Chapter 9 and Sections 403.3 and 403.4 require various fire safety systems to detect and alert the building occupants of a fire condition and to initiate evacuation. The provisions of IBC Chapter 10 and Section 403.5 both require various fire safety features and systems to protect the building occupants during egress or evacuation, thus limiting smoke exposure to occupants on non-fire floors. Section 403.2.3 requires egress stair and elevator hoistway enclosures in Risk Categories III and IV high rise buildings (Table 1604.5), and all buildings over 420 ft in height to exhibit impact resistance that resists the passage of fire and smoke into the shafts, minimizing the potential for inadvertent compromise of the enclosure.

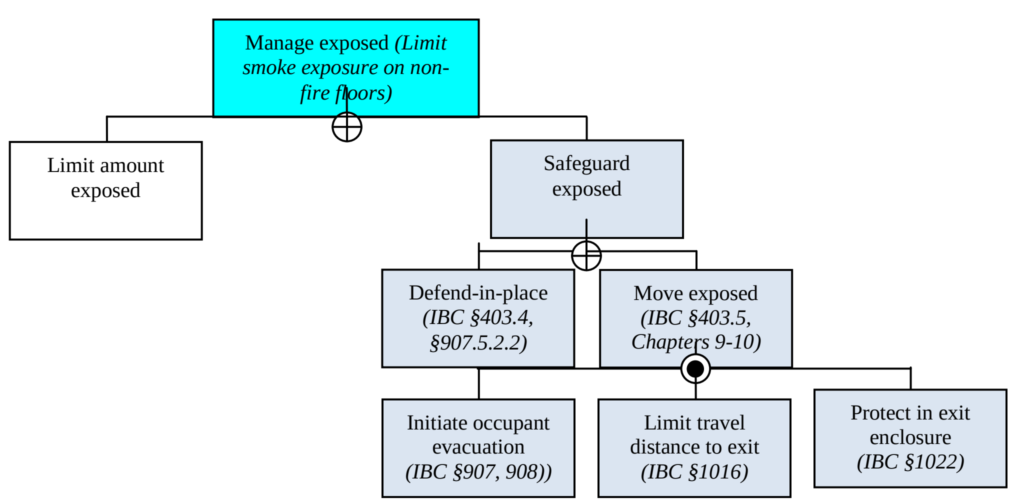


Figure 5: IBC 2012 required features and systems that limit smoke exposure to occupants on non-fire floors.

Fire Suppression Systems Availability

To address the automatic fire suppression (automatic sprinkler) system reliability, it is possible to use the Tree to show the primary system components, features and safeguards required by the IBC to ensure availability of suppression operation. The Tree can identify "single point failure" elements that could result in an unacceptable outcome in the event of a fire. This approach can be used in lieu of a quantitative risk analysis which requires system performance data, event tree and fault tree analysis, as well as occupant exposure analysis (an Available Safe Egress Time vs. Required Safe Egress Time comparative analysis). This could be a line diagram of an IBC-required sprinkler system in a high-rise building including the system components analysis as follows:

- A single sprinkler fails to operate:

NFPA 13 requires that the design assume that multiple sprinklers will operate. In some cases this results in fire control vs. fire extinguishment which significantly reduces smoke production versus no sprinkler activation. This assumption provides a factor of safety and addresses the failure of a single sprinkler fails to operate.

- Sprinkler system floor control valve is closed/no water available:

Statistically the most probable cause for sprinkler system failure is a closed water supply control valve. IBC Section 903.4 requires electronic supervision of water supply, monitored both on-site and off-site for increased reliability/availability.

Section 403.3.1 requires buildings over 420 feet in height to be provided with two risers located in remote exit enclosures with each riser supplying the sprinklers on alternate floors. The sprinkler systems must be arranged such that a single closed floor control valve could at most result in failure of the sprinklers on one floor with those on the floors above and below still functional.

- Sprinkler/standpipe riser is out-of-service:

IBC Section 905.2 requires all sprinkler/standpipe risers be interconnected at the base and control valves to be provided at the base of each riser providing redundancy and greatly reducing the potential of a loss of a sprinkler/standpipe riser.

- Automatic fire pump fails to operate:

Pump failure: jockey pump operates, sufficient water supply for one- to two-sprinklers and building fire alarm notification. For buildings less than 420 ft. in height above fire department connection, fire department pumper is capable of supporting flow demand for either the sprinkler or standpipe systems.

- Pump failure due to no utility power supply:

IBC Section 403.4.8 requires emergency power system for redundancy.

- No water in city/municipal water main or valve closed at connection to city/municipal water supply

IBC Section 403.3.2 requires a connection to a minimum of two city water mains, minimizing the potential for loss of municipal water supply.

Reliability of Other Systems

Sprinkler systems are not the only fire protection feature within a building. Buildings typically have combinations of other types of fire protection features which may include fire and/or smoke rated walls, floor/ceiling assemblies, egress systems, detection systems, alarm systems, smoke control systems, and other mechanisms for protecting people from fire and the products of combustion.

The discussion above regarding sprinkler system reliability is an example of how a risk analysis might be approached. Similar types of analyses with potential failure modes for each of these other systems in a building would need to be performed for the other fire protection features in order for a risk analysis to be complete. Such a risk analysis could be performed using the same methodology as that used for the sprinkler system reliability discussion.

Recommendations for IBC Regarding Elevator Lobbies

Based on the forgoing, the following recommendations are suggested for consideration by the CTC:

6. Unsprinklered low- and mid-rise buildings (buildings with an occupied floor less than 55 feet above the lowest level of fire department vehicle access or less than 75 feet above the lowest level of fire department access with an occupant load less than 30 on each floor)

- **No enclosed elevator lobbies required for traditional elevators.**

o *Rationale: While fire temperatures can be high, causing smoke and gas migration throughout the building, occupants traveling at the typical rate of about 150 ft/min over the maximum permitted travel distance of 200 ft can reach the safety of an egress stairway in approximately 1.3 minutes and can descend to the level of exit discharge in less than five minutes. This time frame is merely an approximation but provides an indication of the required time necessary for egress in low and mid-rise buildings.*

Additionally, code officials participating in the study group stated that lobbies have traditionally not been required in these type buildings in their jurisdictions and their experience has been good.

Sprinklers are required in any building containing Fire service access (3007) and occupant evacuation (3008) elevators so these would not be found in buildings in this category.

Elevator lobbies serving as an area of refuge in accordance with Section 1007.6 for accessible means of egress are required to be enclosed by smoke barriers

7. Sprinklered buildings with occupied floors less than or equal to 75 feet to the lowest level of fire department vehicle access:

- **No enclosed elevator lobbies required for traditional elevators**

o *Rationale: In sprinklered buildings fire temperatures are kept relatively low so hot gas expansion and buoyancy are not driving forces Traditional elevators are not to be used by occupants in fires, so any small infiltration into the hoistway is not significant. Shafts shorter than 75 feet have limited stack effect flows.*

- **Enclosed lobbies required for fire service access (3007) and occupant evacuation (3008) elevators**

o *Rationale: Fire service access and occupant egress elevators need to continue in operation during a fire. Lobbies provide a protected space to stage and to await the elevator and further provide a physical barrier to smoke that might activate a lobby smoke detector and trigger Phase I recall.*

8. Sprinklered buildings with an occupied floor more than 75 feet to the lowest level of fire department vehicle access and with elevator hoistway heights less than or equal to 420 feet.

- **No enclosed elevator lobbies required for traditional elevators.**

o *Rationale: In sprinklered buildings fire temperatures at the ceiling are kept relatively low so hot gas expansion and buoyancy are not driving forces. Traditional elevators are not to be used by occupants in fires, so any small infiltration into the hoistway is not significant. Shafts shorter than 420 feet have limited stack effect flows.*

- **Enclosed elevator lobbies required for fire service access (3007) and occupant evacuation (3008) elevators**

o *Rationale: Fire service access and occupant egress elevators need to continue in operation during a fire. Lobbies provide a protected space to stage and to await the elevator and further provide a physical barrier to smoke that might activate a lobby smoke detector and trigger Phase I recall.*

~~9.~~ Sprinklered buildings with hoistway heights more than 420 feet ~~in building height~~

- **Enclosed elevator lobbies or pressurization of the elevator hoistways required for traditional elevators.**

o *Rationale: While traditional elevators are not permitted to be used in fires, the elevator hoistway height may result in smoke migration due to "stack effect" and spread to remote areas. Enclosed lobbies with smoke tight construction or pressurization of the hoistways will limit infiltration. The consequences of smoke spread in tall buildings with elevator hoistway heights over 420 feet was of greater concern to the Study Group.*

- **EXCEPTION:**

3. Hoistways for traditional elevators separated into vertical sections not exceeding 420 feet in height with no communication of the hoistway environment between sections shall not require enclosed lobbies or pressurization as long as the following condition is met.

4. Where connection of elevator banks is by a transfer corridor, it shall be necessary to pass through at least 2 swinging doors or a revolving door that maintains a separation of the environments to pass from one section to another.

o *Rationale: By separating the hoistways into shorter sections and limiting communication of different shaft environments, both "stack effect" and smoke migration will be limited.*

- **Enclosed elevator lobbies required for fire service access (3007) and occupant evacuation (3008) elevators**

o *Rationale: Fire service access and occupant egress elevators need to continue in operation during a fire. Lobbies provide a protected space to stage and to await the elevator and further provide a physical barrier to smoke that might activate a lobby smoke detector and trigger Phase I recall.*

10. Elevator hoistway pressurization design

- **The design of pressurization systems for elevator hoistways shall be based on a *rational analysis* in accordance with Section 909.4 that utilizes a network model approved by the AHJ and which includes an analysis of possible interactions between building shafts pressurized by different systems, and between pressurized and unpressurized shafts that exceed 420 feet in height.**

Add guidance to commentary for 909.4 that the rational analysis should show that the pressurization design will maintain the estimated Fractional Effective Dose (FED) below 0.5 and the estimated visibility distance above 25 feet within the stairway for 1.5 times the estimated evacuation time for each of the design fires selected.

o *Rationale: Taller buildings with more complex flow paths require analysis utilizing a network model that can account for these interacting flow paths. The criteria suggested for commentary represents the standard of practice for a fire hazard analysis performed as the required rational analysis.*

References

ASHRAE Handbook – Fundamentals, Ch 24, Owen, M. ed., ASHRAE, 2009.

Black, D. R. and Price P. N., "CONTAM airflow models of three large buildings: Model descriptions and validation," Environmental Energy Technologies Division Indoor Environment Department, Lawrence Berkeley National Laboratory, Berkeley, CA, September, 2009

Bukowski, R.W., "Is There a Need to Enclose Elevator Lobbies in Tall Buildings?," Building Safety Journal, Vol 3, No 4, 26-31, August 2005.

Bukowski, R.W., "Status of the Use of Elevators in Fires," Emerging Trends (online), SFPE, Bethesda, MD, 2008.

Emmerich, S. J., "Validation of Multizone IAQ Modeling of Residential-Scale Buildings: A Review," ASHRAE TRANSACTIONS 2001, V. 107, Pt. 2, 2001

Klote, J.H., Hazards Due to Smoke Migration Through Elevator Shafts – Volume I: Analysis and Discussion. Final Report**,** NIST GCR 04-864-1, Gaithersburg, MD, , 2004.

Klote, J.H., Nelson, H.E. and Deal, S., Staging Areas for Persons with Mobility Limitations, NISTIR 4770, NIST, Gaithersburg, MD 1992.

Klote, J.H. and Tamura, G.T., "Elevator Piston Effect and the Smoke Problem," Fire Safety Journal, Vol. 11, No. 3, pp. 227-233, December 1986.

Klote, J.H., "An Analysis of the Influence of Piston Effect on Elevator Smoke Control," NISTIR 88-3751, NIST, Gaithersburg, MD 1988.

Miller, R.S. and Beasley, D., "On Elevator Shaft Pressurization for Smoke Control in Tall Buildings, in *Proc Society of Fire Protection Engineers Professional Development Conference and Exposition* (2008)," Charlotte, North Carolina.

NIST CONTAM homepage http://www.bfrl.nist.gov/IAQanalysis/CONTAM/index.htm

NIST Technical Note (TN) 1658, f10001, *Impact of Sprinklers on the Fire Hazard in Dormitories: Sleeping Room Fire Experiments*, January 2010. [Daniel Madrzykowski William D. Walton]

NISTIR 7120, f04012, *Impact of Sprinklers on the Fire Hazard in Dormitories: Day Room Fire Experiments*, June 2004. [Daniel Madrzykowski, David Stroup, William D. Walton]

NBSIR 80-2097, f80013, *Full-Scale Fire Tests With Automatic Sprinklers in a Patient Room. Phase II*, July 1980. [John O'Neill, Warren Hayes, Jr., Richard Zile]

Sutherland, S., *"*What's changed — and what hasn't — in the 100 years since the Triangle Waist Co. fire*," NFPA Journal,* NFPA Quincy, MA 02269, March/April 2011.

Tamura, G., Stack Effect and Building Design, NRCC CBD-107, Ottawa, Canada, 1968.

Public Comment 2:

William E Koffel, P.E., Koffel Associates, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories <u>in a high-rise building</u>. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by ~~fire~~ <u>smoke</u> partitions. In addition to the requirements in Section ~~708 for fire partitions~~ <u>710 for smoke partitions</u> , doors protecting openings in <u>the smoke partitions shall also comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9 and duct penetrations of the smoke partitions shall be protected as required for corridors in accordance with Section 717.5.4.1</u>~~.elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1.~~ Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the level(s) of exit discharge, provided the level(s) of exit discharge is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 712.1 are not required to have enclosed elevator lobbies.
3. ~~Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall comply with the smoke and draft control door assembly requirements of Section 716.5.3.1 when tested in accordance with UL 1784 without an artificial bottom seal.~~
3. <u>Enclosed elevator lobbies are not required in buildings where fire service access elevators complying with Section 403.6.1 are provided, regardless of the height of the building.</u>

4. ~~Enclosed elevator lobbies are not required where the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:~~
    4.1. ~~Group I-2 occupancies;~~

    4.2. ~~Group I-3 occupancies; and~~
    4.3. ~~Elevators serving floor levels over 75 feet (22860 mm) above the lowest level of fire department vehicle access in high-rise buildings.~~
4. Enclosed elevator lobbies are not required in buildings where each occupied floor is separated into at least two smoke compartments by smoke barriers complying with Section 709 and elevator access is provided to at least two smoke compartments on each occupied floor.
5. ~~Smoke partitions shall be permitted in lieu of fire partitions to separate the elevator lobby at each floor where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 710 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9 and duct penetrations of the smoke partitions shall be protected as required for corridors in accordance with Section 717.5.4.1.~~
6. ~~Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21.~~

~~7.~~5. Enclosed elevator lobbies are not required where the elevator serves only open parking garages in accordance with Section 406.3.

Commenter's Reason: Elevator lobbies serve a useful purpose for firefighters responding to an incident in a high-rise building. The elevator lobby assists in preventing elevator recall and provides a protected area for staging firefighting operations. While the original proposal addresses the technical issues of vertical smoke spread in buildings, it does not address a practical need for firefighting operations. This Public Comment is not intended to address the vertical smoke movement issues which will clearly be debated in the attempt to defeat the standing motion for Disapproval and any subsequent motions for Approval as Submitted or Approval as Modified.

More specifically, the Public Comment does the following:

1. The threshold to require elevator lobbies is raised to high-rise buildings. This seems like a reasonable threshold as to when the additional protection is appropriate for firefighting operations. The Code has long recognized that one of the characteristics of a high-rise building is the challenges presented to manually suppress a fire in such buildings. Even with a mandatory sprinkler requirement, there may still be the need for manual suppression and smoke removal from the building. Both activities typically require transport of equipment to the fire floor to complete.
2. The separation is reduced to a smoke partition as currently permitted in sprinklered buildings by Exception No. 5 and therefore Exception No. 5 is proposed to be deleted.
3. As the CTC has noted, Section 403.6.1 requires fire service access elevators in buildings with an occupied floor more than 120 feet above the lowest level of fire department vehicle access. For this reason, Exception No. 3 has been added to exempt additional elevator lobbies in such buildings.
4. When occupied floors are separated by smoke barriers, the fire service has an area to be used as a staging area on the fire floor and additional separation of elevator lobbies is not necessary (new Exception No. 4).
5. Exceptions No. 3 and 6 have been proposed for deletion since they do not provide a protected staging area nor do they prevent elevator recall caused by smoke spread to a smoke detector in an elevator lobby that is not separated.

It should be noted that Koffel Associates has a number of clients that are impacted by this Public Comment, some favorably, and some not favorably. The Public Comment has not been submitted on behalf of any of our clients. Instead, the Public Comment has been submitted based upon my past experience as a firefighter, which included responses to high-rise buildings, and to provide a level of protection that is appropriate for firefighting personnel when responding to fire incidents in high-rise buildings.

While the Public Comment represents my long standing position regarding elevator lobbies in high-rise buildings, if the standing motion for Disapproval is defeated, I do not plan to make the first motion for Approval as Modified. My intent is to provide an alternative should people perceive this approach as a reasonable position between the positions taken by those who strongly advocate for elevator lobbies and those who strongly oppose elevator lobbies.

Public Comment 3:

William E. Fitch, representing Phyrefish.com requests Disapproval.

Commenter's Reason: The study group, with the endorsement of the CTC, has now proposed several code changes eliminating requirements for elevator lobbies in many buildings. These changes reduce the protection for occupants in a building when it is exposed to a fire. Although the study group members and numerous other interested stakeholders dedicated many hours to this issue over the past year, their conclusions, recommendations and substantiations are embarrassingly inadequate and incorrect. This proposal specifically must be disapproved.

- For low and mid-rise buildings they assume everyone is awake, healthy, and can evacuate rapidly from any occupancy. No thought is given to people with disabilities, people being asleep, medicated, or intoxicated. No consideration of doors being blocked open or other egress obstacles.
- This is obviously inaccurate and irresponsible.
- For sprinklered buildings up to 420 feet their proposals rely on:

1. the sprinklers extinguishing the fire before smoke spreads,

- While sprinklers are extremely reliable and effective, they do not always extinguish the fire. Studies and experience where the fire is only partially controlled have shown the smoke to move throughout the building.

2. there is no stack effect,

- Ignoring stack effect is based on their assumption that the introduction of unconditioned air for pressurization eliminates the temperature differential between the building and the exterior thus eliminating the stack effect. This has never been found to be true and while there will be some temperature equalization it takes far too long to be a factor. Calculations by Bukowski and provided to the Study Group actually show that elevator lobbies <u>are</u> needed above 169 feet for climates of 0°F and above 98 feet for buildings in a -40°F environment. 420 feet is only valid in warm climates (+40°F) such as Miami.

3. any smoke generated is cooled so there is no buoyancy effect.

- Reviews of fire experience have shown that smoke does move off the floor of origin in at least 14% of the fires in sprinklered buildings.

As a result, if these proposals are accepted a portion of the protected means of egress is lost, a potential area of safe refuge is lost, some protection for fire fighters trying to access the floor is lost. The analyses and assessments developed during this year have not justified the proposed changes. They are inadequate and/or irrelevant to that objective. The preconceived objective of reducing cost was upheld in their minds.

The CTC task group on elevator lobbies has avoided looking at historical "facts" on smoke movement in sprinklered buildings. Early on in the process the CTC Chair ruled out the use of anecdotal incidents, and the task group, after initially pursuing a survey of the fire service, dropped that when they were concerned the responses would "not be representative of the facts." And so they have ignored real life data and experiences. And yet, as a part of their justification of these changes, they claimed that "Additionally, code officials participating in the study group stated that lobbies have traditionally not been required in these type buildings in their jurisdictions and their experience has been good." So only experiential information supporting their goal is acceptable but not anything that contradicts their preconceived conclusions.

This entire effort should be an embarrassment to the fine history and purpose of the ICC.

The Fire Safety Code Change Committee clearly recognized these failings and voted overwhelmingly to deny this change. It is hoped that the voting membership of ICC will see this change for what it is and also disapprove it.

FS66-12

Final Action: AS AM AMPC____ D

FS68-12
713.14.1

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 708 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the level(s) of exit discharge, provided the level(s) of exit discharge is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 712.1 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall comply with the smoke and draft control door assembly requirements in Section 716.5.3.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   4.1 Group I-1, Condition 2 occupancies;
   4.2 Group I-2 occupancies;
   4.3 ~~4.2~~ Group I-3 occupancies; and
   4.4 ~~4.3~~ Elevators serving floor levels over 75 feet above the lowest level of fire department vehicle access in high-rise buildings.
5. Smoke partitions shall be permitted in lieu of fire partitions to separate the elevator lobby at each floor where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 710 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9 and duct penetrations of the smoke partitions shall be protected as required for corridors in accordance with Section 717.5.4.1.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21.
7. Enclosed elevator lobbies are not required where the elevator serves only open parking garages in accordance with Section 406.5.

Reason: The CTC Care facilities committee is aware of proposals from the CTC Elevator study group and the Adhoc Healthcare committee that will affect elevator lobby requirements. Currently elevator lobbies are required in Group I-2 and I-3 where smoke compartments are part of the emergency evacuation plan. The CTC Care facilities study group has asked for smoke compartments in Group I-1, Condition 2 as part of a plan to allow for staged evacuation for persons who may require limited assistance in evacuation. If the decision of the membership is that elevator lobby protection is needed in smoke compartment, they should also be required in Group I-1, Condition 2.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party.

The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

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

713.14.1-FS-BALDASSARRA-CTC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that it was not appropriate to approve language that inserts a Group in the code that is not currently recognized. The proponent should bring this back in the public comment phase pending the actions taken on the code change proposal that brings in the Group I-1 condition-type occupancies in full.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldasarra, Code Technologies Committee – Care facilities study group, requests Approval as Submitted.

Commenter's Reason: The Fire Safety committee disapproved this change because G31 had not yet been heard. Code change G31 established the Group I-1, Condition 2 as assisted living with the addition of smoke compartments. This separation configuration is similar to hospitals and jails. This proposal is asking that Group I-1, Condition 2 be required to have elevator lobbies consistent with hospitals and jails.

FS68-12

Final Action: AS AM AMPC____ D

FS70-12
713.14.1

<u>Proposed Change as Submitted</u>

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 708 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

(No changes to Exceptions 1 through 7)

<u>8.</u> <u>Enclosed elevator lobbies and protection of elevator hoistway door openings are not required where the elevator hoistway opens to the exterior.</u>

Reason: This proposal is part of a series of proposals from the CTC Elevator Lobby Study Group. The ICC Executive Board directed the Code Technology Committee (CTC) to study the issue of elevator lobby separations in November 2010 due to the number of code change proposals submitted addressing this issue over a number of code change cycles. The Code Technology Committee formed a study group on the elevator lobby separation issue in December 2010. Note that this subject had been previously addressed by CABO/BCMC in 1986 with a similar conclusion. The code change proposals submitted are the result of the CTC's study of the issue. Note that the scope of the activity was as follows:

Scope

- Review the need for elevator lobbies<u>**,**</u>~~;~~ with emphasis on building use, building and hoistway height, active and passive fire protection features associated with the aforementioned.
- Review the differences and specific needs when dealing with elevator lobbies of traditional-use elevators, fire service elevators, and occupant evacuation elevators.
- Review related code provisions, such as egress from and through elevator lobbies.
- Review the appropriate use of alternatives including pressurization of hoistways, additional doors, roll-down style barriers, and gasketing systems.
- Review with members of elevator industry to scope the requirements of applicable elevator reference standards as it deals with elevator lobby design, use and construction.
- Review design and construction requirements for elevator lobbies, including but not limited to dimensions, location and separation.
- Review applicable code change history, technical studies and loss statistics as part of this review.

Based upon the extensive nature of this area of study**,** 5 Task Groups were formed during the process to provide in-depth review and to manage the number of issues. These task groups developed a number of proposals that were coordinated throughout the process.

More information on this CTC area of study can be found at the following link.
http://www.iccsafe.org/cs/CTC/Pages/ElevatorLobbies.aspx

There should be an exception similar to open parking since there is no accumulation of smoke where elevator hoist ways open to the exterior.

This proposal should not be affected by other proposals submitted by the CTC addressing elevator lobbies except for the need to renumber. None of the proposals from the CTC are intending to delete similar exceptions and thus this will simply be added as one of those exceptions. See discussion on CTC elevator lobby proposal coordination in code change FS##-12

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

713.14.1 #5-FS-Baldassarra-CTC

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 708 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

(No changes to Exceptions 1 through 7)

8. Enclosed elevator lobbies and protection of elevator hoistway door openings are not required <u>on the level</u> where the elevator hoistway opens to the exterior.

Committee Reason: The committee agreed that lobby protection of elevator hoistway openings should not be required when smoke accumulation will not occur. The modification makes it clear that this exception is specific to the level that is open to the exterior and not all other levels that the hoistway connects.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Ali M. Fattah P.E., representing City of San Diego Development Services Department, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 708 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

(No changes to Exceptions 1 through 7)

8. Enclosed elevator lobbies and protection of elevator hoistway door openings are not required on the level where the elevator hoistway <u>door</u> opens <u>directly</u> to the exterior <u>or to areas within 5 ft from the exterior of the building</u>.

Commenter's Reason: This section adds an exception 8 to exempt elevators open to the exterior from elevator lobby requirements and the Fire Safety Committee approved the change. We agree with the change; however the change leaves unanswered the question what open to the exterior means. Can the elevator open into an exterior exit balcony, to a deep lobby area with an open side considered to be an exit balcony? We request that the membership approve the proposed modification to the committee's action.

Public Comment 2:

Jonathan Siu representing City of Seattle Dept of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 708 for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Exceptions:

(No changes to Exceptions 1 through 7)

8. Enclosed elevator lobbies and protection of elevator hoistway door openings are not required on ~~the level~~ levels where the elevator hoistway opens to the exterior.

Commenter's Reason: As approved by the committee, the text of the exception implies there is only one level where the exception would apply. This public comment clarifies neither an elevator lobby nor elevator door protection is required at all levels that are open to the exterior.

FS70-12

Final Action: AS AM AMPC____ D

FS73-12
714.3 (New), 715.3 (New); ADMIN: 104.11.3 (New)

Proposed Change as Submitted

Proponent: James B. Smith, P.E., City of Waukesha Building Department, representing Wisconsin Code Officials Alliance (jsmith@ci.waukesha.wi.us)

Add new text as follows:

703.4 Engineering Judgments. Where the configuration of a penetrating item, group of items or a joint is such that a listed system is determined to be non-existent and reconfiguration of the penetrations or fire resistance rated assembly is determined to be impractical or impossible, alternative methods for maintaining the integrity of the required fire–resistance rating of the assembly shall be permitted to be established using an engineering analysis based on a comparison of listed systems prepared by a manufacturer's technical representative of the systems specified or prepared by the laboratory that conducted the original test. An engineering judgment shall be approved by the building official or an approved source where the information submitted is considered satisfactory. Approved engineering judgments shall be retained by the building official for the period required for retention of public records.

(Renumber subsequent sections)

714.3 Engineering Judgments. Where the configuration of a penetrating item or group of items is such that a listed system is determined to be non-existent and reconfiguration of the penetrations or fire resistance rated assembly is determined to be impractical or impossible, engineering judgments shall be permitted in accordance with Section 703.4.

(Renumber subsequent sections)

715.3 Engineering Judgments. Where the configuration of a joint is such that a listed system is determined to be non-existent and reconfiguration of the penetrations or fire resistance rated assembly is determined to be impractical or impossible, engineering judgments shall be permitted in accordance with Section 703.4.

(Renumber subsequent sections)

Reason: Engineering judgments are being used more often than necessary on construction projects. The code language that is currently being utilized to permit the use of engineering judgments is Section 104.11. Rather than relying on Section 104.11, I feel it is better to include expanded details specific to this type of engineering judgment within a newly created Section 703.4. The intent of the proposal is to provide reasonable parameter to limit the use of engineering judgments, restrict who may prepare an engineering judgment and to allow the approval of the engineering judgment to be by the building official or approved source when the documentation is considered to be acceptable. The last sentence of Section 703.4 has been provided to require retention of the engineering judgments consistent with what is required by existing text in Paragraph 104.11.2. In addition, the language is being proposed as new Sections 714.3 and 715.3 since those are the sections that address penetrations and joints.

Although there are over 8000 classified systems in the Underwriters Laboratories Fire Resistance Directory and thousands more in Intertek, FM Approvals and other laboratories listings, there are still configurations that appear at project sites that have no qualified system listed in a directory. That is particularly true when dealing with existing buildings that were constructed using materials that are outside the current norms that have been tested against. This is when the firestop contracting industry searches for advice from the manufacturer's headquarters technical personnel to seek a determination that a combination of systems that closely resembles the situation be suggested for approval from the manufacturer. Ultimately those are then forwarded to the code official for approval. As the Program Manager for the State of Wisconsin's commercial building program and the head of their material evaluation process, I was routinely called upon to review those "determinations" being proposed for use on projects in Wisconsin. In concert with Wisconsin laws on the practice of Architecture and Engineering I routinely called for those to be endorsed by the Wisconsin registered design or supervising professional (equivalent to "REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE" – as defined in Section 202) for the project prior to my review. Knowing the widespread use of the IBC does not assure the same licensing/registration requirements will exist, I have not included that as a requirement within this proposal.

The end product of that service that is most usable by the code official is when it is performed by the manufacturer's qualified technical personnel who understand the fire performance of these products in systems or a representative of the testing laboratory, and provided they use the characteristics found in similar systems to make a determination about suitability for use of the products in the specific application. The suggestions are then submitted by firestop manufacturer's technical staff through the contractor for approval. Using the knowledge from those who test the products frequently and understand their limitations, the manufacturer's technical personnel are expected to reference the closest possible tested system(s) to determine an appropriate method that provides a system closest to the field condition.

Those having the most experience with fire testing products at companies, as well as being the most removed from the sale of a specific product seem to be the manufacturer's technical personnel at headquarters locations. This Code language is needed to provide the building official transparency in the process when presented engineering judgments from the industry…only if a listed system cannot be found in the directories from any manufacturer…even if it means switching manufacturers for a few applications.

This Code language is needed to set some minimum parameters and requirements for when these determinations are permitted to be used, how these determinations (also known as Engineering Judgments or Equivalent Fire Resistance Rated Assemblies) are created, and who should be responsible for writing these determinations of suitability for use in specific applications.

Although alternative methods typically require approval by the building official, the proposal language also permits approval by an approved source (as defined in Section 202). Despite this language, on large projects there may still be a significant number of engineering judgments required and the need for the engineering judgment may be determined with relatively short lead time (due to changes that occur on the construction site). By including the language to allow approval of the engineering judgment by an approved source, pressure on code officials to grant approvals prior to installation can be reduced.

It should be noted that a separate proposal has been submitted by others to require submission of documents regarding how penetrations and joints are to be protected which should also reduce the need for engineering judgments.

During the last revision cycle various comments were raised ranging from how desperately this type of language is needed in the field to the thought that having such language will encourage an increased use of engineering judgments. I believe that by restricting the application to instances for which a listed system does not exist and by limiting who may prepare the engineering judgment there will not be an increase in the use of engineering judgments. Although the Code will now specifically permit engineering judgments, something permitted today by the Code as an alternative method, most manufacturers will continue to test applications that are commonly used in the field since there is still a cost involved in preparing engineering judgments and the use of engineering judgments has the potential to increase the construction time due to the specific approval required for an engineering judgment.

Cost Impact: None

714.3 (NEW)-FS-SMITH

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Disapproval was based on the following reasons: Engineering judgments are already allowed under Chapter 1 and Section 703; language in the proposal stating that engineering judgments shall be permitted is confusing and could be interpreted to mean that the code official must permit the engineering judgments; engineering judgments are applicable to the entire code, not just Chapter 7, therefore Chapter 1 seems sufficient; allowing engineering judgments to be approved by an approved source could be misleading, approval is by the code official; and unenforceable language such as "determined to be impractical or impossible."

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

James B. Smith, P.E., City of Waukesha Building Division, representing Wisconsin Code Officials Alliance, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

703.4 Engineering Judgments. Where the configuration of a penetrating item, group of items or a joint is such that a listed system is determined to be non-existent ~~and reconfiguration of the penetrations or fire resistance rated assembly is determined to be impractical or impossible~~, alternative methods for maintaining the integrity of the required fire–resistance rating of the assembly shall be permitted to be established using an engineering analysis based on a comparison of listed systems prepared by a manufacturer's technical representative of the systems specified or prepared by the laboratory that conducted the original test. Where the information submitted is considered satisfactory, an~~An~~ engineering judgment shall be approved by the building official or an *approved source* ~~where the information submitted is considered satisfactory~~. Approved engineering judgments shall be retained by the building official for the period required for retention of public records.
(Renumber subsequent sections)

714.3 Engineering Judgments. Where the configuration of a penetrating item or group of items is such that a listed system is determined to be non-existent ~~and reconfiguration of the penetrations or fire resistance rated assembly is determined to be impractical or impossible~~, engineering judgments shall be permitted in accordance with Section 703.4.
(Renumber subsequent sections)

715.3 Engineering Judgments. Where the configuration of a joint is such that a listed system is determined to be non-existent ~~and reconfiguration of the penetrations or fire resistance rated assembly is determined to be impractical or impossible~~, engineering judgments shall be permitted in accordance with Section 703.4.
(Renumber subsequent sections)

Commenter's Reason: This comment addresses and resolves the Committee's reasons for disapproval. In disapproving this code change proposal, the committee stated the following(in bold text) with my explanation following:

- **Engineering judgments are already allowed under Chapter 1 and Section 703** – I was aware that the provisions in Chapter 1 were already being used for the approval of engineering judgments, but in a close review of section 104.11 felt the general language was not detailed enough to adequately deal with the specifics associated with a penetrating item (or group of items) or a joint. For that reason I feel Chapter 7 of the IBC the most appropriate location for the enhanced restrictions proposed only for penetrations and joints. In advancing this public comment I worked with the regulated community to be assured they wanted these enhanced restrictions that I am recommending. I also reviewed IBC section 703 and have to respectfully disagree that the existing language is detailed enough for penetrations and joints. Section 703.3 is specific in 4. where it allows an "Engineering analysis based on a comparison of (the) building element, component or assemblies designs having fire resistance ratings as determined by the test procedures set forth in ASTM E119 or UL 263." We are all far enough along to know the standards for penetrations (ASTM E 814 or UL 1479 – see 713.3.1.2) and joints (ASTM E1966, E2307 or UL 2079 – see 714.3 & 714.4) are appropriately different and those differences are why these new and more restrictive requirements are warranted.
- **Language in the proposal stating that engineering judgments shall be permitted is confusing and could be interpreted to mean that the code official must permit the engineering judgments** – I have restructured and modified the second to last sentence to make it clearer that the code official is only expected to approve the judgment only after he/she has deemed the information satisfactory. The primary reason for the last two sentences was to reinforce the expectation that the code official formally make that call and retain that documentation.
- **Engineering judgments are applicable to the entire code, not just Chapter 7, therefore Chapter 1 seems sufficient** – As noted in my response to the first reason above, I feel that because of the enhanced and detailed requirements specific to penetrations and joints it is appropriate to include just these requirements in Section 703. I agree that the provisions in Ch. 1 (section 104.11 – including 104.11.1 & 104.11.2) cover the entire code and it is for that reason that I felt it appropriate to leave that section unchanged and focus on Chapter 7 for the placement of the provision.
- **Allowing engineering judgments to be approved by an approved source could be misleading, approval is by the code official** – I apologize that the original wording was not clear enough and have restructured that sentence to help clarify the code official is the entity approving the information being submitted. The inclusion of an "approved source", by the definition already included within Chapter 2, allows the code official the opportunity to accept an approval recommendation from a source they have deemed competent and experienced in the subject matter. The modified language in combination with the details in the definition of "approved source" should eliminate all confusion.
- **Unenforceable language such as "determined to be impractical or impossible."** – In researching this committee comment I noted the phrase "impractical or impossible" is already used within the I-Codes as a way of explaining this type of situation where an alternative method of handling is called for. Regardless, I modified the text to eliminate the phrase. The modified language still gives the code official the language that will allow them to reject the use of an engineering judgment when a comparable tested/listed penetration or joint system is found to exist.

FS73-12

Final Action: AS AM AMPC____ D

FS74-12
714.3.2

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc, representing International Firestop Council (tcrimi@sympatico.ca)

Revise as follows:

714.3.2 Membrane penetrations. Membrane penetrations shall comply with Section 714.3.1. Where walls or partitions are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire-resistance will not be reduced.

Exceptions:

1. Membrane penetrations of maximum 2-hour fireresistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0 103 m2) in area, provided the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m2) in any 100 square feet (9.29 m2) of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm). Such boxes on opposite sides of the wall or partition shall be separated by one of the following:
   - 1.1. By a horizontal distance of not less than 24 inches (610 mm) where the wall or partition is constructed with individual noncommunicating stud cavities;
   - 1.2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loosefill, rockwool or slag mineral wool insulation;
   - 1.3. By solid fireblocking in accordance with Section 718.2.1;
   - 1.4. By protecting both outlet boxes with listed putty pads; or
   - 1.5. By other listed materials and methods.
2. Membrane penetrations by listed electrical boxes of any material, provided such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm) unless listed otherwise. Such boxes on opposite sides of the wall or partition shall be separated by one of the following:
   - 2.1. By the horizontal distance specified in the listing of the electrical boxes;
   - 2.2. By solid fireblocking in accordance with Section 718.2.1;
   - 2.3. By protecting both boxes with *listed* putty pads; or
   - 2.4. By other *listed* materials and methods.
3. Membrane penetrations by electrical boxes of any size or type, which have been *listed* as part of a wall opening protective material system for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.
4. Membrane penetrations by boxes other than electrical boxes, provided such penetrating items and the *annular space* between the wall membrane and the box, are protected by an *approved membrane penetration* firestop system installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water, and shall have an F and T rating of not less than the required *fire-resistance rating* of the wall penetrated and be installed in accordance with their listing.
5. The *annular space* created by the penetration of an automatic sprinkler, provided it is covered by a metal escutcheon plate.
6. <u>Membrane penetrations of maximum 2-hour fire resistance-rated walls and partitions by steel Electrical boxes that exceed 16 square inches (0.0 103 m2) in area, or steel electrical boxes of any size that exceed an aggregate area through the membrane of 100 square inches (0.0645 m2) in any 100 square feet (9.29 m2) of wall area, provided the wall or partition is constructed with</u>

individual non-communicating stud cavities, the *annular space* between the wall membrane and the box does not exceed 1/8 inch (3.1 mm), and provided:

6.1. All electrical boxes within the stud cavity are protected by *listed* putty pads; or

6.2. All electrical boxes within the stud cavity are protected by other *listed* materials and methods.

Reason: This proposal reflects a very common current practice. It intends to permit an additional allowance for steel electrical boxes exceeding 16 square inches (0.0 103 m2) in area, and exceeding an aggregate area through the membrane of 100 square inches (0.0645 m2) in any 100 square feet (9.29 m2) of wall area based on testing and listing of these devices in accordance with IBC requirements for membrane penetrations in Section 714.3.1.

Listings for protection of metallic Electrical Boxes specify the conditions under which they may be installed within fire-resistance-rated wall assemblies constructed with bearing and non-bearing wood or steel studs and wallboard membranes. The Listings for metallic outlet or switch boxes identify it is possible to install the boxes under less stringent conditions when such boxes are used in conjunction with tested firestop systems or devices. The individual Classifications indicate the specific applications and the method of installation for which the materials have been investigated.

Cost Impact: This change will reduce the cost of construction by permitting additional design options.

714.3.2-FS-CRIMI

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal was too restrictive in that it would require all electrical boxes within the stud cavity to be protected with putty pads if only one was over area allowance. Further how this relates to steel stud construction is not clear in that steel studs typically have openings in the web.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

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

Modify the proposal as follows:

714.3.2 Membrane penetrations. Membrane penetrations shall comply with Section 714.3.1. Where walls or partitions are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire-resistance will not be reduced.

Exceptions:

1 through 5 *(No changes)*

6. Membrane penetrations of maximum 2-hour fire resistance-rated walls and partitions by steel electrical boxes t**h**at exceed 16 square inches (0.0 103 m2) in area, or steel electrical boxes of any size ~~that exceed an~~ having an aggregate area through the membrane exceeding ~~of~~ 100 square inches (0.0645 m2) in any 100 square feet (9.29 m2) of wall area, provided such penetrating items are protected by listed putty pads or other listed materials and methods, and installed in accordance with the listing. ~~the wall or partition is constructed with individual non-communicating stud cavities, the annular space between the wall membrane and the box does not exceed 1/8 inch (3.1 mm), and provided:~~
   ~~6.1. All electrical boxes within the stud cavity are protected by listed putty pads; or~~
   ~~6.2. All electrical boxes within the stud cavity are protected by other listed materials and methods.~~

Commenter's Reason: This proposal reflects a very common current practice. It would permit an additional allowance for steel electrical boxes exceeding 16 square inches (0.0 103 m2) in size, and exceeding an aggregate area through the membrane of 100 square inches (0.0645 m2) in any 100 square feet (9.29 m2) of wall area based on testing and listing of protection methods in accordance with IBC requirements for membrane penetrations in Section 714.3.1.

While the Fire Safety Committee was quite supportive of FS74-12 at the CAH, they felt some modifications were required. The Committee Reason indicated a concern that the proposal was too restrictive in that it would require all electrical boxes within the a 100 square foot area to be protected with putty pads if only one was over the box density allowance. This revised text now simply refers to protection in accordance with the listing. If testing shows that the fire resistance rating of the wall can be maintained by protecting only a portion of the boxes that together make up the total of more than 100 square inches per 100 square feet, then the listing would reflect that. The proportion of boxes that need to be protected must be determined by fire testing of each solution, and is thus not specified here.

One of the other items identified by the Committee was the need to clarify the application of a single stud cavity for materials such as steel studs, which have openings. That issue has been addressed by this modification by addressing the full wall area, rather than individual stud cavities.

The alternative, as currently permitted in the IBC, would be not to permit these steel electrical boxes which exceed the individual or exceed the maximum total area limit.

Public Comment 2:

John Valiulis, Hilti, Inc, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

714.3.2 Membrane penetrations. Membrane penetrations shall comply with Section 714.3.1. Where walls or partitions are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire-resistance will not be reduced.

Exceptions:

1 through 5 *(No changes)*

6. Membrane penetrations of maximum 2-hour fire resistance-rated walls and partitions by steel electrical boxes that exceed 16 square inches (0.0 103 m2) in area, ~~or steel electrical boxes of any size that exceed an aggregate area through the membrane of 100 square inches (0.0645 m2) in any 100 square feet (9.29 m2) of wall area, provided the wall or partition is constructed with individual non-communicating stud cavities, the *annular space* between the wall membrane and the box does not exceed 1/8 inch (3.1 mm), and~~ provided ~~:~~they
~~6.1. All electrical boxes within the stud cavity~~ are protected by *listed* putty pads~~;~~ or
~~6.2. All electrical boxes within the stud cavity are protected~~ by other *listed* materials and methods.

Commenter's Reason: Section 714.3.2 Exception 1 allows membrane penetrations by steel electrical boxes not exceeding 16 square inches and meeting some other installation criteria. None of the other exceptions to 714.3.2 (Exceptions 2 through 5) would allow steel electrical boxes larger than 16 square inches either.

Underwriters Laboratories has had putty pad listings for "Wall Opening Protective Materials", also known as Listing category CLIV, for the protection of steel electrical boxes larger than 4 inches x 4 inches (16 square inches) installed as membrane penetrations since 1998. However, the code does not explicitly recognize the use of putty pads (or other listed materials and methods) to make the larger steel electrical boxes acceptable over the 16 square inch limitation in 714.3.2 Exception 1.

Code change proposal FS74-12, amended as shown above, would add an explicit exception to 714.3.2 to clearly indicate that the listed protection methods are acceptable when installed steel electrical boxes need to be larger than 16 square inches.

Cost impact: This change will not increase the cost of construction.

FS74-12

Final Action: AS AM AMPC____ D

FS76-12
714.4.1.2

Proposed Change as Submitted

Proponent: Sam Francis, American Wood Council (sfrancis@awc.org)

Revise as follows:

714.4.1.2 Membrane penetrations. Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.4.1.1.1 or 714.4.1.1.2. Where floor/ceiling assemblies are required to have a *fire resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced.

Exceptions:

(No changes to Exceptions 1 through 6)

7. The ceiling membrane of 1- and 2-hour fire resistance- rated horizontal assemblies is permitted to be interrupted with the double wood top plate of ~~a *fire-resistance-rated*~~ wall assembly <u>that is sheathed with Type X gypsum wallboard</u>, provided that all penetrating items through the double top plates are protected in accordance with Section 714.4.1.1.1 or 714.4.1.1.2 <u>and the ceiling membrane is tight to the top plates.</u> ~~The *fire-resistance rating* of the wall shall not be less than the rating of the horizontal assembly.~~

Reason: This is a common structural connection and prior to the 2012 edition the code had not prohibited where the floor structure rests on the top plate in wood frame construction. The requirement for similar rating should be left to the specific application in the code (where the code requires supporting construction to be rated the same as the construction being supported (depending on the type of floor or wall). As written, even nonbearing walls serving no fire protection purpose would have to be rated for up to 2 hours. A double top plate represents a minimum of 3 inches of solid wood at the point of interruption, representing no more hazard than the noncombustible penetrations permitted by Exceptions 1 and 2 of the section, since the annular space around such penetrations needs only protection against the passage of smoke and flame or nothing at all, since in the case of steel electrical boxes up to 1/8 inch of unprotected annular space is permitted. A ceiling running into double top plates provides superior protection in comparison.

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

714.4.1.2-FS-FRANCIS

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal appropriately technically describes what should be done with this detail as the protection to the penetrating top plates is provided by the gypsum wallboard.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mark Nowak, Steel Framing Alliance, requests Disapproval.

Commenter's Reason: The committee approved FS76-12 as submitted. However, there was no substantiation submitted to support the lessening of requirements for penetrations of rated assemblies. In addition, the proposal as approved only allows combustible framing to penetrate the ceiling assembly. A rational argument might be acceptable for non-combustible construction to penetrate the assembly but there should be a higher standard of evidence for a combustible material. At best the proposal as approved by the committee is insufficient in addressing the different types of construction and should be disapproved.

FS76-12
Final Action: AS AM AMPC____ D

FS82-12

707.5, 707.9, 717.9, 711.4.1, 707.9, 711.6, 711.9, 712.1.17, 715, 715.1, 715.4.1, 715.5, 715.6, Chapter 35

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions, representing International Firestop Council; Gary Hamilton, Hamilton Benchmark; William Koffel, P.E., Koffel Associates; John Valiulis, Hilti, Inc (john.valiulis@hilti.com)

Revise as follows:

707.5 Continuity. Fire barriers shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed space, such as the space above a suspended ceiling. Joints ~~and voids at intersections~~ shall comply with Sections 707.8 and 707.9

707.9 Joints. Joints at the intersection of fire barriers and the underside of a non-fire resistance rated floor or roof sheathing, slab or deck above, shall comply with 715.4

711.6 Joints. Joints made in or between horizontal assemblies shall comply with Section 715.1. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be protected in accordance with Section ~~715.4~~ 715.2.

711.9 Smoke barrier. Where horizontal assemblies are required to resist the movement of smoke by other sections of this code in accordance with the definition of smoke barrier, penetrations and joints in such horizontal assemblies shall be protected as required for smoke barriers in accordance with Sections 714.5 and 715.1.~~6~~. Regardless of the number of stories connected by elevator shaft enclosures, doors located in elevator shaft enclosures that penetrate the horizontal assembly shall be protected by enclosed elevator lobbies complying with Section 713.14.1. Openings through horizontal assemblies shall be protected by shaft enclosures complying with Section 713. Horizontal assemblies shall not be allowed to have unprotected vertical openings.

712.1.17 Nonfire-resistance-rated joints. Joints in or between floors without a required fire-resistance rating shall be permitted in accordance with Section 715.6~~1.4.1~~.

SECTION 715
~~**FIRE-RESISTANCT JOINT SYSTEMS**~~ **PROTECTION OF JOINTS**

715.1 Joints in or between systems fire resistance rated assemblies. Joints in or between fire resistance rated assemblies shall comply with Sections 715.1.1 through 715.1.4.

~~**715.1**~~ **715.1.1 General.** Joints ~~installed~~ in or between fire-resistance rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved *fire-resistant joint system* designed to prevent ~~resist~~ the passage of ~~fire~~ flames, excessive heat, and hot gases for a time period not less than
the required *fire-resistance rating* of the wall, floor or roof in or between which it is installed. *Fire-resistant joint systems* shall be tested in accordance with Section 715.1.3.

Exception: *Fire-resistant joint systems* shall not be required for joints in all of the following locations:

1. Floors within a single *dwelling unit*.
2. Floors where the joint is protected by a shaft enclosure in accordance with Section 713.

3. Floors within atriums where the space adjacent to the atrium is included in the volume of the atrium for smoke control purposes.
4. Floors within malls.
5. Floors and ramps within open and enclosed parking garages or structures constructed in accordance with Sections 406.5 and 406.6, respectively.
6. Mezzanine floors.
7. Walls that are permitted to have unprotected openings.
8. Roofs where openings are permitted.
9. Control joints not exceeding a maximum width of 0.625 inch (15.9 mm) and tested in Accordance with ASTM E119 or UL263.

~~**715.1.1 Curtain wall assembly**. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be protected in accordance with Section 715.4.~~

~~**715.2**~~ **715.1.2 Installation.** A fire-resistant joint system shall be securely installed in accordance with the listing criteria in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases.

~~**715.3**~~ **715.1.3 Fire test criteria.** Fire-resistant joint systems shall be tested in accordance with the requirements of either ASTM E 1966 or UL 2079. Nonsymmetrical wall joint systems shall be tested with both faces exposed to the furnace, and the assigned fire-resistance rating shall be the shortest duration obtained from the two tests. When evidence is furnished to show that the wall was tested with the least fire-resistant side exposed to the furnace, subject to acceptance of the building official, the wall need not be subjected to tests from the opposite side.

> **Exception:** For exterior walls with a horizontal fire separation distance greater than 5 feet (1524 mm), the joint system shall be required to be tested for interior fire exposure only.

~~**715.6**~~ **715.1.4 Fire-resistant joint systems in smoke barriers.** *Fire-resistant joint* systems in or between smoke barriers~~, and joints at the intersection of a horizontal smoke barrier and an exterior curtainwall,~~ shall be tested in accordance with the requirements of UL 2079 for air leakage. The L rating of the joint system shall not exceed 5 cfm per linear foot (0.00775 m3/s m) of joint at 0.30 inch (7.47 Pa) of water for both the ambient temperature and elevated temperature test.

~~**715.4**~~ **715.2** ~~**Exterior curtain wall/floor intersection.**~~**Joints between fire-resistance rated floor assemblies and curtain walls.** Joints between curtain walls and floor or floor/ceiling assemblies that are required to be fire resistance rated shall comply with Sections 715.2.1 through 715.2.3.

715.2.1 Fire resistance-rated floor or floor/ceiling assemblies. Where fire resistance-rated floor or floor/ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies shall be sealed with an approved system to prevent the interior spread of fire. Such systems shall be securely installed and tested in accordance with ASTM E 2307 to provide an F rating for a time period at least equal to the fire-resistance rating of the floor assembly. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

> **Exception:** Voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies where the vision glass extends to the finished floor level shall be permitted to be sealed with an approved material to prevent the interior spread of fire. Such material shall be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (0.254 mm) of water column (2.5 Pa) for the time period at least equal to the fire-resistance rating of the floor assembly.

~~**715.5**~~ **715.2.2 Spandrel wall.** Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5. Where Section 705.8.5 does not require a fire-resistance rated spandrel wall, the requirements of Section 715.2.14 shall still apply to the intersection between the spandrel wall and the floor.

715.2.3 Joints at the intersection of a horizontal smoke barrier and an exterior curtain wall. Joints at the intersection of a horizontal smoke barrier and an exterior curtain wall shall be tested in accordance with the requirements of UL 2079 for air leakage. The L rating of the joint system shall not exceed 5 cfm per linear foot (0.00775 m3/s m) of joint at 0.30 inch (7.47 Pa) of water for both the ambient temperature and elevated temperature tests.

715.3 Joints between fire resistance rated walls and non-fire resistance rated floors or roofs. Joints between fire barriers and non-fire resistance rated floors or roofs shall comply with Sections 715.3.1 and 715.3.2.

715.3.1 Fire test criteria. Joints at the intersection of fire barriers with the underside of a non-fire resistance rated floor or roof sheathing, slab or deck above shall be protected by an approved continuity head of wall joint system installed as tested in accordance with ASTM E2837 and designed to resist the passage of fire for a time period not less than the required fire resistance rating of the wall in which it is installed.

715.3.2 Installation. Continuity head of wall joint systems shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.

~~707.9~~ 715.4 ~~Voids at intersections~~ Joints between fire resistance rated walls and non-fire resistance rated walls. The voids created at the intersection of a fire barrier and a non-fire-resistance-rated wall shall be filled. An approved material or system shall be used to fill the void, shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.

~~715.4.1~~ 715.5 ~~Exterior curtain wall/nonfire-resistance-rated floor assembly intersections~~ Joints between non-fire resistance rated floors and curtain walls. ~~Voids created at~~ Joints between ~~the Intersection of~~ exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be sealed with an approved material or system to retard the interior spread of fire and hot gases between stories.

~~711.4.1~~ 715.6 ~~Nonfire-resistance-rated assemblies~~ **Joints within non-fire resistance rated floors.** Joints in or between floor assemblies without a required fire-resistance rating shall comply with one of the following:

1. The joint shall be concealed within the cavity of a wall.
2. The joint shall be located above a ceiling.
3. The joint shall be sealed, treated or covered with an approved material or system to resist the free passage of flame and the products of combustion.

   Exception: Joints meeting one of the joint exceptions listed in Section 715.1.

Add new standard as follows to Chapter 35:

ASTM ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

E 2634—08	Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems 1903.3
E2837 – 11	Standard Test Method for Determining the Fire Resistance of Continuity Head-Of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies …………………………………….715.3
F 547—06	Terminology of Nails for Use with Wood and Wood-based Materials . . . . .Table 2506.2

Reason: Section 715 organization is revised as follows, to group the rules for any given application together, and to draw clear distinctions between each one of them.

715.1 JOINTS IN OR BETWEEN FIRE RESISTANCE RATED ASSEMBLIES
715.2 JOINTS BETWEEN FIRE RESISTANCE RATED FLOOR ASSEMBLIES AND CURTAIN WALLS
715.3 JOINTS BETWEEN FIRE RESISTANCE RATED WALLS AND NON-FIRE RESISTANCE RATED FLOORS OR ROOFS
715.4 JOINTS BETWEEN FIRE RESISTANCE RATED WALLS AND NON-FIRE RESISTANCE RATED WALLS
715.5 JOINTS BETWEEN NON-FIRE RESISTANCE RATED FLOORS AND CURTAIN WALLS
715.6 JOINTS WITHIN NON-FIRE RESISTANCE RATED FLOORS

Almost all of the code requirements are exactly as in the 2012 IBC, except moved to the appropriate new sub-section of 715. Section 715.3 is new, to incorporate the testing to the 2011-issued ASTM standard E2837. Referencing the test standard should mostly avoid the need for AHJ's to be given engineering judgments to evaluate for that same application, as the existence of the ASTM fire test and corresponding listings from UL will allow standardized, tested and listed designs to be used. The performance requirements for the joint are listed in 715.3.2, which are identical to what IBC 2012 article 707.9 required for the performance of that same joint. Thus, the only real addition is the addition of 715.3.1, which references the ASTM test standard, thus allowing the AHJ to expect some documented proof that the proposed design does meet the performance requirements as enumerated in IBC 2012.

The charging statements in the earlier parts of Chapter 7 that have pointed to sections or articles within 715 are modified to correct the articles to which they need to reference in the proposed, reorganized section 715.

715.1.1:
The change that now proposes to reference that a fire-resistive joint system will prevent the passage of "<u>flames, excessive heat, and hot gases</u>" and not just "fire" is made in order to harmonize with the IBC definition of fire resistance. The test method tests for all three, so adding this verbiage does not add any new requirements that have not always been complied with when testing to ASTM E1966 or UL 2079.

Cost Impact: Will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ASTM E2837-11 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

707.5-FS-CRIMI-HAMILTON-KOFFEL-VALIULIS

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

For staff analysis of the content of ASTM E2837-011 relative to CP#28, Section 3.6, please visit: <u>http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf</u>.

Committee Reason: The committee felt that the proposal needs to be revised to be consistent with the actions taken on FS31-12 and FS32-12. Further, changing the term "resist" to "prevent" in Section 715.1.1 may be less restrictive and inconsistent with other code language. Locating all requirements for joints in the same section is commendable, but the proposal as written is too confusing and needs to be simplified.
.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

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

Modify the proposal as follows:

707.5 Continuity. Fire barriers shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed space, such as the space above a suspended ceiling. Joints and voids at intersections shall comply with Sections 707.8 and 707.9

(Section 707.9 revised and relocated to Section 715.3 4)

~~**707.9 Joints.** Joints at the intersection of fire barriers and the underside of a non-fire resistance rated floor or roof sheathing, slab or deck above, shall comply with 715.3 4~~

(Section 711.4.1 revised and relocated to Section 715.~~5~~ 6)

711.6 Joints. Joints made in or between horizontal assemblies shall comply with Section 715.1. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be protected in accordance with Section 715.2.

711.9 Smoke barrier. Where horizontal assemblies are required to resist the movement of smoke by other sections of this code in accordance with the definition of smoke barrier, penetrations and joints in such horizontal assemblies shall be protected as required for smoke barriers in accordance with Sections 714.5 and 715.1. Regardless of the number of stories connected by elevator shaft enclosures, doors located in elevator shaft enclosures that penetrate the horizontal assembly shall be protected by enclosed elevator lobbies complying with Section 713.14.1. Openings through horizontal assemblies shall be protected by shaft enclosures complying with Section 713. Horizontal assemblies shall not be allowed to have unprotected vertical openings.

712.1.17 Nonfire-resistance-rated joints. Joints in or between floors without a required fire-resistance rating shall be permitted in accordance with Section ~~715.6~~ 715.5.

SECTION 715
PROTECTION OF JOINTS

715.1 Joints in or between systems fire resistance rated assemblies. Joints in or between fire resistance rated assemblies shall comply with Sections 715.1.1 through 715.1.4.

715.1.1 General. Joints in or between fire-resistance rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved *fire-resistant joint system* designed to ~~prevent~~ resist the passage of flames, excessive heat, and hot gases for a time period not less than
the required *fire-resistance rating* of the wall, floor or roof in or between which it is installed. *Fire-resistant joint systems* shall be tested in accordance with Section 715.1.3.

Exception: *Fire-resistant joint systems* shall not be required for joints in all of the following locations:

1. Floors within a single *dwelling unit*.
2. Floors where the joint is protected by a shaft enclosure in accordance with Section 713.
3. Floors within atriums where the space adjacent to the atrium is included in the volume of the atrium for smoke control purposes.
4. Floors within malls.
5. Floors and ramps within open and enclosed parking garages or structures constructed in accordance with Sections 406.5 and 406.6, respectively.
6. Mezzanine floors.
7. Walls that are permitted to have unprotected openings.
8. Roofs where openings are permitted.
9. Control joints not exceeding a maximum width of 0.625 inch (15.9 mm) and tested in Accordance with ASTM E119 or UL263.

~~**715.3 Joints between fire resistance rated walls and non-fire resistance rated floors or roofs.** Joints between fire barriers and non-fire resistance rated floors or roofs shall comply with Sections 715.3.1 and 715.3.2.~~

~~**715.3.1 Fire test criteria** Joints at the intersection of fire barriers with the underside of a non-fire resistance rated floor or roof sheathing, slab or deck above shall be protected by an approved continuity head of wall joint system installed as tested in accordance with ASTM E2837 and designed to resist the passage of fire for a time period not less than the required fire resistance rating of the wall in which it is installed.~~

~~**715.3.2 Installation**. Continuity head of wall joint systems shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.~~

~~**715.4**~~ **715.3 Joints between fire resistance rated walls and non-fire resistance rated walls.** The voids created at the intersection of a fire barrier and a non-fire-resistance-rated wall shall be filled. An approved material or system shall be used to fill the void, shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.

~~**715.5**~~ **715.4 Joints between non-fire resistance rated floors and curtain walls.** Joints between exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be sealed with an approved material or system to retard the interior spread of fire and hot gases between stories.

~~711.6~~ <u>715.5</u> **Joints within non-fire resistance rated floors.** Joints in or between floor assemblies without a required fire-resistance rating shall comply with one of the following:

1. The joint shall be concealed within the cavity of a wall.
2. The joint shall be located above a ceiling.
3. The joint shall be sealed, treated or covered with an approved material or system to resist the free passage of flame and the products of combustion.

   Exception: Joints meeting one of the joint exceptions listed in Section 715.1.

(Portions of code change proposal not shown remain unchanged)

Add new standard as follows:

ASTM ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

E 2634—08 Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems 1903.3
~~E2837 – 11 Standard Test Method for Determining the Fire Resistance of Continuity Head-Of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies ………………………………………………………………..715.3~~
F 547—06 Terminology of Nails for Use with Wood and Wood-based Materials . . . . .Table 2506.2

Commenter's Reason: Section 715 organization is revised as follows, to group the rules for any given application together, and to draw clear distinctions between each one of them.

715.1 JOINTS IN OR BETWEEN FIRE RESISTANCE RATED ASSEMBLIES
715.2 JOINTS BETWEEN FIRE RESISTANCE RATED FLOOR ASSEMBLIES AND CURTAIN WALLS
715.3 JOINTS BETWEEN FIRE RESISTANCE RATED WALLS AND NON-FIRE RESISTANCE RATED WALLS
715.4 JOINTS BETWEEN NON-FIRE RESISTANCE RATED FLOORS AND CURTAIN WALLS
715.5 JOINTS WITHIN NON-FIRE RESISTANCE RATED FLOORS

All of the code requirements are almost exactly as in the 2012 IBC, except moved to the appropriate new sub-section of 715. The proposed new Section 715.3, to incorporate the testing to the 2011-issued ASTM standard E2837. Referencing the test standard has been deleted to be consistent with the Committee Reason statement, and the actions taken at the Code Action Hearings in Dallas on FS31-12 and FS32-12. Should the Assembly accept FS31 or FS32 at the Final Action Hearings, these additions can be reinserted by ICC staff.

FS82-12

Final Action: AS AM AMPC____ D

FS83-12
716.2

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

716.2 Fire-resistance-rated glazing. Fire-resistance-rated glazing tested as part of a fire-resistance-rated wall <u>or floor/ceiling </u>assembly in accordance with ASTM E 119 or UL 263 and labeled in accordance with Section 703.6 ~~shall be permitted in fire doors and fire window assemblies where tested and installed in accordance with their listings and~~ shall not otherwise be required to comply with this section <u>when used as part of a wall or floor/ceiling assembly</u>. <u>Fire-resistance-rated glazing shall be permitted in fire door and fire window assemblies where tested and installed in accordance with their listings and when in compliance with the requirements of this section.</u>

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/default.aspx. Since its inception in April/2005, the CTC has held twenty two meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Labeling of Fire Rated Glazing". The scope of the activity is noted as:

Identify root causes of problems selecting, specifying, installing, and inspecting fire protective and fire resistive glazing and other assembly components including the frames. Propose identification requirements and other related code changes.

The changes proposed for Section 716.2 clarify how the code currently provides fire-resistance-rated glazing. The modifications to the first sentence clarify that when fire-resistance-rated glazing tested in accordance with ATM E119 and used as part of a wall or floor/ceiling assembly, it is not subject to the provisions of Section 716.

However, the second sentence clarifies that when fire-resistance-rated glazing is used as part of a fire door or fire window assembly there are provisions in Section 716 that apply to its use. As currently worded the user could be mislead as to the application of the additional requirements for applications involving fire door and window assemblies.

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

716.2-FS-BALDASSARRA-CTC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that this proposal clarifies that when fire-resistance-rated glazing is tested in accordance with ASTM E118 and used as part of a wall or floor/ceiling assembly, the glazing is not subject to the provisions of Section 716.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., representing City of San Diego Development Services Department, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

716.2 Fire-resistance-rated glazing. Fire-resistance-rated glazing tested as part of a fire-resistance-rated wall or floor/ceiling assembly in accordance with ASTM E 119 or UL 263 and labeled in accordance with Section 703.6 shall not otherwise be required to comply with this section when used as part of a wall ~~or floor/ceiling assembly~~. Fire-resistance-rated glazing shall be permitted in fire door and fire window assemblies where tested and installed in accordance with their listings and when in compliance with the requirements of this section.

Commenter's Reason: We request that the membership approve the proposed modification to the committee's action.
The Fire Safety Committee approved a code change submitted by the ICC Code Technology Committee addressing the use of glazing in floors required to have a fire resistance rating. We urge the membership to support our public comment for approvals as modified.

The proposed changes to Section 716.2 make reference to the labeling requirements in Section 703.6. which in turn references Table 716.3. The table does not address fire rated glazing that is in a horizontal assembly, It is not clear how the Code Official would know that a fire resistance rated window assembly is tested and listed for use in a floor ceiling assembly or roof ceiling assembly that is required to satisfy a fire resistance rating.

FS83-12
Final Action: AS AM AMPC____ D

FS84-12
716.3.1, 716.3.2 (New), 716.5.8.3, 716.5.8.3.1 and 716.6.8

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

716.3 Marking fire-rated glazing assemblies. *Fire-rated glazing* assemblies shall be marked in accordance with Tables 716.3, 716.5, and 716.6.

716.3.1 Identification. For fire-rated glazing, the *label* shall bear the identification required in Table 716.3 and Table 716.5. "D" indicates that the glazing is permitted to be used in *fire door* assemblies and that the glazing meets the fire protection requirements of NFPA 252. "H" shall indicate that the glazing meets the hose stream requirements of NFPA 252. "T" shall indicate that the glazing meets the temperature requirements of Section 716.5.5.1. The placeholder "XXX" represents the fire -rating period, in minutes.

716.3.2 Identification. For fire-protection-rated glazing, the *label* shall bear the following identification required in Table 716.3 and Table 716.6: "OH – XXX." "OH" indicates that the glazing meets both the fire protection and the hose-stream requirements of NFPA257 or UL9 and is permitted to be used in fire window openings. The placeholder "XXX" represents the fire-rating period, in minutes.

~~716.3.1~~ 716.3.3 **Fire-rated glazing that exceeds the code requirements.** *Fire-rated glazing* assemblies marked as complying with hose stream requirements (H) shall be permitted in applications that do not require compliance with hose stream requirements. *Fire-rated glazing* assemblies marked as complying with temperature rise requirements
(T) shall be permitted in applications that do not require compliance with temperature rise requirements. *Fire-rated glazing* assemblies marked with ratings (XXX) that exceed the ratings required by this code shall be permitted.

716.5.8.3 Labeling. Fire-protection-rated glazing shall bear a *label* or other identification showing the name of the manufacturer, the test standard and information required in Section 716.3.1 ~~716.5.8.3.1~~ that shall be issued by an *approved agency* and shall be permanently identified on the glazing.

~~**716.5.8.3.1 Identification.** For fire-protection-rated glazing, the *label* shall bear the following four-part identification: "D - H or NH - T or NT - XXX." "D" indicates that the glazing shall be used in *fire door* assemblies and that the glazing meets the fire protection requirements of NFPA 252. "H" shall indicate that the glazing meets the hose stream requirements of NFPA 252. "NH" shall indicate that the glazing does not meet the hose stream requirements of the test. "T" shall indicate that the glazing meets the temperature requirements of Section 716.5.5.1. "NT" shall indicate that the glazing does not meet the temperature requirements of Section 716.5.5.1. The placeholder "XXX" shall specify the fire-protection-rating period, in minutes.~~

716.6.8 Labeling requirements. Fire-protection-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and information required in Section 716.3.2 and Table 716.6 that shall be issued by an approved agency and shall be permanently identified on the glazing.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/default.aspx. Since its inception in April/2005, the CTC has held twenty two meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Labeling of Fire Rated Glazing". The scope of the activity is noted as:

> Identify root causes of problems selecting, specifying, installing, and inspecting fire protective and fire resistive glazing and other assembly components including the frames. Propose identification requirements and other related code changes.

The proposed changes to Section 716.3 (the addition of Section 716.3.1 and 716.3.2) clarify the requirements for marking of fire-rated glazing assemblies. No technical changes are being introduced.

Section 716.3.1 was moved from Section 716.5.8.3.1. The language was modified to clarify that the provisions of the section apply to fire-rated glazing used in fire door assemblies. Additionally, consistent with Tables 716.3 and Table 716.5, the language was modified to reflect the fact that fire-rated glazing assemblies that do not meet the temperature or hose stream requirements of this section are not required to be labeled as "NT" and "NH" respectively.

Section 716.3.2 was added to clarify that Tables 716.3 and 716.6 are the appropriate tables to be used for fire-protection-rated glazing, and to provide details of the required label and standards for performance, consistent with such tables. This section essentially reflects the same language as contained in Section 715.5.9.1 of the 2009 IBC.

The remaining changes are made to update cross-references to reflect the new section numbers.

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

716.3-FS-BALDASSARRA-CTC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that not all necessary information was relocated from Section 716.5.8.3.1, specifically the descriptions of what NH and NT are with respect to the glazing label.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, P.E., FSFPE, requests Approval as Submitted.

Commenter's Reason: In the development cycle leading up to the 2012 IBC, the CTC submitted an extensive set of code changes calculated to provide IBC users with a comprehensive methodology for marking all types of fire rated glazing and a means of determining when and where those markings were to be used. These proposals were adopted and became a part of the 2012 IBC. However, following publication of the 2012 IBC, it became evident that several corrections were required. As a result, the CTC submitted four (4) proposals in this development cycle, namely, FS83-12, FS84-112, FS85-12, and FS95-12, to make needed corrections.

At the Technical Committee's fire safety hearings earlier this year, the committee recommended FS83-12 and FS85-12, as submitted; FS95-12, as modified; and disapproval of FS84-12. Unfortunately, the adoption of FS-84-12, as submitted, is critical to correcting the methodology adopted in the 2012 IBC for marking fire rated glazing.

FS84-12 does several things. First, it moves the text of section 716.5.8.3.1 to section 716.3.1. Second, in making that move, it deletes "NH" and "NT" as designations used in the marking of fire rated glazing. Third, it modifies section 716.3.1 and 716.3.2 to clarify that Tables 716.3, 716.5 and 716.6 are the primary sources for determining the markings to be used and the relationship of those markings to the various fire rated glazing applications that are provided for in the Code.

According to its reason statement, the Committee recommended that FS84-12 be disapproved solely on the basis that it deletes the "NH" and "NT" designations.

The cornerstones of the CTC's comprehensive methodology for marking fire rated glazing as adopted in the 2012 IBC are the marking designations set out in Table 716.3 and the inclusion of those designations for every fire rated glazing application set out in Tables 716.5 and 716.6. The reason FS84-12 proposes to delete the "NH" and "NT" designations is, simply, because they were inadvertently left in section 716.5.8.3.1 when the comprehensive marking system proposed by the CTC was adopted as a part of the 2012 IBC as they do not appear anywhere in the operative IBC Tables, namely, Tables 716.3, 716.5 or 716.6.

As a part of the comprehensive changes proposed by the CTC to the 2012 IBC, the "NH" and "NT" designations were never included in Tables 716.3, 716.5 and 716.6 because they are unnecessary in that the "H" or "T" marking**s** on a fire rated glazing assembly label means that the glazing assembly me**ets** the hose stream test or the temperature rise criteria, respectively, and the simple absence of an "H" or a "T" marking is sufficient to alert the user that the assembly has not been hose stream tested ("NH") or temperature rise tested ("NT").

In short, the "NH" and "NT" designations are unnecessary and were inadvertently left in section 716.5.8.3.1 when the 2012 IBC marking provisions were adopted. They should now be deleted from the Code and FS84-12 should be adopted as submitted.

Therefore, at the Final Action hearings, the CTC urges you to vote against the standing motion to disapprove FS84-12 and, following that, to vote in favor of a motion to approve FS84-12 as submitted.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “Areas of Study”. The Area of Study for this code change and public comment is called “Labeling of Fire Rated Glazing.”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/LabelingFireRatedGlazing.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

FS84-12

Final Action: AS AM AMPC____ D

FS86-12

Table 716.5, 716.5.8.1.2.1, 716.5.8.1.2.2

Proposed Change as Submitted

Proponent: Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee and Primary Fire Rated Glazing Manufacturers (tzaremba@ralaw.com)

Revise as follows:

TABLE 716.5
OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL[e]	MINIMUM SIDELIGHT! TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDELITE/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4	3	Not Permitted	Not Permitted	Not Permitted	4	Not Permitted	W-240
	3	3[a]	Not Permitted	Not Permitted	Not Permitted	3	Not Permitted	W-180
	2	1½	~~100 sq. in.~~ Maximum size tested [c]	~~≤100 sq.in. =~~ D-H-90 ~~>100 sq..in.=~~ or D-H-W-90	Not Permitted	2	Not Permitted	W-120
	1½	1½	~~100 sq. in.~~ Maximum size tested [c]	~~≤ 100 sq. in. =~~ D-H-90 ~~>100 sq. in.=~~ or D-H-W-90	Not Permitted	1½	Not Permitted	W-90
Shaft, exit enclosures and exit passageway walls	2	1½	100 sq. in.[c,d]	≤100 sq. in. = D-H-90 >-100 sq in.= D-H-T-or D-H-T-W-90	Not Permitted	2	Not Permitted	W-120

Fire barriers having a required fire- resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways, interior exit ramps and exit passageway walls	1	1	100 sq. in.[c,d]	≤10 0 sq.in. = D-H-60 >100 sq.in.= D-H-T-60 or D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
					Fire protection			
Other fire barriers	1	3/4	Maximum size tested	D-H-NT-45	3/4		D-H-NT-45	
Fire partitions: Corridor walls	1 0.5	1/3[b] 1/3[b]	Maximum size tested Maximum size tested	D-20 D-20	^{3}3/4[b] 1/3		D-H-OH-45 D-H-OH-20	
Other fire partitions	1 0.5	3/4 1/3	Maximum size tested Maximum size tested	D-H-45 D-H-20	3/4 1/3		D-H-45 D-H-20	

TABLE 716.5—continued
OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL[e]	MINIMUM SIDELIGHT/ TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDELITE/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Exterior walls	3	$1^1/_2$	~~100 sq. in.~~ Maximum size tested[c]	~~≤100 sq.in. =~~ D-H-90 ~~> 100 sq. in. =~~ or D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2	$1^1/_2$	~~100 sq. in.~~ Maximum size tested[c]	~~≤100 sq.in. =~~ D-H-90 ~~>100 sq.in.=~~ or D-H-W-90	Not Permitted	2	Not Permitted	W-120
					Fire Protection			
	1	3/4	Maximum Size tested	D-H-45	3/4		D-H-45	
Smoke barriers					**Fire protection**			
	1 1	1/3[b]	Maximum Size tested Size Tested size tt	D-20	3/4		D-H-OH-45	

For SI: 1 square inch = 645.2 mm

a. Two doors, each with a fire protection rating of $1^1/_2$ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.
b. For testing requirements, see Section 716.6.3.
c. Fire-resistance-rated glazing tested to ASTM E 119 in accordance with Section 716.2 shall be permitted, in the maximum size tested.
d. Except where the building is equipped throughout with an automatic sprinkler and the fire-rated glazing meets the criteria established in Section 716.5.5.
e. Under the column heading "Fire-rated glazing marking door vision panel," W refers to the fire-resistance rating of the glazing, not the frame.

716.5.8.1.2.1 Horizontal exits. Fire-protection rated glazing shall be permitted ~~as vision panels~~ in 1½-hour fire protection rated, self-closing swinging fire door assemblies serving as horizontal exits in fire walls~~ where limited to 100 square inches (0.065 m^2) with no dimension exceeding 10 inches (0.3 m^2)~~.

716.5.8.1.2.2 Fire barriers. Fire-protection-rated glazing shall be permitted in fire doors having a 1½-hour fire protection rating intended for installation in fire barriers~~, where limited to 100 square inches (0.065 m^2)~~.

Reason: This proposal eliminates an inconsistency in the IBC and an inconsistency between the IBC and NFPA 80. In that regard, IBC section 716.5 says that "fire door assemblies and shutters shall be installed in accordance with … NFPA 80." In turn, NFPA 80 provides that fire protection rated glazing may be used to the maximum sizes tested in 1½ hour fire protection rated doors in fire walls and fire barriers. In allowing fire protection rated glazing in the maximum sizes tested in these applications, NFPA 80 correctly recognizes that, since the doors in these applications are not fire-resistance or temperature rise rated, there is no reason to limit their use of fire protection rated glazing to 100 sq. in. If adopted, this proposal would reconcile these sections of the IBC and NFPA 80.

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

T716.5-FS-ZAREMBA

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that this proposal was not appropriate for fire door assemblies as indicated in Section 716.5.8.1.2.1

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee and Primary Fire Rated Glazing Manufacturers, requests Approval as Submitted.

Commenter's Reason: This proposed change is intended to eliminate a contradiction between Section 716.5 and 716.5.8.1.2 that unnecessarily limits the amount of *fire protection rated* glazing that can be used in certain 1½ hour *fire protection rated* doors.

Section 716.5 clearly says that: "[a]pproved fire door and fire shutter assemblies *shall* be constructed of *any material or assembly of component materials* that conforms to the test requirements …." (Emphasis added). It is then contradicted by Section 716.5.8.1.2 which says that, even if a door using a larger size glazing meets the test criteria of NFPA 252, the allowed amount of fire protection rated glazing that can be used in that 1½ hour doors is, nevertheless, limited to 100 square inches.

There is, simply, no technical basis for this contradiction between Section 716.5 and 716.5.8.1.2. If the code intended fire doors in these applications to limit temperature rise, then temperature rise tested doors would be required. But, temperature rise doors are *not* required in these applications. Since they are not, pursuant to section 716.5, the amount of fire protection rated glazing used in these doors should not be limited to 100 square inches if the use of larger sizes still meets the test criteria specified in NFPA 252 for 1½ hour fire doors.

The doors at issue in this proposed change are *fire protection* rated, that is, they are only tested to ensure that they will confine a fire. They are ***not*** tested for temperature rise. Nevertheless, if a door manufacturer wanted to exceed the 100 sq. in. size limitation found in 716.5.8.1.2, it would be forced to use a more expensive *fire resistance* rated glazing, tested to limit temperature rise, even though the door itself would *not* be temperature rise tested. (See, section 716.5.8.1.1).

Historically, the size limitations found in Section 716.5.8.1.2 are the result of a compromise based on the performance limitations applicable to traditional wired glass. For many years, wired glass was the *only* fire rated glazing in existence, but it ability to survive a fire test was generally limited to 45 minutes. As a result, a compromise was reached respecting 1½ hour (90 min.) fire doors. While view panels were allowed, they were limited to 100 square inches.

Today, many modern forms of *fire protection rated* glazing can easily pass a 1½ hour fire test while fully satisfying the most stringent human impact requirements applicable to doors set out in 16 C.F.R. 1201.

If adopted, this code change would harmonize the requirements for *fire protective* doors and *fire protective glazing* when used in the 1½ hour applications addressed in 716.5.8.1.2. It would also eliminate the contradiction that now exists between Sections 716.5 and 716.5.8.1.2.

Although the Committee recommended that FS86-12 be disapproved, a lack of any technical justification for its action is evident from its reason statement. Rather than providing any technical or other substantive basis for its action, the Committee, simply, said that it "felt … this proposal was not appropriate for the door assemblies as indicated in Section 716.5.8.1.2.1."

Unfortunately, the Committee's decision contradicts the mandate of Section 716.5 which says that, if a 1½ hour fire protection rated door can meet the applicable test requirements (NFPA 252) using fire protection rated glazing larger than 100 square inches, it *shall* be allowed. Instead of disapproving FS86-12, the Committee should have given effect to Section 716.5 by adopting FS86-12 as submitted, thus, eliminating the impediments posed in Section 716.5.8.1.2.1.

Using the ICC code development process and other means, the Glazing Industry Code Committee and the Fire Rated Glazing Manufacturers are committed to ensuring that the "right glass is used in the "right applications." As the Proponents of this proposal, both organizations believe that the adoption of FS86-12 will further that objective. Consequently, both organizations urge you to approve proposed changes to Section 716.5.8.1.2.1 and related sections of Table 716.5 by approving FS86-12 as submitted. To do this, you are urged to vote against the standing motion to disapprove FS86-12 and vote in favor of a motion to approve FS86-12 as submitted.

Thank you for your support.

FS86-12
Final Action: AS AM AMPC____ D

FS88-12
716.5.3.1

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

716.5.3.1 Smoke and draft control. *Fire door* assemblies shall also meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.01524 $m^3/s \cdot m^2$) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature and elevated temperature tests. Louvers shall be prohibited. Installation of smoke doors shall be in accordance with NFPA 105.

> **Exception:** Where enclosed elevator lobbies are not required by Section 713.14.1, elevator hoistway doors opening into a corridor are not required to meet the requirements for a smoke and draft control door assembly.

Reason: The ICC Executive Board directed the Code Technology Committee (CTC) to study the issue of elevator lobby separations in November 2010 due to the number of code change proposals submitted addressing this issue over a number of code change cycles. The Code Technology Committee formed a study group on the elevator lobby separation issue in December 2010. Note that this subject had been previously addressed by CABO/BCMC in 1986 with a similar conclusion. The code change proposals submitted are the result of the CTC's study of the issue. Note that the scope of the activity was as follows:

Scope

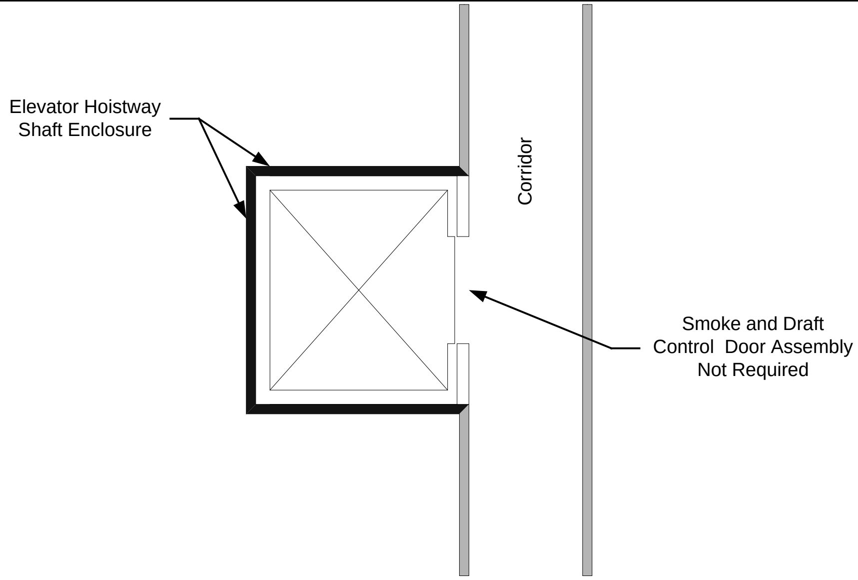
- Review the need for elevator lobbies,~~;~~ with emphasis on building use, building and hoistway height, active and passive fire protection features associated with the aforementioned.
- Review the differences and specific needs when dealing with elevator lobbies of traditional-use elevators, fire service elevators, and occupant evacuation elevators.
- Review related code provisions, such as egress from and through elevator lobbies.
- Review the appropriate use of alternatives including pressurization of hoistways, additional doors, roll-down style barriers, and gasketing systems.
- Review with members of elevator industry to scope the requirements of applicable elevator reference standards as it deals with elevator lobby design, use and construction.
- Review design and construction requirements for elevator lobbies, including but not limited to dimensions, location and separation.
- Review applicable code change history, technical studies and loss statistics as part of this review.

Based upon the extensive nature of this area of study**,** 5 Task Groups were formed during the process to provide in-depth review and to manage the number of issues. These task groups developed a number of proposals that were coordinated throughout the process.

More information on this CTC area of study can be found at the following link.
http://www.iccsafe.org/cs/CTC/Pages/ElevatorLobbies.aspx

This proposal is intended to clarify that when an enclosed elevator lobby is not required in accordance with Section 713.14.1 that smoke and draft protection is not required when the hoistway opens into a rated corridor. See figure below. Section 713.14.1 is based upon number of stories and not the fact that such elevators open onto a rated corridor so it is not entirely clear how the code is currently written that this was the intent . The following are the sections that are relevant to this issue and which demonstrate how such confusion could occur. The lobby provisions are independent from the corridor provisions.

Note that this proposal is one of several proposals submitted by the CTC Elevator Lobby study group. This particular proposal will be correlated as necessary. For instance if the elevator lobby provisions are moved to chapter 30 then the referenced section will be appropriately revised. See discussion on CTC elevator lobby proposal coordination in code change FS##-12



SECTION 716.5.3.1, EXCEPTION – SMOKE AND DRAFT CONTROL AT HOISTWAY

713.14 Elevator, dumbwaiter and other hoistways. Elevator, dumbwaiter and other hoistway enclosures shall be constructed in accordance with Section 713 and Chapter 30.

713.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three *stories*. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by *fire partitions*. In addition to the requirements in Section 708 for *fire partitions*, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 716.5.3 as required for *corridor* walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1. Elevator lobbies shall have at least one *means of egress* complying with Chapter 10 and other provisions within this code.

Exceptions:

1. Enclosed elevator lobbies are not required at the level(s) of *exit discharge*, provided the level(s) of *exit discharge* is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Elevators not required to be located in a shaft in accordance with Section 712.1 are not required to have enclosed elevator lobbies.
3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall comply with the smoke and draft control door assembly requirements in Section 716.5.3.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   4.1. Group I-2 occupancies;
   4.2. Group I-3 occupancies; and
   4.3. Elevators serving floor levels over 75 feet above the lowest level of fire department vehicle access in high-rise buildings.
5. Smoke partitions shall be permitted in lieu of *fire partitions* to separate the elevator lobby at each floor where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition to the requirements in Section 710 for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 710.5.2.2, 710.5.2.3, and 716.5.9 and duct penetrations of the smoke partitions shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21.
7. Enclosed elevator lobbies are not required where the elevator serves only *open parking garages* in accordance with Section 406.3.

713.14.1.1 Areas of refuge. Areas of refuge shall be provided as required in Section 1007.

SECTION 1018 CORRIDORS

1018.1 Construction. *Corridors* shall be fire-resistance rated in accordance with Table 1018.1. The *corridor* walls required to be fire-resistance rated shall comply with Section 709 for *fire partitions*.

Exceptions:

1. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group E where each room that is used for instruction has at least one door opening directly to the exterior and rooms for assembly purposes have at least one-half of the required *means of egress* doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A *fire-resistance rating* is not required for *corridors* contained within a dwelling or sleeping unit in an occupancy in Group R.
3. A *fire-resistance rating* is not required for *corridors* in *open parking garages*.
4. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group B which is a space requiring only a single *means of egress* complying with Section 1015.1.
5. Corridors adjacent to the exterior walls of buildings shall be permitted to have unprotected openings on unrated exterior wall where unrated walls are permitted by Table 602 and unprotected openings are permitted by Table 705.8.

SECTION 708 FIRE PARTITIONS

708.1 General. The following wall assemblies shall comply with this section.

1. Walls separating *dwelling units* in the same building as required by Section 420.2.
2. Walls separating *sleeping units* in the same building as required by Section 420.2.
3. Walls separating tenant spaces in *covered mall buildings* as required by Section 402.7.2.
4. Corridor walls as required by Section 1018.1.
5. Elevator lobby separation as required by Section 713.14.1.

708.2 Materials. The walls shall be of materials permitted by the building type of construction.

708.3 Fire-resistance rating. Fire partitions shall have a *fire-resistance rating* of not less than 1 hour.

Exceptions:

1. Corridor walls permitted to have a $^{1}/_{2}$ hour *fire-resistance rating* by Table 1018.1.
2. *Dwelling unit* and *sleeping unit* separations in buildings of Type IIB, IIIB and VB construction shall have *fire-resistance ratings* of not less than $^{1}/_{2}$ hour in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

708.6 Openings. Openings in a *fire partition* shall be protected in accordance with Section 716.

SECTION 710 SMOKE PARTITIONS

710.1 General. Smoke partitions installed as required elsewhere in the code shall comply with this section.

710.5 Openings. Openings in smoke partitions shall comply with Sections 710.5.1 and 710.5.2.

710.5.1 Windows. Windows in smoke partitions shall be sealed to resist the free passage of smoke or be automatic-closing upon detection of smoke.

710.5.2 Doors. Doors in smoke partitions shall comply with Sections 710.5.2.1 through 710.5.2.3.

710.5.2.1 Louvers. Doors in smoke partitions shall not include louvers.

710.5.2.2 Smoke and draft control doors. Where required elsewhere in the code, doors in smoke partitions shall meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.015424 $m^3/(s \cdot m^2)$) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature test and the elevated temperature exposure test. Installation of smoke doors shall be in accordance with NFPA 105.

SECTION 716 OPENING PROTECTIVES

716.1 General. Opening protectives required by other sections of this code shall comply with the provisions of this section.

716.5 Fire door and shutter assemblies. Approved *fire door* and fire shutter assemblies shall be constructed of any material or assembly of component materials that conforms to the test requirements of Section 716.5.1, 716.5.2 or 716.5.3 and the *fire protection rating* indicated in Table 716.5. *Fire door* frames with transom lights, sidelights or both shall be permitted in accordance with Section 716.5.6. *Fire door* assemblies and shutters shall be installed in accordance with the provisions of this section and NFPA 80.

Exceptions:

1. Labeled protective assemblies that conform to the requirements of this section or UL 10A, UL 14B and UL 14C for tin-clad *fire door* assemblies.
2. Floor *fire door* assemblies in accordance with Section 711.8.

TABLE 716.5
OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL[e]	MINIMUM SIDELIGHT/ TRANSOM ASSEMBLY RATING (hours)	FIRE RATED GLAZING MARKING SIDELITE/ TRANSOM PANEL
Fire partitions: Corridor walls	0.5	1/3[b]	Maximum size tested	D-20	1/3	D-H- OH-20

716.5.3 Door assemblies in corridors and smoke barriers. *Fire door* assemblies required to have a minimum *fire protection rating* of 20 minutes where located in *corridor* walls or *smoke barrier* walls having a *fire-resistance rating* in accordance with Table 716.5 shall be tested in accordance with NFPA 252 or UL 10C without the hose stream test.

Exceptions:

1. Viewports that require a hole not larger than 1 inch (25 mm) in diameter through the door, have at least a 0.25-inch-thick (6.4 mm) glass disc and the holder is of metal that will not melt out where subject to temperatures of 1,700°F (927°C).
2. *Corridor* door assemblies in occupancies of Group I-2 shall be in accordance with Section 407.3.1.
3. Unprotected openings shall be permitted for *corridors* in multitheater complexes where each motion picture auditorium has at least one-half of its required *exit* or *exit access doorways* opening directly to the exterior or into an *exit* passageway.
4. Horizontal sliding doors in *smoke barriers* that comply with Sections 408.3 and 408.8.4 in occupancies in Group I-3.

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

716.5.3.1-FS-BALDASSARRA-CTC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that the protection of smoke and draft control doors should be provided on elevator hoistway doors when they open into a corridor that is required to have draft and smoke control doors.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee, requests Approval as Submitted.

Commenter's Reason: The protection of elevator openings is addressed by Section 713.14.1 which specifically does not address openings in rated corridors but instead addresses elevators hoistways that connect more than 3 stories. The CTC believes that protection of elevator openings is not required based upon the requirement for rated corridors. More specifically, the hazards that a corridor and associated smoke protected openings are protecting are the hazards from individual tenant spaces on that story. An elevator hoistway is not the hazard the corridor requirements were intended to protect. The hazards of hoistway openings are addressed based upon number of stories as noted in Section 713.14.1**.** See attached figure.

The ICC Executive Board directed the Code Technology Committee (CTC) to study the issue of elevator lobby separations in November 2010 due to the number of code change proposals submitted addressing this issue over a number of code change cycles. The Code Technology Committee formed a study group on the elevator lobby separation issue in December 2010. Note that this subject had been previously addressed by CABO/BCMC in 1986 with a similar conclusion. The code change proposals submitted are the result of the CTC's study of the issue. Note that the scope of the activity was as follows:

Scope

- Review the need for elevator lobbies,~~;~~ with emphasis on building use, building and hoistway height, active and passive fire protection features associated with the aforementioned.
- Review the differences and specific needs when dealing with elevator lobbies of traditional-use elevators, fire service elevators, and occupant evacuation elevators.
- Review related code provisions, such as egress from and through elevator lobbies.
- Review the appropriate use of alternatives including pressurization of hoistways, additional doors, roll-down style barriers, and gasketing systems.
- Review with members of elevator industry to scope the requirements of applicable elevator reference standards as it deals with elevator lobby design, use and construction.
- Review design and construction requirements for elevator lobbies, including but not limited to dimensions, location and separation.
- Review applicable code change history, technical studies and loss statistics as part of this review.

Based upon the extensive nature of this area of study**,** 5 Task Groups were formed during the process to provide in-depth review and to manage the number of issues. These task groups developed a number of proposals that were coordinated throughout the process.

FS88-12

Final Action: AS AM AMPC____ D

FS89-12
716.5.3.2, 716.5.3.2.1 (New), 716.6.7.4 (New)

<u>Proposed Change as Submitted</u>

Proponent: Robert J Davidson, Davidson Code Concepts, LLC, representing SaftiFirst a Division of O'Keeffes, Inc. (rjd@davidsoncodeconcepts.com)

Revise as follows:

716.5.3 Door assemblies in corridors and smoke barriers. *Fire door* assemblies required to have a minimum *fire protection rating* of 20 minutes where located in *corridor* walls or *smoke barrier* walls having a *fire-resistance rating* in accordance with Table 716.5 shall be tested in accordance with NFPA 252 or UL 10C without the hose stream test.

Exceptions: *(No change to current text)*

716.5.3.2 Glazing in door assemblies. In a 20-minute *fire door assembly*, the glazing material in the door itself shall have a minimum fire-protection-rated glazing of 20 minutes and shall be exempt from the hose stream test. Glazing material in any other part of the door assembly, including transom lights and sidelights, shall be tested in accordance with NFPA 257 or UL 9, including the hose stream test, in accordance with Section 716.6<u>, subject to the limitations in Section 716.5.3.2.1</u>.

<u>**716.5.3.2.1 Glazing in sidelites.** The use of fire protection rated glazing in sidelites shall be limited to a minimum of 44 inches above the finished floor surface.</u>

716.6.7 Interior fire window assemblies. Fire-protection- rated glazing used in *fire window assemblies* located in *fire partitions* and *fire barriers* shall be limited to use in assemblies with a maximum *fire-resistance rating* of 1 hour in accordance with this section.

<u>**716.6.7.4 Interior fire windows in fire-resistant rated corridors and exit passageways.** Fire protection-rated glazing in fire windows tested to NFPA 257 used in fire-resistant rated corridors and exit passageways shall be limited to applications where the bottom edge of the window frame is a minimum of 44-inches above the finished floor surface. The bottom edge height of fire resistance rated glazing tested as an assembly to ASTM E119 or UL 263 and rated a minimum of 1-hour shall not be limited.</u>

Reason: The purpose of this proposal is to provide for protection of specific egress paths against radiant heat exposure that can occur through the use of fire protection rated glazing. Building codes in other countries such as New Zealand and the United Kingdom have taken this exposure problem into account in the application of their requirements with height above egress path limitations of 1100 mm (43.3 inches) and up to 2 M (6.6 feet).

Fire protection rated glazing materials do not protect against radiant heat. The unrestricted use of these materials in exit corridors in the large sizes for which they have been tested and listed threaten the life safety of building occupants attempting to exit past them in a fire as well as firefighters using the same protected path for rescue and firefighting. By restricting the use of these materials to above 44" from the floor along specific egress paths, occupants and firefighters can crawl below the level of the fire windows, and combustibles piled on the floor are not as likely to pose a threat to windows installed at this height.

This proposal addresses the radiant heat issue by providing for a height limitation in the application of fire protection rated glazing in sidelights with proposed Section 716.5.3.2.1 and the use of fire protection rated glazing in specific egress paths in proposed Section 716.6.7.2.

The recognition of this issue is not restricted to overseas; NFPA 80 provides background information and recommends that the consideration be given to the issue.

NFPA 80-2010

4.4.5* *Glazing material shall be permitted in fire doors having the fire protection ratings shown in Table 4.4.5 when tested in accordance with NFPA 252, Standard Methods of Fire Tests of Door Assemblies, and shall be limited in size and area in accordance with Table 4.4.5.*

A.4.4.5 *Doors containing fire resistance–rated glazing materials fabricated and tested as door assemblies in accordance with NFPA 252, Standard Methods of Fire Tests of Door Assemblies, to determine a fire protection rating should be regulated by this standard as a fire assembly and not as a glazing material permitted in fire door assemblies as prescribed in Section 4.4.*

Regarding Table 4.4.5, footnote c, consideration should be given to limiting fire protection glazing size in non–temperature rise doors where 60- and 90-minute fire protection is required due to radiant heat hazards. See Annex I.

If the limited amount of glazing in a fire door presents a risk, fire windows along a corridor or exit passageway would be a greater risk. Within NFPA 80 Appendix I the opening paragraph states:

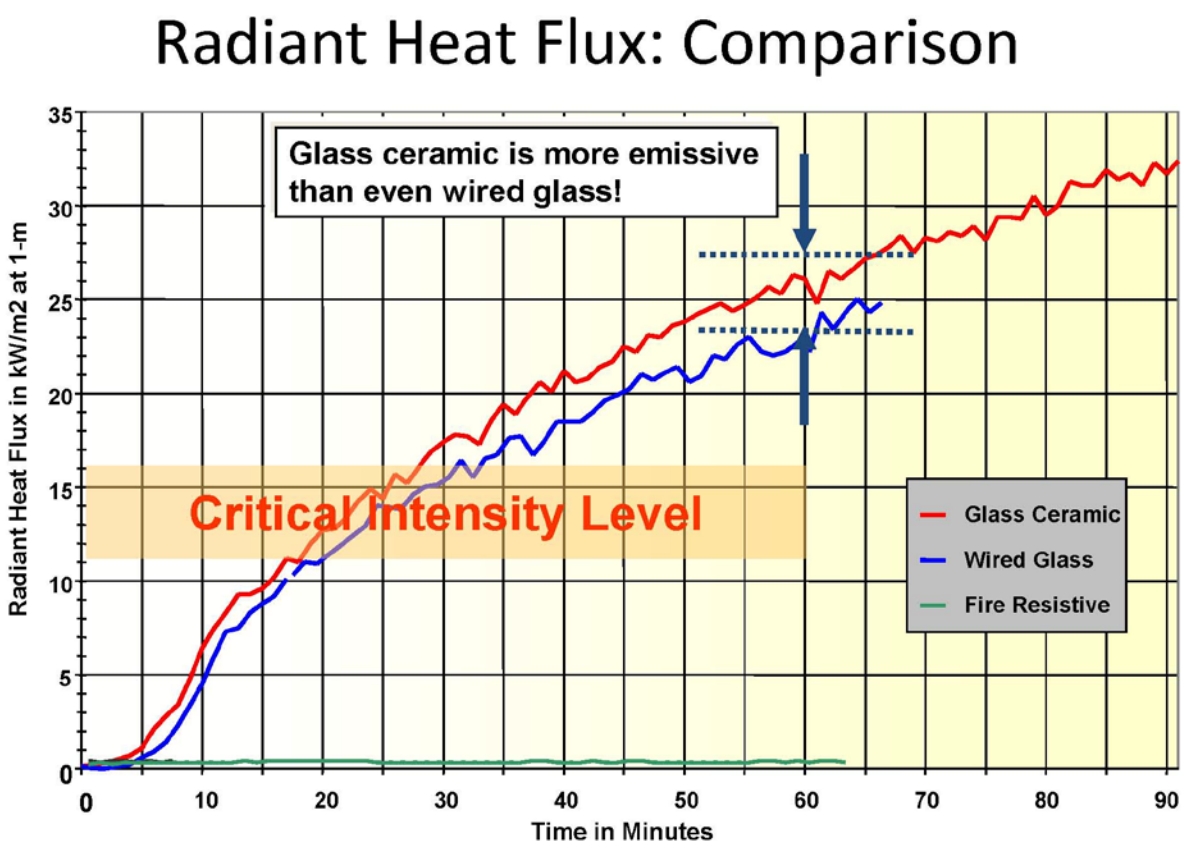
I.1 Background. *Fire windows were originally designed for protecting openings in exterior walls. In such applications, radiant heat transfer was not a significant consideration, since the main function of fire windows was to contain the flames within the building. However, where fire windows are used in interior partitions, users of this standard might need to consider radiant heat transfer during fire. Exiting through corridors and past fire windows could be compromised, and combustible materials on the unexposed side of fire windows could be ignited. The information that follows is a guide to the evaluation of radiant heat transfer through fire windows.*

The third paragraph of NFPA 80 Appendix I states:

Test Method. Because the present fire test standard, NFPA 257, does not require measuring and reporting temperature rise on the unexposed face of the glazing material or radiant heat transmission, glazing products tested to this standard have not been required to retard heat transfer. However, these data are required in many European fire test standards. [2] As a result, European building codes place limitations on the use of glazing in fire-resistant partitions inside buildings and require the use of insulating glazing in means of egress as well as where combustibles could be in close proximity

This code change at the same time permits use in larger sizes of products that meet fire resistance radiant heat and temperature rise limits of ASTM E119, as those products do not transmit dangerous levels of radiant heat.

Fire test data show that at 45-minutes, these products transmit in excess of 20 kW/m^2, at 20 minutes of fire exposure, these materials transmit in excess of 10 kW/m^2, and at 10 minutes of fire exposure, transmit 5 kW/m^2. http://vimeo.com/13218481 See below, Chart Cumulative Radiant Heat Energy Data Chart, prepared by the test sponsor of the test cited above. The Society of Fire Protection Engineers Fire Protection Engineering Handbook identifies a fairly obvious tolerance limit for exposure to radiant heat of 2.5 kW/m^2 due to unbearable pain. (See SFPE Handbook of Fire Protection Engineering, 2nd edition, page 2-114).



Also included as further support of this code change are two test reports from the Coast Guard testing of (1) Ceramic (FireLite) in steel bulkheads (Report No. CG-D-37-95), and (2) wired glass in steel bulkheads (Report No. CG-D-38-95). Temperature rise and radiant heat flux measurements were recorded. The tests were intended to measure radiant heat flux and surface temperature performance at 60 minutes.

The tests can be summarized as follows:

Wired Glass Test
The test of the wired glass panels resulted in glazing failure prior to 60-minutes, so radiant heat and temperature rise were only recorded up to the time of the wired glass failure.

Test 1
- Heat flux at end of test (41:24 minutes) - 71 kW/m sq.
- Surface temperature - wired glass temperature - 730 degrees C; steel frame - 540 degrees C

Test 2
- Heat flux at end of test (37:46 minutes) - 48 kW/m sq.
- Surface temperature - wired glass temperature - 730 degrees C; steel frame - 550 degrees C

Test 3
- Heat flux at end of test (48:30 minutes) - 57 kW/m sq.
- Surface temperature - wired glass temperature - 760 degrees C; steel frame - 585 degrees C

Conclusion on page 8 - As the window panes began to reach their melting point and flow out of the test frame, the recorded heat flux levels showed obvious increases. In all three tests, the recorded heat flux increased approximately 5-7 kW/m sq. until the wire glass fell out of the test frame and the test was terminated.

Ceramic (FireLite) Test

Test 1
- Heat flux at end of test (60:00 minutes) - 75 kW/m sq.
- Surface temperature - ceramic glass temperature - 800 degrees C; steel frame - 600 degrees C

Test 2
- Heat flux at end of test (60:00 minutes) - 69 kW/m sq.
- Surface temperature - ceramic glass temperature - 800 degrees C; steel frame - 600 degrees C

Test 3
- Heat flux at end of test (60:00 minutes) - 73 kW/m sq.
- Surface temperature - ceramic glass temperature - 800 degrees C; steel frame - 600 degrees C

According to these test reports, the surface temperature is significantly higher on the glazing than it is on the steel frame. Also, the report notes that the radiant heat measurements taken that included the "cooler steel frame" were several percentages lower than the view that included just the glazing. (see Ceramic test report (Report No. CG-D-37-95), page 6.)

Limitations on area uses of fire protection-rated glazing products is long overdue. In Europe, code regulators have recognized the need for restricting use of fire protection-rated glazing materials based on radiant heat hazards, particularly their use in egress paths. Reasonable limits protecting life safety are achieved by limiting the height of windows in exit corridors, permitting building occupants safe egress. The restriction on use in other fire barriers and fire partitions reduces the possibility of fire spread due to auto-ignition, which test data show can occur well before the 45-minute fire exposure to which fire protection-rated glazing products have been tested.

<u>Bibliography</u>

1. Test Report, Fire Performance of Three Wired Glazed Window Assemblies, Report No. CG-D-38-95
   http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA302226
2. Test Report, Fire Performance Evaluation of Three A-O Glazed Window Assemblies, Report No. CG-D-37-95
   http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA302316
3. New Zealand Compliance Document for New Zealand Building Code Clauses C1, C2, C3, C4 Fire Safety
   http://www.dbh.govt.nz/UserFiles/File/Publications/Building/Compliance-documents/C-fire-safety-1st-edition-amendment-9.pdf
4. United Kingdom Building regulations Fire Safety, Volume 2 – Buildings Other than Dwellinghouses
   http://www.planningportal.gov.uk/uploads/br/BR_App_Doc_B_v2.pdf
5. NFPA 80-2010 “Standard for Fire Doors and Other Opening Protectives”
   http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=80

Cost Impact: This code change will not increase construction costs, as fire protection-rated glazing materials are still permitted, and the cost of fire resistance products permitted for larger applications and next to the floor is now comparable to safety rated fire protection products that pass hose stream testing.

716.6.7.3 (NEW)-FS-DAVIDSON

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal was too restrictive for exit access corridors without proper substantiation. Further, the minimum 44 inch height requirements for fire protection rated glazing in sidelites could be a significant increase in the cost of construction.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Robert J Davidson, Davidson Code Concepts, LLC, representing SaftiFirst a Division of O'Keefes, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

716.5.3.2 Glazing in door assemblies. In a 20-minute *fire door assembly*, the glazing material in the door itself shall have a minimum fire-protection-rated glazing of 20 minutes and shall be exempt from the hose stream test. Glazing material in any other part of the door assembly, including transom lights and sidelights, shall be tested in accordance with NFPA 257 or UL 9, including the hose stream test, in accordance with Section 716.6, subject to the limitations in Section 716.5.3.2.1.

716.5.3.2.1 Glazing in sidelights. ~~The use of fire protection rated glazing in sidelites shall be limited to a minimum of 44 inches above the finished floor surface~~. <u>Fire-protection-rated glazing in excess of 100 square inches (0.065 m2) is prohibited. Fire-resistance-rated glazing in excess of 100 square inches (0.065 m2) in fire door assemblies shall be tested as components of the door assemblies, and not as glass lights.</u>

716.6.7.4 Interior fire windows in fire-resistant rated corridors and exit passageways. Fire protection-rated glazing in fire windows tested to NFPA 257 used in fire-resistant rated corridors ~~and exit passageways~~ shall be limited to applications where the bottom edge of the window frame is a minimum of 44-inches above the finished floor surface. The bottom edge height of fire resistance rated glazing tested as an assembly to ASTM E119 or UL 263 and rated a minimum of 1-hour shall not be limited.

Commenter's Reason: The committee reason that the proposal was too restrictive without substantiation ignores the technical data included in the original reason statement; the background from NFPA 80; and the bibliography references. More importantly, the current code provisions restrict the use of fire protection glazing in exit enclosures and exit passageway walls, exit access stairways, exit access ramps, interior exit stairways, interior exit ramps and exit passageway walls. The reason is the transmittal of radiant heat. That is one of the main limitations of fire protection rated glazing.

When a corridor is required to be enclosed with fire-resistance rated construction the purpose is to protect the occupants using that corridor to access an exit. The code is clear that the fire-resistance protection must be maintained from the point of entry into the corridor to the exit.

"1018.6 Corridor continuity.
Fire-resistance-rated corridors shall be continuous from the point of entry to an exit, and shall not be interrupted by intervening rooms. Where the path of egress travel within a fire-resistance-rated corridor to the exit includes travel along unenclosed exit access stairways or ramps, the fire resistance-rating shall be continuous for the length of the stairway or ramp and for the length of the connecting corridor on the adjacent floor leading to the exit."

The purpose is the same as the protection of the other components that are required to be protected for the benefit of the occupants. For consistency of fire protection the same restrictions on the use of fire rated glazing materials should apply to the fire-resistance rated corridors. Neither the occupants utilizing the enclosed corridors or the fire knows the difference between a fire-resistance rated corridor and an exit passageway in terms of radiant heat exposure.

Section 716.5.3.2.1 has been modified to address the committee's concern on the 44 inch height limitation which was developed using standards used in the UK and New Zealand. The language has been replaced with language taken from IBC Section 716.5.5.1 which applies to doors in interior exit stairways and ramps and exit passageways for consistency.

The strikeout in Section 716.6.7.4 was done to eliminate an editorial error made when the original proposal was submitted. Exit passageways already restrict the use of fire protection rated glazing.

FS89-12
Final Action: AS AM AMPC____ D

FS91-12
716.5.5.1

Proposed Change as Submitted

Proponent: Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee and Primary Fire Rated Glazing Manufacturers (tzaremba@ralaw.com)

Revise as follows:

716.5.5.1 Glazing in doors. Fire-protection-rated glazing in excess of 100 square inches (0.065 m2) is not permitted. Fire-resistance-rated glazing in excess of 100 square inches (0.065 m2) shall be permitted in *fire door*<u>*s.*</u> ~~assemblies when tested as components of the door assemblies, and not as glass lights, and shall have a maximum transmitted temperature rise of 450o F (250o C) in accordance with Section 716.5.5.~~ <u>Fire doors using listed fire-resistance-rated glazing shall have a maximum transmitted temperature rise in accordance with Section 716.5.5 when tested in accordance NFPA 252, UL 10B or UL 10C.</u>

Reason: This proposal is not intended to change the underlying requirements of section 716.5.5.1. It is intended to provide uniformity for testing fire-resistance-rated glazing when it is used in temperature rise fire doors.

When glazing in temperature rise fire doors exceeds 100 sq. in., it must be fire-resistance-rated glazing. An issue arises as to the sequence of testing when fire-resistance-rated glazing is used in a fire door because fire-resistance-rated glazing is tested to ASTM E119 and the fire door is tested to NFPA 252. Working closely with UL, this code change proposal was developed to answer the question as to how to test a fire door when it uses fire-resistance-rated glazing. In that regard, the proposal would require the glazing to be tested first, and, if it meets the ASTM E119 acceptance criteria, it is listed as a fire-resistance-rated glazing. That "listed fire-resistance rated glazing" is then installed in a fire door and tested in accordance with NFPA 252, the fire door test, including tests for the maximum transmitted temperature rise requirements of Section 716.5.5.

If adopted, this proposal will provide uniformity for testing ASTM E119 fire-resistance-rated glazing when used in NFPA 252 tested fire doors.

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

716.5.5.1-FS-ZAREMBA

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

716.5.5.1 Glazing in doors. Fire-protection-rated glazing in excess of 100 square inches (0.065 m2) is not permitted. Fire-resistance-rated glazing in excess of 100 square inches (0.065 m2) shall be permitted in *fire doors.* <u>Listed fire-resistance rated glazing in a</u> fire door ~~using listed fire-resistance-rated glazing~~ shall have a maximum transmitted temperature rise in accordance with Section 716.5.5 when <u>the fire door is</u> tested in accordance <u>with</u> NFPA 252, UL 10B or UL 10C.

Committee Reason: The committee agreed that the proposed testing for maximum transmitted temperature of fire-resistance-rated glazing was appropriate. The modification clarifies that it is the glazing that gets tested.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Robert J Davidson, Davidson Code Concepts, LLC, representing SaftiFirst a Division of O'Keefes, Inc., requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

716.5.5.1 Glazing in doors. Fire-protection-rated glazing in excess of 100 square inches (0.065 m2) is not permitted. Fire-resistance-rated glazing in excess of 100 square inches (0.065 m2) shall be permitted in fire door~~s~~ assemblies. Listed fire-resistance rated glazing in a fire door assembly shall have a maximum transmitted temperature rise in accordance with Section 716.5.5 when the fire door assembly is tested in accordance with NFPA 252, UL 10B or UL 10C.

Commenter's Reason: The suggested modifications are editorial in that the original submitter did not intend to make any change to the underlying requirements, just to provide uniformity with testing requirements. Sidelights and transoms are part of the "fire door assembly" and current code language refers to the fire door "assembly". The original submittal and the committee modification referred to "fire door(s)" only, which eliminates the allowance for fire-resistance rated glazing in the remainder of the assembly, (sidelights and transoms). The correct terminology is "fire door assembly.

FS91-12
Final Action: AS AM AMPC____ D

FS94-12
716.5.8, 716.5.8.1, 716.5.8.1.2.1, 716.5.8.3

Proposed Change as Submitted

Proponent: Bob Eugene, representing Underwriters Laboratories (Robert.Eugene@ul.com)

Revise as follows:

716.5.8 Glazing material. Fire-~~protection~~-rated glazing conforming to the opening protective requirements in Section 716.5 shall be permitted in *fire door* assemblies.

716.5.8.1 Size limitations. <u>Fire-resistance-rated glazing shall comply with the size limitations in Section 716.5.8.1.1</u>. Fire-protection-rated glazing shall comply with the size limitations of NFPA 80, except as provided in Section~~s 716.5.8.1.1 and~~ 716.5.8.1.2.

716.5.8.1.1 Fire-resistance-rated glazing in door assemblies in fire walls and fire barriers rated greater than 1 hour. Fire-resistance-rated glazing tested to ASTM E 119 or UL 263 and NFPA 252, UL 10B or UL 10C shall be permitted in *fire door assemblies* located in *fire walls* and in *fire barriers* in accordance with Table 716.5 to the maximum size tested in accordance with their listings.

716.5.8.1.2 Fire-protection-rated glazing in door assemblies in fire walls and fire barriers rated greater than 1 hour. Fire-protection-rated glazing shall be prohibited in *fire walls* and *fire barriers* except as provided in Sections 716.5.8.1.2.1 and 716.5.8.1.2.2.

716.5.8.1.2.1 Horizontal exits. Fire-protection-rated glazing shall be permitted as vision panels in *self-closing* swinging *fire door* assemblies serving as horizontal exits in *fire walls* where limited to 100 square inches (0.065 m^2) with no dimension exceeding 10 inches (0.3 m~~m~~).

716.5.8.1.2.2 Fire barriers. Fire-protection-rated glazing shall be permitted in *fire doors* having a 1-1/2-hour *fire protection rating* intended for installation in *fire barriers*, where limited to 100 square inches (0.065 m^2).

716.5.8.2 Elevator, stairway and ramp protectives. Approved fire-protection-rated glazing used in *fire door* assemblies in elevator, stairway~~s~~ and ramp~~s~~ enclosures shall be so located as to furnish clear vision of the passageway or approach to the elevator, stairway or ramp.

716.5.8.3 Labeling. Fire-protection-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and information required in Section ~~716.5.8.3.1~~ <u>Table 716.3</u> that shall be issued by an *approved agency* and shall be permanently identified on the glazing.

Reason: The charging language of Section 716.5.8 references fire-protection-rated glazing. The sub sections which follow detail requirements for both fire-protection-rated glazing and fire-resistance-rated glazing. The proposed changes to Section 716.5.8 editorially correct this along with several other typographical errors. No technical changes are being introduced.

.

Cost Impact: None

716.5.8-FS-EUGENE

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

716.5.8 Glazing material. Fire-rated glazing <u>and fire-resistance-rated glazing</u> conforming to the opening protective requirements in Section 716.5 shall be permitted in *fire door* assemblies.

(Portions of the proposal not shown remain unchanged).

Committee Reason: The committee agreed that the proposal clarified the differences between fire-resistance-rated glazing and fire-protection-rated glazing regarding code application. The modification simply extends this differentiation to Section 716.5.8.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bob Eugene, representing UL LLC, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

716.5.8.3 Labeling. Fire-~~protection~~-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and information required in ~~Section~~ Table 716.3 that shall be issued by an *approved agency* and shall be permanently identified on the glazing.

(Portions of the proposal not shown remain unchanged)

Commenter's Reason: The term "fire-rated" is a defined term that includes both fire-protection-rated and fire-resistance-rated. Both are included in Table 716.3. The deletion to the term "Section" in the last sentence is editorial, was discussed in testimony at the Dallas hearings, but was inadvertently omitted from the motion by the Code Development Committee.

FS94-12
Final Action: AS AM AMPC____ D

FS99-12, Part I
202, 712.1.3.3 (New), 717 (New)

Proposed Change as Submitted

Proponent: Tom Meyer, Colorado Code Consulting, LLC, representing Stobich Fire Protection (tmeyers@coloradocode.net); Steve Thomas, Colorado Code Consulting, LLC, representing Stobich Fire Protection (sthomas@coloradocode.net)

THIS IS A 5 PART CODE CHANGE. ALL PARTS WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

PART I – IBC FIRE SAFETY

Add new definition as follows:

<u>**Fire Curtain.** A flexible membrane assembly constructed of materials designed to restrict the spread of fire when tested in accordance with UL 10D.</u>

Add new text as follows:

<u>**SECTION 717**</u>
<u>**FIRE AND SMOKE CURTAINS**</u>

<u>**717.1 General.** Fire and smoke curtains permitted by other sections of this code shall comply with the provisions of this section.</u>

<u>**717.2 Fire Test Criteria.** Fire and smoke curtains shall be tested in accordance with the requirements of UL 10D.</u>

<u>**717.3 Activation.** Fire and smoke curtains shall comply with the following criteria:</u>

1. <u>Fire and smoke curtains shall be actuated by approved spot-type detectors listed for releasing service.</u>
2. <u>Fire detection systems providing control input or output signals to fire and smoke curtains or elements thereof shall comply with the requirements of Section 907. Such systems shall be equipped with a control unit complying with UL 864 and listed as smoke control equipment.</u>

(Renumber subsequent sections)

Add new standard to Chapter 35 as follows:

<u>UL 10D-09</u> <u>Outline of Investigation for Fire Tests for Fire Protective Curtains</u>

Reason: This proposal introduces fire curtains into the code to be used in protecting vertical openings. A new section has been proposed to address the requirements for a fire curtain in a new Section 717. The current code has several different ways to protect these openings. These curtains have been tested in accordance with UL 10D which is similar to UL 263 without the hose stream test. Horizontal assemblies are not required to pass the hose stream test. Therefore, the standards are similar in how they evaluate the system. The proposal is also creating a new definition to address the testing and installation requirements for the curtain. UL 10D has been specified as the test standard for the fire curtains. It is similar to other fire-resistance tests with the exception of a hose stream test.

Section 712.1.2 currently permits the installation of a draft curtain and closely spaced automatic sprinklers in lieu of providing a fire-resistant rated shaft enclosure. The intent of this requirement is to limit the amount of smoke and heat that can extend up through the opening created for an escalator. This proposal is intended to provide a third option to the designer to address the floor openings created by an escalator. The installation of a fire curtain is being presented as that option. A fire curtain can meet the requirement of a fire rated assembly, but has not been tested with a hose stream. A fire curtain will provide an equal level of protection, if not better, than the current draft curtain and sprinklers.

Section 721.1.18 would permit a horizontally deployed curtain that would enclose the vertical floor opening and provide the same protection as the horizontal assembly.

Section 404.6 requires that an atrium be separated from other spaces of the building by a one-hour fire barrier. The exceptions to that requirement permit the installation of a non-fire rated assembly in exception 1. The proposal permits the installation of a fire curtain around the perimeter of the atrium as an additional option. A fire curtain provides an equivalent level of protection to glass forming a smoke partition protected by automatic sprinklers outlined in exception 1. The intent of the exception is to provide a smoke separation at the atrium.

Section 1009.3 presents a new type of separation requirement for exit access stairways. It introduces the concept of fire curtains into the code and permits their use to enclose exit access stairs that serve a maximum of four stories. Fire curtains are tested to UL 10D which does not include the hose stream test. The intent is to allow an alternative to a full enclosure. The current code permits stairs to be open between adjacent stories without enclosure. This proposal is also consistent with the protection that Exceptions 3 and 4 of Section 1009.3 provides, with the draft curtain and closely spaced sprinklers.

Cost Impact: This change will reduce the cost of construction

Analysis: A review of the standard proposed for inclusion in the code, UL10D-09 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

712.1.3.3 (NEW)-FS-MEYERS-THOMAS-721.1.18 (NEW)-FS-MEYERS-THOMAS-404.6-FS-MEYERS-THOMAS-1009.3-FS-MEYERS-THOMAS

Public Hearing Results

For staff analysis of the content of UL 10D-2009 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf.

PART I – IBC FIRE SAFETY
Committee Action: Disapproved

Committee Reason: Disapproval was requested by the applicant based on the committee's actions on FS99-12 Parts II through V. The committee also suggested the proponent clarify how the fire and smoke curtains are tested and that definitions should not contain requirements, such as compliance to a test standard.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Stephen Thomas, Colorado Code Consulting, LLC, representing Stobich Fire Protection, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART I – IBC FIRE SAFETY

~~**Fire Curtain.** A flexible membrane assembly constructed of materials designed to restrict the spread of fire when tested in accordance with UL 10D.~~

SECTION 717
FIRE AND SMOKE CURTAINS

717.1 General. Fire and smoke curtains permitted by other sections of this code shall comply with the provisions of this section.

717.2 Fire Test Criteria. Fire and smoke curtains shall be tested in accordance with the requirements of UL ~~10D~~ 10C.

717.3 Activation. Fire and smoke curtains shall comply with the following criteria:

1. Fire and smoke curtains shall be actuated by approved spot-type detectors listed for releasing service.
2. Fire detection systems providing control input or output signals to fire and smoke curtains or elements thereof shall comply with the requirements of Section 907. Such systems shall be equipped with a control unit complying with UL 864 and listed as smoke control equipment.

(Renumber subsequent sections)

~~**Add new standard to Chapter 35 as follows:**~~

~~UL 10D-09 Outline of Investigation for Fire Tests for Fire Protective Curtains~~

Commenter's Reason: The original change included five parts. This public comment deletes three of those parts (I, III and V). Part I was a definition that the committee included that it contained requirements and was not needed. Therefore, we have deleted it from our proposal. Part III addressed the use of fire curtains in vertical openings in floors. Part V addressed floor openings for exit access stairways. This public comment only maintains the use of fire curtains to separate atriums from adjacent spaces. Part II has also been preserved to provide language that describes how the curtains will operate during a fire event as well as the testing requirements.

The current language in the code permits three separate options to modify the required separation between atriums and adjacent spaces. One of those options is the use of a glass wall that is protected by a fire sprinkler system. This separation is not a tested fire-resistant rated assembly. The only testing that has been done on this separation is to confirm that the glazing will not break when the fire sprinklers are activated and wash the glass. This separation has also been in the code for many years. It has met the test of time.

This proposal is intended to provide a fourth option of separating the atrium from adjacent spaces. We are introducing the concept of fire curtains into the code. These curtains have been used extensively in Europe to provide a fire separation in many areas. The curtain is deployed vertically upon the detection of smoke. They are held in place by rods on each side of the opening preventing the curtains from moving when the atrium smoke control system is activated. They will also provide a fire and smoke seal between the atrium opening and adjacent spaces. This will reduce the volume of the space and reduce the size of the smoke control system. It will also allow occupants to egress past the atrium without being exposed to the smoke and heat within the atrium.

There was concern about the use of UL 10D as the test standard for the fire curtains. Therefore, we have revised the proposal to require them to be tested using UL 10C or NFPA 252. Both of these standards are currently referenced in the code. We are also proposing the rating of the curtains be a minimum of 20 minute rated assemblies. The current glass option is not rated at all as noted above. By providing a 20 minute rating, we are providing at least the same protection as glass protected with fire sprinklers.

FS99-12, Part I
Final Action: AS AM AMPC____ D

FS99-12, Part IV
202, 712.1.3.3 (New), 717 (New)

<u>Proposed Change as Submitted</u>

Proponent: Tom Meyer, Colorado Code Consulting, LLC, representing Stobich Fire Protection (tmeyers@coloradocode.net); Steve Thomas, Colorado Code Consulting, LLC, representing Stobich Fire Protection (sthomas@coloradocode.net)

THIS IS A 5 PART CODE CHANGE. ALL PARTS WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

PART IV – IBC GENERAL

Revise as follows:

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 711, or both.

Exception: A fire barrier is not required where a glass wall forming a smoke partition is provided. The glass wall shall comply with all of the following:

1. Automatic sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the atrium side. The sprinklers shall be located between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and at intervals along the glass not greater than 6 feet (1829 mm). The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction;
   - 1.1. The glass wall shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates; and
   - 1.2. Where glass doors are provided in the glass wall, they shall be either self-closing or automatic-closing.
2. A fire barrier is not required where a glass-block wall assembly complying with Section 2110 and having a 3/4-hour fire protection rating is provided.
3. A fire barrier is not required between the atrium and the adjoining spaces of any three floors of the atrium provided such spaces are accounted for in the design of the smoke control system.
4. <u>A fire barrier is not required between the atrium and the adjoining spaces when a fire curtain having a one-hour fire-resistance rating in accordance with Section 717 is installed at the perimeter of the atrium opening. The curtain shall not be placed in such a location as to obstruct the means of egress.</u>

Reason: This proposal introduces fire curtains into the code to be used in protecting vertical openings. A new section has been proposed to address the requirements for a fire curtain in a new Section 717. The current code has several different ways to protect these openings. These curtains have been tested in accordance with UL 10D which is similar to UL 263 without the hose stream test. Horizontal assemblies are not required to pass the hose stream test. Therefore, the standards are similar in how they evaluate the system. The proposal is also creating a new definition to address the testing and installation requirements for the curtain. UL 10D has been specified as the test standard for the fire curtains. It is similar to other fire-resistance tests with the exception of a hose stream test.

Section 712.1.2 currently permits the installation of a draft curtain and closely spaced automatic sprinklers in lieu of providing a fire-resistant rated shaft enclosure. The intent of this requirement is to limit the amount of smoke and heat that can extend up through the opening created for an escalator. This proposal is intended to provide a third option to the designer to address the floor openings created by an escalator. The installation of a fire curtain is being presented as that option. A fire curtain can meet the requirement of a fire rated assembly, but has not been tested with a hose stream. A fire curtain will provide an equal level of protection, if not better, than the current draft curtain and sprinklers.

Section 721.1.18 would permit a horizontally deployed curtain that would enclose the vertical floor opening and provide the same protection as the horizontal assembly.

Section 404.6 requires that an atrium be separated from other spaces of the building by a one-hour fire barrier. The exceptions to that requirement permit the installation of a non-fire rated assembly in exception 1. The proposal permits the installation of a fire curtain around the perimeter of the atrium as an additional option. A fire curtain provides an equivalent level of protection to glass forming a smoke partition protected by automatic sprinklers outlined in exception 1. The intent of the exception is to provide a smoke separation at the atrium.

Section 1009.3 presents a new type of separation requirement for exit access stairways. It introduces the concept of fire curtains into the code and permits their use to enclose exit access stairs that serve a maximum of four stories. Fire curtains are tested to UL 10D which does not include the hose stream test. The intent is to allow an alternative to a full enclosure. The current code permits stairs to be open between adjacent stories without enclosure. This proposal is also consistent with the protection that Exceptions 3 and 4 of Section 1009.3 provides, with the draft curtain and closely spaced sprinklers.

Cost Impact: This change will reduce the cost of construction

Analysis: A review of the standard proposed for inclusion in the code, UL10D-09 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

712.1.3.3 (NEW)-FS-MEYERS-THOMAS-721.1.18 (NEW)-FS-MEYERS-THOMAS-404.6-FS-MEYERS-THOMAS-1009.3-FS-MEYERS-THOMAS

Public Hearing Results

For staff analysis of the content of UL 10D-2009 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf.

PART IV – IBC GENERAL
Committee Action: Disapproved

Committee Reason: The committee disapproved this proposal for the following reasons: The ability of the fire and smoke curtain to remain in place when the atrium smoke control system was activated needs to be addressed; and lack of substantiation showing the equivalency of fire and smoke curtains and sprinklers to a fire barrier with a one hour fire-resistance rating.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Stephen Thomas, Colorado Code Consulting, LLC, representing Stobich Fire Protection, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART IV – IBC GENERAL

Revise as follows:

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 711, or both.

Exception: A fire barrier is not required where a glass wall forming a smoke partition is provided. The glass wall shall comply with all of the following:

1. Automatic sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the atrium side. The sprinklers shall be located between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and at intervals along the glass not greater than 6 feet (1829 mm). The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction;
   1.1. The glass wall shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates; and
   1.2. Where glass doors are provided in the glass wall, they shall be either self-closing or automatic-closing.

2. A fire barrier is not required where a glass-block wall assembly complying with Section 2110 and having a 3/4-hour fire protection rating is provided.
3. A fire barrier is not required between the atrium and the adjoining spaces of any three floors of the atrium provided such spaces are accounted for in the design of the smoke control system.
4. A fire barrier is not required between the atrium and the adjoining spaces when a fire curtain having a ~~one-hour~~ twenty-minute fire-resistance rating in accordance with Section 717 is installed at the perimeter of the atrium opening. The curtain shall not be placed in such a location as to obstruct the means of egress.

Commenter's Reason: The original change included five parts. This public comment deletes three of those parts (I, III and V). Part I was a definition that the committee included that it contained requirements and was not needed. Therefore, we have deleted it from our proposal. Part III addressed the use of fire curtains in vertical openings in floors. Part V addressed floor openings for exit access stairways. This public comment only maintains the use of fire curtains to separate atriums from adjacent spaces. Part II has also been preserved to provide language that describes how the curtains will operate during a fire event as well as the testing requirements.

The current language in the code permits three separate options to modify the required separation between atriums and adjacent spaces. One of those options is the use of a glass wall that is protected by a fire sprinkler system. This separation is not a tested fire-resistant rated assembly. The only testing that has been done on this separation is to confirm that the glazing will not break when the fire sprinklers are activated and wash the glass. This separation has also been in the code for many years. It has met the test of time.

This proposal is intended to provide a fourth option of separating the atrium from adjacent spaces. We are introducing the concept of fire curtains into the code. These curtains have been used extensively in Europe to provide a fire separation in many areas. The curtain is deployed vertically upon the detection of smoke. They are held in place by rods on each side of the opening preventing the curtains from moving when the atrium smoke control system is activated. They will also provide a fire and smoke seal between the atrium opening and adjacent spaces. This will reduce the volume of the space and reduce the size of the smoke control system. It will also allow occupants to egress past the atrium without being exposed to the smoke and heat within the atrium.

There was concern about the use of UL 10D as the test standard for the fire curtains. Therefore, we have revised the proposal to require them to be tested using UL 10C or NFPA 252. Both of these standards are currently referenced in the code. We are also proposing the rating of the curtains be a minimum of 20 minute rated assemblies. The current glass option is not rated at all as noted above. By providing a 20 minute rating, we are providing at least the same protection as glass protected with fire sprinklers.

Public Comment 2:

Stephen Thomas, Colorado Code Consulting, LLC, representing Stobich Fire Protection, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PART IV – IBC GENERAL

Revise as follows:

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 711, or both.

Exception: A fire barrier is not required where a glass wall forming a smoke partition is provided. The glass wall shall comply with all of the following:

1. Automatic sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the atrium side. The sprinklers shall be located between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and at intervals along the glass not greater than 6 feet (1829 mm). The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction;
   1.1. The glass wall shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates; and
   1.2. Where glass doors are provided in the glass wall, they shall be either self-closing or automatic-closing.
2. A fire barrier is not required where a glass-block wall assembly complying with Section 2110 and having a 3/4-hour fire protection rating is provided.
3. A fire barrier is not required between the atrium and the adjoining spaces of any three floors of the atrium provided such spaces are accounted for in the design of the smoke control system.
4. A fire barrier is not required between the atrium and the adjoining spaces when a fire curtain having a ~~one-hour~~ twenty-minute fire-resistance rating in accordance with Section 717 is installed at the perimeter of the atrium opening. In addition, automatic sprinklers shall be provided along both sides of the fire curtain, or on the room side if there is no walkway on the atrium side. The sprinklers shall be located between 4 inches and 12 inches (102 mm and 305 mm) away from the fire curtain and at intervals along the fire curtain not greater than 6 feet (1829 mm). The sprinkler system shall be designed so that the entire surface of the fire curtain is wet upon activation of the sprinkler system without obstruction. The curtain shall not be placed in such a location as to obstruct the means of egress.

Commenter's Reason: See Reason statement to Public Comment #1.

FS99-12, Part IV

Final Action: AS AM AMPC____ D

FS100-12
714.1.1 (New)

Proposed Change as Submitted

Proponent: Clay Aler, P.E., Koffel Associates, representing self

Add new text as follows:

717.1 General. The provisions of this section shall govern the protection of duct penetrations and air transfer openings in assemblies required to be protected and duct penetrations in nonfire-resistance-rated floor assemblies.

717.1.1 Ducts and Air Transfer Openings. Ducts transitioning horizontally between shafts shall not require a shaft enclosure provided that the duct penetration into each associated shaft is protected with *dampers* complying with the this section.

Reason: The code intent is to maintain the integrity of shaft enclosures when they are provided. The code intent is maintained by providing dampers in accordance with Section 717. The code intent is not to require a continuous shaft enclosure of main ducts where adequate protection of the individual shaft enclosures is maintained. The overriding intent is to maintain appropriate separation between stories within an enclosed building and to minimize the spread of fire and smoke through the use of dampers as ductwork leaves a shaft enclosure. Providing a continuous horizontal shaft enclosure with required supporting construction will have significant cost implications.

Cost Impact: The proposed code language will allow the designer to determine the approach taken to protect ductwork that must transition horizontally between shaft enclosures that are not continuous through all stories of a building. Designers choosing to provide dampers at each duct penetration of the associated discontinuous shaft enclosures should see a reduction in construction cost

607.1.1-FS-ALER – 714.1.1-FS-ALER

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that damper protection was sufficient to allow ductwork to transition between vertical shafts without being horizontally enclosed in a shaft.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Roger Evans, Park City Municipal Corporation, representing Utah Chapter of I.C.C., requests Disapproval.

Commenter's Reason: The code proponent justifies the change by trying to address the code intent. The language is not necessary because the code official and the designer can use the present language that is in the code for a safe building. If you had to justify the code intent with the model codes, you would end up with a code that is longer than the 2009 I.B.C. Commentary.

FS100-12
Final Action: AS AM AMPC____ D

FS108-12
717.3.3.2 (IMC 607.3.3.2)

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, representing Aon Fire Protection Engineering (al.godwin@aon.com)

Revise as follows:

717.3.3.2 (IMC 607.3.3.2) Smoke damper actuation. The *smoke damper* shall close upon actuation of a *listed* smoke detector or detectors installed in accordance with Section 907.3 and one of the following methods, as applicable:

1. Where a *smoke damper* is installed within a duct, a smoke detector installed in the duct, or smoke detector installed outside the duct with sampling tubes protruding into the duct, shall be installed ~~in the duct~~ within 5 feet (1524 mm) of the *damper* with no air outlets or inlets between the detector and the *damper*. The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, *dampers* shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.
2. Where a *smoke damper* is installed above *smoke barrier* doors in a *smoke barrier*, a spot-type detector ~~*listed* for releasing service~~ shall be installed on either side of the *smoke barrier* door opening. The detector shall be listed for releasing service if used for direct interface with the damper.
3. Where a *smoke damper* is installed within an air transfer opening in a wall, a spot-type detector ~~*listed* for releasing service~~ shall be installed within 5 feet (1524 mm) horizontally of the *damper*. The detector shall be listed for releasing service if used for direct interface with the damper.
4. Where a *smoke damper* is installed in a *corridor* wall or ceiling, the *damper* shall be permitted to be controlled by a smoke detection system installed in the *corridor*.
5. Where a ~~total-coverage~~ smoke ~~detector~~ detection system is installed in ~~provided within~~ areas served by the duct in which the damper would be located, ~~a heating, ventilation and air-conditioning (HVAC) system,~~ the *smoke dampers* shall be permitted to be controlled by the smoke detection system.

Reason: This section has remained the same for a number of cycles and is outdated.

There are several things of concern related to this section. Firstly, in methods 2 and 3 above, spot-type detectors "listed for releasing service" are referenced. While a limited number of manufacturers produce these types of detectors, most do not and it should not be a requirement that the detectors used be listed for release service. This can be confirmed by research to the UL Fire Protection Equipment Directory, Category UROX. The interface to close dampers is most often achieved by using a relay module, not a relay on the detector or detector base.

Secondly, method 1 is an example of a detector being located "within" a duct. In most cases, detectors are located outside the duct with sampling tubes protruding into the duct. While the restrictions of this method are often applied to duct detectors with sampling tubes, it suggests that only detectors placed within the duct may be used.

Lastly method 5, in our opinion, has two faults. One, the definition of "total-coverage smoke detector system" is not appropriate for the intent of the section, and two, the location for detectors should not be based on areas served by the HVAC system but rather by the areas served by the duct in which the damper is located. We were unable to locate a total-coverage smoke detector system in the IBC. And the definition in NFPA 72 is located in Chapter 17. NFPA 72 requires detectors above ceilings in some cases.
My firm has also been called on a case where a duct detector at a shaft was being replaced with detection in all areas served by the duct on one floor as part of a renovation. The smoke dampers on the floors above had duct detectors with sampling tubes. The AHJ stated that the HVAC system also serves the floors above and without full coverage on those levels they could not approve the design approach.

Also, of the 5 methods listed, method 5 is the only one that uses the plural of smoke dampers. All others apply to single dampers.

Cost Impact: There should be no cost impact as this is the standard method of installation.

717.3.3.2-FS-GODWIN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Although the committee thought that the revisions to exceptions 1 through 4 had merit, they disagreed with the revisions to exception 5 as it appears to allow required dampers to be replaced with smoke detection, which is not appropriate.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Al Godwin, CBO, CPM, representing Aon Fire Protection Engineering Corporation, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

717.3.3.2 Smoke damper actuation. The *smoke damper* shall close upon actuation of a *listed* smoke detector or detectors installed in accordance with Section 907.3 and one of the following methods, as applicable:

1. Where a *smoke damper* is installed within a duct, a smoke detector installed in the duct, or smoke detector installed outside the duct with sampling tubes protruding into the duct, shall be installed ~~in the duct~~ within 5 feet (1524 mm) of the *damper* with no air outlets or inlets between the detector and the *damper.* The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, *dampers* shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.
2. Where a *smoke damper* is installed above *smoke barrier* doors in a *smoke barrier,* a spot-type detector ~~*listed* for releasing service~~ shall be installed on either side of the *smoke barrier* door opening. The detector shall be listed for releasing service if used for direct interface with the damper.
3. Where a *smoke damper* is installed within an air transfer opening in a wall, a spot-type detector ~~*listed* for releasing service~~ shall be installed within 5 feet (1524 mm) horizontally of the *damper.* The detector shall be listed for releasing service if used for direct interface with the damper.
4. Where a *smoke damper* is installed in a *corridor* wall or ceiling, the *damper* shall be permitted to be controlled by a smoke detection system installed in the *corridor.*
5. Where a total-coverage smoke detector system is provided within areas served by a heating, ventilation and air-conditioning (HVAC) system, *smoke dampers* shall be permitted to be controlled by the smoke detection system.

Commenter's Reason: In its review, the Committee agreed with items 1 thru 4. However, when asked a question I incorrectly responded that smoke detectors on the floor would replace the damper in the duct. That is obviously incorrect. The correct answer is that smoke detectors on the floor would replace the detector in the duct. The damper remains in place.

Public Comment 2:

Al Godwin, CBO, CPM, representing Aon Fire Protection Engineering Corporation, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

717.3.3.2 Smoke damper actuation. The *smoke damper* shall close upon actuation of a *listed* smoke detector or detectors installed in accordance with Section 907.3 and one of the following methods, as applicable:

1. *(no change)*
2. *(no change)*
3. *(no change)*
4. *(no change)*
5. Where a ~~total-coverage~~ smoke detection~~or~~ system is installed in ~~provided within~~ all areas served by the duct in which the damper will ~~would~~ be located, ~~a heating, ventilation and air-conditioning (HVAC) system,~~ the *smoke dampers* shall be permitted to be controlled by the smoke detection system.

Commenter's Reason: In its review, the Committee agreed with items 1 thru 4, which are submitted under a separate Public Comment. However, when asked a question I incorrectly responded that smoke detectors on the floor would replace the damper in the duct. That is obviously incorrect. The correct answer is that smoke detectors on the floor would replace the detector in the duct. The damper remains in place. The committee also recommended some amendments; e.g. adding “all” and changing “would” to “will.” Those changes have been made.

FS108-12

Final Action: AS AM AMPC____ D

FS109-12
717.5.2 (IMC 607.5.2), Chapter 35

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc, representing International Firestop Council (tcrimi@sympatico.ca)

Revise as follows:

717.5.2 (IMC 607.5.2) Fire barriers. Ducts and air transfer openings of *fire barriers* shall be protected with *approved fire dampers* installed in accordance with their listing. Ducts and air transfer openings shall not penetrate enclosures for stairways, ramps and exit passageways except as permitted by Sections 1022.4 and 1023.6, respectively.

Exception: *Fire dampers* are not required at penetrations of *fire barriers* where any of the following apply:

1. Penetrations are tested in accordance with ASTM E 119 or UL 263 as part of the fire-resistance rated assembly.
2. Ducts are used as part of an *approved* smoke control system in accordance with Section 909 and where the use of a *fire damper* would interfere with the operation of a smoke control system.
3. Such walls are penetrated by ducted HVAC systems, have a required *fire-resistance rating* of 1 hour or less, are in areas of other than Group H and are in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than No. 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.
4. <u>HVAC ducts comply with the requirements of ASTM E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.</u>

Add new standard to Chapter 35 as follows:

ASTM
<u>E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.</u>

Reason: This proposal permits an additional exception to the requirement to install fire dampers in duct and air transfer openings through fire barriers provided the HVAC ducts are protected by a tested and listed assembly conforming to the new *ASTM E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems e*valuated for the specific purpose.

This ASTM is now referenced as part of ICC-ES AC179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies. The purpose of these acceptance criteria is to establish requirements for fire protection enclosure systems applied to metallic HVAC ducts, which provides an alternate to required fire-resistance-rated shafts or an alternate to required fire dampers in specific locations. This proposal is consistent with AC 179 criterion providing an alternate to shaft enclosures for vertical ducts, and an alternate to fire dampers in horizontal ducts (penetrating fire barriers, fire partitions, and or smoke barriers) and vertical ducts.

The new ASTM Standard evaluates the HVAC duct systems for surface burning characteristics, non-combustibility, fire resistance, durability, and fire engulfment with horizontal and vertical through-penetration firestops. The Standard evaluates the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, with or without openings. These test methods evaluate the ability of a HVAC duct system to resist the spread of fire from one compartment to another compartment when subjected to the standard time-temperature curve of ASTM E119.

The test method evaluates the ability of a HVAC duct system to resist the spread of fire from one compartment to another compartment separated by a fire resistance rated construction when the HVAC duct system is exposed to fire under one or more of the following conditions:

Condition A— Fire exposure from the outside of the horizontal HVAC duct system without openings,
Condition B— Fire exposure from the outside of the vertical HVAC duct system without openings,
Condition C— Fire exposure from the outside with hot gases entering the inside of the horizontal HVAC duct system with unprotected openings, and

Condition D— Fire exposure from the outside with hot gases entering the inside of the vertical HVAC duct system with unprotected openings.

Cost Impact: This change will potentially reduce the cost of construction.

Analysis: FS 102, Part II and FS 109 provide similar provisions for ducts penetrating fire barriers. The committee needs to make its intent clear with respect to these provisions. A review of the standard proposed for inclusion in the code, ASTM E2816-11 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

717.5.2-FS-CRIMI

Public Hearing Results

For staff analysis of the content of ASTM E2816-011 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf.

Committee Action: Disapproved

Committee Reason: The committee felt that testing in accordance with ASTM E119 or UL263 as allowed in item #1 was appropriate and the proposed language was not needed.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

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

Modify the proposal as follows:

717.5.2 (IMC 607.5.2) Fire barriers. Ducts and air transfer openings of *fire barriers* shall be protected with *approved fire dampers* installed in accordance with their listing. Ducts and air transfer openings shall not penetrate enclosures for stairways, ramps and exit passageways except as permitted by Sections 1022.4 and 1023.6, respectively.

Exception: *Fire dampers* are not required at penetrations of *fire barriers* where any of the following apply:

1. Penetrations are tested in accordance with ASTM E 119 or UL 263 as part of the fire-resistance rated assembly.
2. Ducts are used as part of an *approved* smoke control system in accordance with Section 909 and where the use of a *fire damper* would interfere with the operation of a smoke control system.
3. Such walls are penetrated by ducted HVAC systems, have a required *fire-resistance rating* of 1 hour or less, are in areas of other than Group H and are in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than No. 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.
4. HVAC ducts having a *fire resistance rating* of not less than 2 hours in accordance ~~comply~~ with the requirements of ASTM E2816~~-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems~~.

Add new standard to Chapter 35 as follows:

ASTM
E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.

Commenter's Reason: This proposal simply allows an additional exception to the requirement to install fire dampers in duct and air transfer openings through fire barriers. It is based on using HVAC ducts protected by a tested and listed assembly conforming to the new *ASTM E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems e*valuated for the specific purpose.

This additional exception should be viewed in the context of what is already permitted in 717.5.2 as alternatives to the required fire dampers. Exception 1 allows penetrations protected in accordance with ASTM E119, which would seal around the exterior of the duct, and not prevent passage of "super-heated air" through an un-insulated duct.

Exception 2 sites IBC Section 909, which applies to mechanical or passive smoke control systems when they are required by other provisions of this code. It should be acknowledged that, currently, there are no requirements in 909.20 to protect the ducts supplying pressurization air to these interior exit stairways at all, even from fire, let alone super-heated air. The addition proposed here will provide a much greater level of protection to prevent the transfer of fire, heated gases, and smoke than the current Exception 2 permits.

Exception 3 is most similar to the language proposed here, excepted that it provides only a 1 hour fire resistance rating. This proposal has been modified to require a full 2 hour fire resistance rating based upon ASTM E2816 testing. Again, the proposed Exception 4 would far exceed the existing allowance for an alternative to the damper protection.

In order to clarify some misinterpretations, it is important to understand that this code change only addresses the use of the use of Listed HVAC protected duct systems to *fire dampers* (UL 555), not smoke dampers (UL 555S); combination fire and smoke dampers (UL 555C); corridor dampers or ceiling dampers and ceiling air diffusers. At a minimum, Listed HVAC duct system having a 2-hour fire-resistance-rating provide at least equal, and likely much greater, fire protection than a fire damper. UL 555 (Section 1.12) fire dampers do not measure or detect hot gases through the fire damper assembly. ASTM E2816 (Section 5.3.3) does use an integrity test (ASTM E119) to detect and check for the passage hot gases through the HVAC duct system. Ignition of the combustible material used during the ASTM E2816 integrity test is a failure. The fire damper and duct tested in UL 555 are allowed to leak unlimited amounts of hot gases, which my ignite combustibles or raise the temperature in the protected compartment to a flash over condition.

In respect to statements made during the Hearings about Fire Dampers needing to comply with a "Drop Test", UL 555 (Section 15) requires a drop test to evaluate the fire damper's break-away joint design and connection to the HVAC duct and the fire damper's stability, which is the fire damper's ability to remain in position during this shock. However, this test is not performed on the test assembly that was fire tested.   ASTM E2816 (Section 15.4.7) requires the supports and HVAC duct system demonstrate its stability by remaining in place in the test assembly during the entire ASTM E119 fire exposure. The stability requirement in ASTM E2816 requiring the entire HVAC duct system to remain in place during an ASTM E119 fire exposure is more severe that the UL 555 stability test on a non-fire tested assembly. Furthermore, there are no building or mechanical code requirements for HVAC ducts to be subjected to a drop test.

The ASTM E2816 standard is a full-consensus, fire-resistive test method approved by Committee E05 on Fire after 7 years of development. The Standard evaluates the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, with or without openings. It evaluates the ability of a HVAC duct system to resist the spread of fire from one compartment to another compartment separated by fire resistance rated construction when the HVAC duct system is exposed to fire from the outside of the horizontal or vertical HVAC duct system, or from the outside with hot gases entering the inside of the HVAC duct system from unprotected openings, when subjected to the standard time-temperature curve of ASTM E119. This test is now also referenced as part of ICC-ES AC179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies. The purpose of that acceptance criteria is specifically to establish requirements for fire protection enclosure systems applied to metallic HVAC ducts, which provides an alternate to required fire-resistance-rated shafts or an alternate to required fire dampers in specific locations. This proposal is consistent with AC 179 criterion providing an alternate to fire dampers in horizontal ducts (penetrating fire barriers, fire partitions, and or smoke barriers) and vertical ducts.

In summary, a ASTM E2816 HVAC duct system exceeds the existing level of fire-resistance rated protection currently required by this section and the capability of a fire damper in restricting the energy transfer as well as eliminating openings and flaming on the unexposed surface of the HVAC duct system and the fire barrier or horizontal assembly.

Public Comment 2:

John D. Nicholas, Perceptive Solutions LLC, representing Unifrax I LLC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

717.5.2 (IMC 607.5.2) Fire barriers. Ducts and air transfer openings of *fire barriers* shall be protected with *approved fire dampers* installed in accordance with their listing. Ducts and air transfer openings shall not penetrate enclosures for stairways, ramps and exit passageways except as permitted by Sections 1022.4 and 1023.6, respectively.

Exception: *Fire dampers* are not required at penetrations of *fire barriers* where any of the following apply:

1. Penetrations are tested in accordance with ASTM E 119 or UL 263 as part of the fire-resistance rated assembly.
2. Ducts are used as part of an *approved* smoke control system in accordance with Section 909 and where the use of a *fire damper* would interfere with the operation of a smoke control system.
3. Such walls are penetrated by ducted HVAC systems, have a required *fire-resistance rating* of 1 hour or less, are in areas of other than Group H and are in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than No. 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.
4. *Listed* HVAC duct~~s~~ systems having a *fire resistance rating* of not less than 2 hours in accordance ~~comply~~ with the requirements of ASTM E2816.~~-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.~~

Add new standard to Chapter 35 as follows:

ASTM
E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.

Commenter's Reason: The addition of protected and *listed* ASTM E2816 HVAC duct systems to the Exceptions already allowed in Section 717.5.2 increases life safety. Exception 4 exceeds the protection afforded by *approved fire dampers* and the other Exceptions.

Much of the opponent's Hearing testimony must have been based on a misunderstanding because statements were made unrelated to the issue at hand, Exceptions to the *approved fire damper's* (UL 555) requirements at penetrations of *fire barriers*. An important point to clarify the misunderstanding is that Exception 4 does **not** include smoke dampers (UL 555S); combination fire and smoke dampers (UL 555C); corridor dampers, ceiling dampers or ceiling air diffusers whose performance attributes were introduced as Hearing testimony by opponents. A *listed* HVAC duct system having a 2-hour fire-resistance-rating provides at least equal, or greater, fire protection than the *approved fire damper* as is evident by the following observations and information typically associated with fire tests and life safety.

TEST ASSEMBLY – ASTM E2816 uses a test assembly compliant with or exceeding ASTM E119 requirements. UL 555 can use a reduced test assembly size compared to ASTM E119 requirements. Both test assemblies are tested in compliance with the ASTM E119 time-temperature curve.

FIRE-RESISTANCE RATING – an HVAC duct system *Listed* to ASTM E2816 provides a fire-resistance rating equal to the fire-resistance rating of the *fire barrier*, or 100%. For example, a 2-hour fire-resistance-rated wall assembly will have a *Listed* 2-hour fire-resistance-rated HVAC duct system. In contrast, the *approved fire damper's* rating is only required to be 75% or 1-1/2 hours for the same 2-hour fire-resistance-rated *fire barrier*.

PRESSURE – *Approved fire dampers* are not tested under a positive furnace pressure condition (UL 555 Section 10.3.7). ASTM E2816 (Sections 7.5.3, 7.5.4, and 10.4) requires positive furnace pressure. In addition, Sections 13.5 and 13.6 of ASTM E2816 require negative pressure within the entire HVAC duct system. These pressure conditions of ASTM E2816 force hot gases from the furnace to the unexposed side on the test assembly creating a worse-case fire test condition, which is more representative of an actual fire.

OPENINGS –Openings are allowed in *approved the fire damper* up to 3/8 inches and between the *approved fire damper* and sleeve up to 1/8 inches (UL 555 Section 4.2, 4.3 and 4.4). No information is presented relative to openings in the duct in UL 555. ASTM E2816 (Section 15.4.2, 15.4.3, 15.4.6 and 15.4.8) does not allow openings in the *listed* ASTM E2816 HVAC duct system. ASTM E2816 requirements of no openings are more severe than UL 555 requirements that allow openings.

FLAMING – The *approved fire damper* assembly is allowed to have unexposed surface flaming (Exceptions 1, 2, & 3 to UL 555 Section 10.1.1.4). The HVAC duct system *listed* to ASTM E2816 (Section 15.4.5) does not allow flaming to occur on any portion of the unexposed surface of the HVAC duct system, the wall assembly, or floor assembly. The requirement for no flaming in ASTM E2816 is more severe than the flaming allowances in UL 555.

UNEXPOSED SURFACE TEMPERATURES – UL 555 (Section 1.12) does not measure or have any unexposed temperature limitation requirements. ASTM E2816 requires the same maximum thermocouple temperature limitation on the duct, firestop, and *fire barrier* as required by ASTM E119 (Section 7.4), which is 325°F over initial temperature. ASTM E119 (Section 7.4) and ASTM E814 (Section 10.2.1.1) both limit a single thermocouple rise to 325°F above its initial reading. ASTM E2816 has the same 325°F unexposed temperature rise limitation (Section 15.4.4). The *approved fire damper* and duct tested in UL 555 are allowed an unlimited temperature rise, which may ignite combustibles or raise the temperature in the protected compartment to a flash over condition. ASTM E2816 unexposed temperature rise limitations for a *listed* HVAC duct system are far more severe than UL 555 allowance of an unlimited unexposed temperature rise on an *approved fire damper*.

INTERNAL DUCT TEMPERATURES – There are no building or mechanical code requirements for internal duct temperatures to be measured. UL 555, ASTM E119, and ASTM E2816 do not measure or have any internal temperature limitation requirements.

SMOKE – According to UL 555 (Section 1.12) *approved fire dampers* do not measure limitation of the passage of smoke or products of combustion through the *approved fire damper* assembly. ASTM E2816 (Section 5.3.3) does not measure limitation of smoke.

HOT GASES – UL 555 (Section 1.12) does not require a measurement or detection hot gases through the *approved fire damper* assembly. ASTM E2816 (Section 5.3.3) uses an integrity test (ASTM E119) to detect and check for the passage of hot gases through the *listed* HVAC duct system. Ignition of the combustible material used during the ASTM E2816 integrity test is a failure. The *approved fire damper* and duct tested in UL 555 are allowed to leak unlimited amounts of hot gases, which may ignite combustibles or raise the temperature in the protected compartment to a flash over condition. A *listed* HVAC duct system is subjected to a more severe requirement than an *approved fire damper*.

HOSE STREAM – A requirement of ASTM E2816 is that the *listed* HVAC duct system is subjected to a hose stream test in compliance with ASTM E2226 as specified in ASTM E119. Section 15.4.8 states, "No openings shall occur on any portion of the unexposed surface of the test assembly (for example, the minimum specified distance around the opening through the fire-separating element, the HVAC duct, and the firestop) during the application of the hose stream, which is the same opening limitation specified in ASTM E119 Section 18.1.2 used for a *fire barrier*. UL 555 also has a hose stream requirement (Section 10). However, clearances between parts (openings) in an *approved fire damper* can be up to 1 inch after the hose-stream test. No openings after the application of the hose stream in ASTM E2816 is a more severe limitation than the openings allowed in UL 555 after the application of the hose stream.

STABILITY – There are no building or mechanical code requirements for HVAC duct systems to be subjected to a drop test. UL 555 (Section 15) requires a drop test to evaluate the *approved fire damper's* break-away joint design and connection to the HVAC duct and the *approved fire damper's* stability, which is the *approved fire damper's* ability to remain in position during this shock. However, this test is not performed on the test assembly that was fire tested despite the following statement in UL 555: "The filled drum is then to free-fall onto the duct, to simulate debris falling in a building fire." ASTM E2816 (Section 15.4.7) requires the supports and HVAC duct system demonstrate its stability by remaining in place in the test assembly during the entire ASTM E119 fire exposure. The stability requirement in ASTM E2816 requiring the entire *listed* HVAC duct system to remain in place during an ASTM E119 fire exposure is more severe that the UL 555 stability test on a non-fire tested assembly.

MAINTENANCE – Approved fire dampers require constant maintenance. IBC 717.4 requires *approved fire dampers* to be inspected and maintained. Numerous industry papers exist on the inspection and maintenance. For example, the document titled Inspection, Testing, and Maintenance of Fire Dampers, Smoke Dampers, and Combination Fire Smoke Dampers states, "Periodic inspection, performance testing, and maintenance are required to ensure these dampers function as intended in an emergency. Codes, standards, regulatory and manufacturer's publications have been issued recommending testing and maintenance intervals and procedures." The *listed* ASTM E2816 HVAC duct system does not require periodic testing, inspection and maintenance reducing costs and interruption of building services.

The committee felt that testing in accordance with ASTM E119 or UL263 as allowed in Exception 1 was appropriate and the proposed language was not needed. Historically, when more specific fire tests are developed based on ASTM E119 or UL263 for specific product applications, such as ASTM E814 or UL1479 (firestop systems), ASTM E1966 or UL2079 (fire resistive joint systems), ASTM E2307 (perimeter joint systems), UL9 (windows), UL10B and 10C (doors), those tests were placed into the code because those test standards evaluate the specific product application, which typically increases life safety. This proposal is following that historical path, providing an additional Exception for a *listed* HVAC duct system based upon testing of the fire-resistance duct system's performance in the configuration representative of the intended application.

Exception 1 allows un-insulated HVAC ducts to penetrate *fire barriers* provided that they are protected in accordance with ASTM E119, which would seal around the exterior of the duct. Exception 1 does not prevent the transfer of energy through the HVAC duct or prevent the passage of "super-heated air" within the duct. A *listed* HVAC duct system tested to ASTM E2816 provides a firestop system requirement. A *listed* HVAC duct systems affords the duct additional protection and resistance to energy transfer because the unexposed surface temperature rise on the duct and *fire barrier* of any single thermocouple is limited to 325°F above the initial temperature. This is the same requirement of ASTM E119 in Section 7.4, which is only required of the *fire barrier* in Exception 1.

Exception 2 applies to mechanical or passive smoke control systems referenced in IBC Section 909. However, there are no requirements in Section 909.20 to protect the ducts supplying pressurization air to these interior exit stairways from fire. While it is not addressed by either Section 717.5.2 or Section 909.20, depending on the fire's duration and air flow, the fire could heat the duct and create "super-heated air". A *listed* HVAC duct system tested to ASTM E2816 provides additional protection and resistance to energy transfer through the duct into adjacent compartments and into the duct greatly limiting the supply air's temperature rise as opposed to the un-insulated duct.

Exception 3 only requires a *fire-resistance rating* of 1 hour or less. This additional Exception 4 requires a *fire-resistance rating* of at least 2-hours.

In summary, a *listed* ASTM E2816 HVAC duct system exceeds the existing level of fire-resistance rated protection currently required by Section 717.5.2 and an *approved fire damper*. A *listed* ASTM E2816 HVAC duct system restricts energy transfer, eliminates openings, and flaming on the unexposed surface of the HVAC duct system and the *fire barrier*. Therefore a *listed* ASTM E2816 duct system should be included as an additional option as an Exception to *approved fire dampers* in Section 717.5.2.

FS109-12

Final Action: AS AM AMPC____ D

FS113-12
717.5.5 (IMC 607.5.4)

Proposed Change as Submitted

Proponent: Barry Gupton, PE, NC Department of Insurance, Office of State Fire Marshal, Engineering Division (barry.gupton@ncdoi.gov)

Revise as follows:

717.5.5 (IMC 607.5.4) Smoke Barriers. A listed smoke damper designed to resist the passage of smoke and a listed fire damper, or a listed combination fire/smoke damper, shall be provided at each point a duct or air transfer opening penetrates a smoke barrier. Smoke dampers and smoke damper actuation methods shall comply with Section 717.3.3.2

Exceptions:

1. Smoke dampers are not required where the openings in ducts are limited to a single smoke compartment and the ducts are constructed of steel.
2. Fire dampers are not required where the code does not require fire dampers for duct penetrations of fire barriers or fire-resistant-rated horizontal assemblies.

Reason: The current wording of the section does not address the required fire-rating portion of the barrier. Clearly indicates the use of combination fire/smoke dampers. Coordinates the section with the requirements of the IMC.

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

717.5.5-FS-GUPTON

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that the additions of fire damper requirements for smoke barriers was appropriate as in most cases smoke barriers are also required to be fire resistance rated.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Williams, CBO, Chair, representing ICC Ad Hoc Committee on Healthcare, requests Disapproval.

Commenter's Reason: This public comment is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed code changes and public comments. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

The ICC Ad Hoc Committee on Healthcare (AHC) requests that this proposed code change be disapproved for the following reasons:

1. The purpose of a smoke barrier is to provide construction that forms an effective membrane to reasonably prevent the passage of smoke. Smoke barriers are used to create separate areas to contain smoke and products of combustion. The long accepted rationale for requiring 1 hour rated construction is to create a substantial and durable partition, i.e., one that will reasonably contain smoke. As stated in the 2012 IBC commentary to Section 709.4, "…the general assumption [is] that a barrier which provides a fire-resistance rating will be capable of limiting the spread of smoke through it."
   Smoke barriers were never intended to be treated exactly like fire barriers, as evidenced by the requirement for a 20 minute opening protective and lack of positive latching devices on cross corridor door per section 709.5. Also, the smoke barrier is not required to have the same vertical continuity as described in the exception to Section 709.4
2. A smoke barrier is, by definition, a barrier to the passage of smoke and is not intended or expected to be exposed to fire for extended periods and is, therefore, not required to have a fire-resistance rating exceeding 1 hour. The occupancies in which smoke barriers are required are also generally required to be sprinklered, further reducing the likelihood that these barriers will be exposed to fire for extended periods of time.
3. If the intent of this change is to clarify the requirements for walls that are both smoke barriers AND fire barriers at the same time, the code already covers this concern. This is a common occurrence in the designs using smoke barriers: a wall is identified as both a fire barrier and a smoke barrier. In such cases, the wall construction must meet the provisions of Section 717.5.5 as well as Section 707 for fire barrier assemblies and Section 1025 for horizontal exits. The most restrictive provisions of each section would then apply i.e., the building would be required to have a fire barrier with a fire-resistance rating of at least 2 hours based on Section 1025.2 and any duct penetrations would need to be protected with a combination fire and smoke damper or with separate fire and smoke dampers based on Sections 717.5.2 and 717.5.2.1.
4. The Exception does not seem to be applicable to anything in the charging paragraph.
5. Contrary to the proponent's cost impact statement, the proposed change would significantly increase the cost of construction without a measurable benefit. Fire dampers in smoke barriers are not required by current code.
6. The proposed change would also add substantial on-going maintenance and testing costs to an already cost-burdened healthcare system without providing a benefit.

FS113-12

Final Action: AS AM AMPC____ D

FS114-12
717.5.5 (IMC 607.5.4)

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare

Revise as follows:

717.5.5 (IMC 607.5.4) Smoke barriers. A *listed smoke damper* designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a *smoke barrier*. *Smoke dampers* and *smoke damper* actuation methods shall comply with Section 717.3.3.2.

Exceptions:

1. *Smoke dampers* are not required where the openings in ducts are limited to a single smoke compartment and the ducts are constructed of steel.
2. Smoke dampers are not required in ambulatory care facilities and Group I-2 hospital occupancies where the HVAC system is fully ducted in accordance with Section 603 of the *International Mechanical Code* and where buildings are equipped throughout with an automatic sprinkler system in accordance with Sections 903.3.1.1 and equipped with quick response sprinklers in accordance with Section 903.3.2.

Reason: This proposal is submitted by the ICC Ad Hoc Committee for Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

Duct smoke dampers at smoke barrier walls in facilities fully protected with electronically supervised, tested and maintained quick response automatic sprinkler systems should be omitted from the I-codes, have not been required by other model codes and have shown a history of success without the additional dampers. In preparation for this proposal the AHC asked Rolf Jensen & Associates (RJA) to review and provide comments on the "Smoke Damper Evaluation for Air Movement & Control Association International, Inc." analysis and dated May 14, 2010. A copy of their summary can be found at www.iccsafe.org.

The supporting information, summarized by RJA for the AHC, describes information gathered in the years since quick response sprinklers (QRS) have been deployed. Untenable conditions are typically measured in amount of heat, obscuration of exit signs, and carbon monoxide levels. The studies summarized these conditions taking approximately 2 hours to 2-1/2 hours to reach untenable levels. Considering non-smoking policies in hospitals, use of Class A materials, and overall reduction of items to fuel a fire, it is highly unlikely to reach the constant burning levels noted in the study. However, even if judged in those timeframes noted in the report, the actual responder timeframe should enter into the equation. The following summarizes emergency responder timeframes:

Alarm is sounded, either by manual pull by the staff or by the automatic smoke detection system (most likely an addressable system)

- Staff employs defend-in-place method, which includes shutting doors to the origin of the fire and relocating patients out of the immediate area (i.e. to the other side of the compartment smoke barrier)
- Within 10 minutes of alarm, the fire department arrives
- In the context of the fire response, doors are opened by the fire department to find the source of the fire. These are the doors that automatically closed upon initiation of the alarm. Any mechanical system is now out of the equation, because of the active use of the doorways in the fire response, or if needed, the patient movement away from the room of origin.

In conclusion, the meaningful time of the fire protection of the building occurs in the first 30 minutes of the fire incident, when decisions are made by fire professionals and the safety staff of the hospital in terms of status of the patients. Quick response sprinklers are more often noted as the most important feature of the overall building fire protection system, and are demonstrated to be effective in containing spread of the fire than dampering of the duct system.

Please note that this proposal deals only with smoke zone barrier walls. It is not proposed to change the requirement for these dampers at shafts or at the air handler units.

The RJA comments are as follows:

Evaluations of recent automatic sprinkler performance data and smoke movement analysis report for smoke dampers revealed the following:

1. In 3,750 fires reported over the years of 2003 – 2006 in hospitals, mental health and substance abuse facilities; one civilian death was recorded. That individual was within the room of fire origin within a mental health facility and started the fire.
2. The overwhelming majority (i.e. 97+%) of fires within these facilities did not extend beyond the room of origin, despite having an automatic suppression system present in only 57% of reported fires.
3. Automatic sprinkler protection in a hospital has higher reliability and better performance than other occupancies. In over 1,600 fires in hospitals spanning 2003 - 2006, when sprinklers were present and the fires were large enough to activate an automatic suppression system, those systems showed a 97% operational reliability and were effective 100% of the time.
4. The requirements for electronically supervised hydraulically designed automatic sprinkler system increases the system reliability
5. Properly documented testing and maintenance improves the reliability of these systems. CMS holds healthcare facility operators accountable for the testing and maintenance requirements of NFPA 25. Verification of this documentation and maintenance records are checked every 1 to 3 years.
6. Tenable conditions are present in the smoke movement analysis for sprinklered buildings with or without smoke dampers.
7. Tenable conditions in non sprinklered configurations can be maintained for test fire duration of 30 minutes beyond room of origin.

Due the required automatic system design requirements, the limited smoke movement in a fully sprinklered building, required testing and maintenance of these suppression systems, the omission of smoke dampers is justified. There are still multiple safeguards to protect the building occupants from a multiple loss of life fire.

The use of smoke dampers between smoke zones in hospitals protected with Quick Response automatic Sprinklers (QRS) is being evaluated based on the reports of fire outcomes in hospitals; automatic sprinkler system reliability, performance, and effectiveness; and an assessment of previous smoke movement work in non sprinklered configurations.

NFPA issued an updated report on automatic sprinkler performance in two different reports [(1)(2)]. The reported data has been reviewed and evaluated for hospital facilities when possible. The failure modes will be reviewed and addressed based on current Building Code and Fire Code requirements.

Jennifer Flynn's report [(2)] shows there were 3,750 fires reported to have occurred over the years of 2003 – 2006 in hospitals, mental health, substance abuse and medical office type facilities. In all those fires, one fatality was reported, and that fatality occurred within the room of fire origin. That one fatality occurred as a result of a mental health patient using flammable liquids and igniting the mattress and other materials within his room.

Of reported 2003-2007 structure fires in health care properties, an estimated 57% showed sprinklers present, with higher percentages for hospitals (71%) and nursing homes (65%) and a much lower percentage for clinics and doctor's offices (28%). Sprinklers were also reported as present in half or more of all reported fires in laboratories (60%), manufacturing facilities (52%), theaters (50%), and prisons and jails (50%). In every other property use, more than half of all reported fires had no sprinklers.

Hospitals have the highest percentage of automatic sprinklers present in all the occupancies analyzed in this report. Despite suppression systems being present in only
57% of health care properties where fires were reported, those fires only extended beyond the room of origin in less than 3 percent of all reported fires. This can be directly attributed to the **R.A.C.E.** training medical staff are mandated to receive annually. The **C** in RACE relates to *confining* the fire. More simply, medical staff are trained to close the doors in rooms where fires ignite, after they **R**escue patients near the fire origin and **A**lert others of the presence of the fire.

For most property use groups and most types of automatic extinguishing equipment, the majority of reported fires were too small to activate operational equipment.
When automatic extinguishing equipment was present, the percentages of fires too
small to activate operating equipment, based on overall reported structure fires, were as follows:

• 65% for all sprinklers,
• 65% for wet pipe sprinklers,
• 70% for dry pipe sprinklers,
• 61% for dry (or possibly wet) chemical systems,
• 43% for carbon dioxide systems,
• 66% for foam systems, and
• 59% for halogen systems.

Sprinklers in the area of fire failed to operate in only 7% of reported structure fires large enough to activate sprinklers. Based on Table A [(1)] , non confined fires larger than the sprinkler design area happened less than 2.0 % of the total non-confined and confined structure fires for healthcare buildings. These fires may affect a large part of a smoke compartment but they rarely happen.

Table 3A [(1)] indicates the percentage of effective operation of sprinklers in 620 fires large enough for sprinkler activation at 87% in all healthcare related facilities. The Flynn report breaks this down by type of healthcare facility. Where sprinklers were present and the fire was large enough to operate the sprinklers in hospitals alone, sprinklers were effective 100 percent of the time.

The assessment of automatic sprinkler failures are summarized in Table 4A [(1)]. However, healthcare or hospitals are not separated as an occupancy type.
The reason sprinklers fail to operate in all occupancies are:

1.	System turned off	53%
2.	Inappropriate suppression system	20%
3.	Lack of Maintenance	15%
4.	Manual intervention	9%
5.	System component damages	2%

In new and existing hospitals, the automatic sprinkler systems require electronic supervision. This supervision will typically address the major (53%) reason for system failure. This analysis is limited to hospitals. Automatic water based suppression is the appropriate means to control fires in this healthcare occupancy. This addresses 20% of the documented failures. Automatic water based suppression systems are required for all new hospitals and all renovations over 4000 square feet. 73%of the failures are addressed by electronically supervised automatic sprinkler systems.

Lack of maintenance is addressed by the CMS enforcement which ensures facilities follow NFPA 25. Existing healthcare facilities are required to document the NFPA 25 inspection, testing and maintenance on all water based suppression systems. Through contracts with state public health and fire marshal's offices that direct periodic surveys, CMS ensures that the needed inspection, testing and maintenance is provided in health care facilities. This work will also identify damaged system components. The required testing and maintenance and damage will address 17% of the documented failures.

Manual intervention is a fire service function. Standard operating procedures recommend determining the fire no longer poses a threat before shutting the system down.

The Hall report [(1)] also notes reasons for ineffectiveness of systems. This category addresses the effectiveness of a system not the failure. These systems still operated but not at the design intent. These have 2 major categories. Extinguishing agent did not reach the fire and not enough extinguishing agent available.

Shielded fires are the first category. These can be addressed by proper design. Small shielded fires under tables or beds are within the design parameters of a NFPA 13 compliant sprinkler system. Missing areas under duct work or within storage racks are the typical issues in this category. These types of items, if missed in the initial design and installation, should be identified in the ongoing testing and maintenance required by NFPA 25.

Insufficient extinguishing agent addresses inadequate water supply and partially closed valves. Proper maintenance and testing will identify a deteriorating water supply. The electronic supervision required for the hospital sprinkler system will send a trouble alarm to the fire alarm panel for partially closed control valves.

The hydraulically designed, electronically supervised, and regularly tested and maintained automatic sprinkler system is substantially more reliable than the current performance data indicate. Fire loss data also shows there has not been a documented multiple loss of live fire due to fire in a fully sprinklered building.

This sprinkler system analysis was done to evaluate the current data and how it relates to hospitals and demonstrates that the probability of a catastrophic failure of the required sprinkler system is remote. The biggest influence on the automatic sprinkler performance is the fire services for a properly designed, installed and maintained sprinkler system.

SMOKE DAMPER EVALUATION – ADDITIONAL CONSIDERATIONS

This portion of the reason statement evaluates an analysis prepared by Koffel Associates, Inc. (KA) titled "Smoke Damper Evaluation for Air Movement & Control Association International, Inc." and dated May 14, 2010. The purpose of our evaluation is to closely examine the details, assumptions, and conclusions related to the KA analysis to quantify the severity of hazardous conditions expected given the smoke spread predicted in the analysis for the scenarios with and without smoke dampers.

The KA analysis utilized a CONTAM computer model to predict smoke movement throughout a representative building under various conditions. The primary variables considered in this comparative analysis were whether the fire was sprinklered or unsprinklered and whether smoke dampers were included or omitted from the model. Data from a study titled "Fire Experiments of Zoned Smoke Control at the Plaza Hotel in Washington DC" by John H. Klote at the National Institute of Standards and Technology (NIST), 1990, was used as a basis for modeling smoke in the CONTAM model. Specifically, the KA analysis assumed a smoke concentration of 5.66×10^{-5} lb/ft^3 in the compartment of origin for the unsprinklered fire scenario and a concentration of 1.89×10^{-6} lb/ft^3 for the sprinklered fire scenario which is reportedly based on the fire test data contained in the Klote study.

The Klote study involved real fire tests conducted in the Plaza Hotel, a seven-story masonry structure. The Plaza Hotel tests were intended to evaluate the effectiveness of zoned mechanical smoke control systems. While not specified in the KA analysis, it appears that data from Plaza Hotel Test 1 and/or Test 5 was used for the unsprinklered fire scenario and data from Test 10 was used for the sprinklered fire scenario. Each of these three fire tests involved burning a 300 lb wood crib in a second floor corridor of the Plaza hotel with no mechanical smoke control systems active and all windows closed. Table 1 and Table 2 below summarize the select relevant data presented in the Klote study and KA analysis. This data shows movement away from the area of fire origin with and without smoke dampers installed in the model.

Table 1: Klote Study Results

	Tests 1 and 5	Test 10
Fuel Load	300 lb Wood Crib	300 lb Wood Crib
Test Duration	30 min	30 min
Sprinkler Interaction	No Sprinklers	Quick Response Sprinkler above Wood Crib
Peak Optical Density on Fire Floor (Fig. 24, 25)	3 m^{-1} @ 4 mins[1]	0.1 m^{-1} @ 3 mins
Peak CO Concentration on Fire Floor (Fig. 21)	~6,000 ppm	~200 ppm

The maximum optical density from Tests 1 and 5 was not reported in the Klote study. This optical density value is estimated based on the CO concentrations, which show a factor of 30 differential between the sprinklered and unsprinklered fire scenarios. This factor of 30 was applied to the maximum optical density value that was reported in the sprinklered fire test (Test 10). This assumption matches the KA analysis which assumed a smoke concentration for the unsprinklered fire scenario that was approximately 30 times the sprinklered scenario.

Table 2: KA Analysis Results
Smoke Concentration on Non-Fire Floor
(presented as % of smoke concentration on Fire Floor)

	Smoke Dampers	Without Smoke Dampers
5 Story Building @ 30 mins	1.37%	25.05%
5 Story Building @ 1 hour	2.51%	40.33%
5 Story Building @ 12 hours	7.78%	64.28%
50 Story Building @ 30 mins	0.11%	2.88%
50 Story Building @ 1 hour	0.21%	5.21%
50 Story Building @ 12 hours	0.69%	15.15%

The most severe conditions on the non-fire floor predicted by the KA analysis consider a 5 story building, no smoke dampers, and a constant smoke concentration on the fire floor over a 12-hour period. This scenario predicted that after 12 hours, the conditions on the non-fire floor, in terms of smoke concentrations, would be 64.28% of the conditions on the fire floor. After 30 minutes of constant conditions on the fire floor, the non-fire floor smoke concentration is 25.05% of that on the fire floor.

It should be noted that the assumption of constant peak smoke conditions for an extended period of time (as much as 12 hours) on the fire floor is extremely conservative. The Klote study data is based on a 30 minute test duration where the peak smoke concentrations (obscuration and CO concentrations) occur at one particular instance during the 30 minute test. Further, a fire burning at a constant rate over a 12 hour period of time would necessitate a fuel load to support such a fire. The most densely packed storage occupancies have fuel loads approaching only 3 or 4 hours.

The KA assumption is particularly conservative when considering the sprinkler controlled fire where Klote's study indicates that the fire in Test 10 was extinguished about 7 minutes after fire ignition. Klote's study also indicates that for the unsprinklered fires (Tests 1 and 5) the heat release rate of the fire decreased due to low oxygen levels after approximately 15 minutes as can be seen by the reduction in temperature shown in Figure 12 of the Klote study. So, maintaining a constant fire burning rate over a 30- minute duration is unlikely and is a very conservative assumption, especially in a building like hospitals that is occupied 24/7 by alert staff.

The following tables are intended to assess the degree of tenable conditions that may be present on the non-fire floor (for cases with and without smoke dampers) considering the referenced data from the Klote's study and the smoke concentration modeling performed in the KA analysis. The data in Table 3 is based on the CONTAM model results for the 5 story building only, which was the most challenging building configuration in terms of smoke concentrations on the non-fire floor.

Table 3: Tenability Analysis- Sprinklered Fire Scenario

Klote Test 10 (Sprinklered Fire)		
Peak Optical Density (D) on Fire Floor (Fig. 24, 25)	$0.1\ m^{-1}$ @ 3 mins	
Peak CO Concentration on Fire Floor (Fig. 21)	~200 ppm	
Calculated Visibility Based on Optical Density[1]	34.8 m (lighted sign)	
	With Smoke Dampers	**Without Smoke Dampers**
Predicted CO Concentration on Non-Fire Floor at 30 mins	200 ppm * 1.37% = **3 ppm**	200 ppm * 25.05% =**50 ppm**
Predicted Visibility on Non-Fire Floor at 30 mins	34.8 m / 1.37% = **2538 m**	34.8 m / 25.05% = **138 m**
Predicted CO Concentration on Non-Fire Floor at 1 hour	200 ppm * 2.51% = **5 ppm**	200 ppm * 40.33% =**81 ppm**
Predicted Visibility on Non-Fire Floor at 1 hour	34.8 m / 2.51% =**1385 m**	34.8 m / 40.33% = **86 m**
Predicted CO Concentration on Non-Fire Floor at 12 hours	200 ppm * 7.78% =**16 ppm**	200 ppm * 64.28% =**129 ppm**
Predicted Visibility on Non-Fire Floor at 12 hours	34.8 m / 7.78% =**447 m**	34.8 m / 64.28% =**54 m**

[1] The optical densities (D) reported in the Klote Study were converted to light extinction coefficients (K) by K=2.3D and visibilities (V) were calculated to light-emitting (exit) sign by V-8/K.

Table 4: Tenability Analysis- Unsprinklered Fire Scenario

Klote Tests 1 and 5 Data (Unsprinklered Fire)		
Peak Optical Density (D) on Fire Floor (Fig. 24, 25)	$3\ m^{-1}$ @ 4 min	
Peak CO Concentration on Fire Floor (Fig. 21)	~6,000 ppm	
Calculated Visibility Based on Optical Density [1]	1.2 m (lighted sign)	
	With Smoke Dampers	**Without Smoke Dampers**
Predicted CO Concentration on Non-Fire Floor at 30 mins	6,000 ppm * 1.37% =**83 ppm**	6,000 ppm * 25.05% =**1503 ppm**
Predicted Visibility on Non-Fire Floor at 30 mins	1.2 m / 1.37% = **84.7 m**	1.2 m / 25.05% = **4.6 m**
Predicted CO Concentration on Non-Fire Floor at 1 hour	6,000 ppm * 2.51% =**151 ppm**	6,000 ppm * 40.33% =**2420 ppm**
Predicted Visibility on Non-Fire Floor at 1 hour	1.2 m / 2.51% =**46.2 m**	1.2 m / 40.33% = **2.9 m**
Predicted CO Concentration on Non-Fire Floor at 12 hour	6,000 ppm * 7.78% =**467 ppm**	6,000 ppm * 64.28% =**3857 ppm**
Predicted Visibility on Non-Fire Floor at 12 hour	1.2 m / 7.78% =**14.9 m**	1.2 m / 64.28% =**1.8 m**

[1]The optical densities (D) reported in the Klote Study were converted to light extinction coefficients (K) by K=2.3D and visibilities (V) were calculated to light-emitting (exit) sign by V=8/K.

The KA analysis discusses tenability on the non-fire floor in terms of visibility through smoke. A tenability performance criterion of approximately 10 meters (30 feet) is cited by the KA analysis as a commonly used value. While this visibility criterion is within ranges of visibility criteria for general building applications presented by The SFPE Handbook, 4th edition (Section 2, Chapter 4) Table 2-4.3, a lower criterion of 4 meters is suggested for healthcare occupancies where patients and staff are familiar with their surroundings and egress paths are typically defined by small rooms and corridors as opposed to large open spaces where greater visibility is necessary. Table 2-4.2 of the SFPE Handbook suggest a visibility threshold of 4 meters to allow safe escape when occupants are familiar with their surroundings.

Although not referenced in the KA analysis, tenability is also often measured in terms of carbon monoxide (CO) concentrations. CO is a measure of the toxicity of smoke that occupants are exposed to during evacuation. Carbon monoxide (CO) causes the formation of carboxyhemoglobin in the bloodstream when it is being breathed in the air during exposure. This relationship between exposure time and the concentration of carbon monoxide is dynamic, varying based upon the varying concentrations of CO within the surroundings and the physical condition of the individual. A more detailed discussion of the formation of carboxyhemoglobin can be found in the SFPE Handbook, 4^{th} edition (Section 2, Chapter 6). Figure 2-6.14 of the SFPE Handbook indicates that occupant exposure with an at rest respiratory rate to a carbon monoxide concentration of 2,000 parts per million (ppm) can be experienced for 30 minutes before incapacitation occurs. Based on this relationship between exposure time and concentration, a conservative tenability criterion for carbon monoxide concentrations of 2000 ppm is suggested.

Based on the tenability criteria of 4 meters for visibility and 2000 ppm for CO concentrations, the data in the Klote study for the sprinklered fire indicates that conditions were tenable on the fire floor during the 30 minute fire test as the minimum visibility was measured to be 34.8 meters to a lighted exit sign and a maximum CO concentration of approximately 200 ppm. If the conditions on the fire floor are tenable, then any lower concentrations of smoke on non-fire floors, as predicted by the KA analysis, will also be tenable. This suggests that for sprinkler controlled fires, tenable conditions will be maintained on the non-fire floor, regardless of whether smoke dampers are installed, when considering the assumptions contained in the KA analysis. This is further supported by a study performed by Notarianni, "Measurement of Room Conditions and Response of Sprinklers and Smoke Detectors During a Simulated Two- Bed Hospital Patient Room Fire", NISTIR 5240, 1993 which assessed performance of sprinklers and smoke detectors in typical hospital room configurations. This study concluded that in all tests, with one exception, the sprinklers actuated in the room of fire origin before the patient's life would be threatened. The one exception was the shielded fire test where the sprinklers activated after untenable conditions were reached in the patient room. This study supports the assertion that in most cases sprinklers will activate and control further growth of the fire before untenable conditions are reached in the room of origin. Therefore, the sprinklers help to control the spread of untenable conditions throughout the building.

The results of for the unsprinklered fire scenario in Table 4 above show a minimum visibility on the non-fire floor of 4.6 meters to a lighted exit sign and a maximum CO concentration of 1503 ppm after 30 minutes of constant peak conditions on the fire floor. Based on the tenability criteria cited above of at least 4 meters of visibility and a maximum CO concentration of 2000 ppm, the conditions after 30 minutes for the unsprinklered fire scenario can also be considered tenable. It should be noted that the lowest visibility conditions in the Klote study occurred no earlier than 4 minutes after fire ignition and the maximum CO concentrations occurred no earlier than 15 minutes after fire ignition. The KA analysis for the 30 minute exposure assumes these most severe conditions on the fire floor from fire ignition (time zero) which indicates that tenable conditions should be maintained on the non-fire floor for more than 30 minutes after fire ignition when considering the delay in the Klote tests from ignition to when the most severe conditions occur in on the fire floor.

For the 1991 edition of NFPA 101, the Subcommittee on Health Care Occupancies performed studies that evaluated the benefits of healthcare occupancies when provided with a fully automatic sprinkler system and quick response sprinkler heads. All new Group I-2 buildings are required to be provided with a fully automatic sprinkler system and QRS. The studies discussed and mentioned above provide further scientific documentation that sprinklers are a more than effective means of mitigating the transfer of smoke beyond smoke compartment walls, as was discussed over twenty years ago.

Additionally, the requirements for interior finishes, decorative materials, mattresses, upholstered furniture, decorative vegetation and other decorative furnishings have become more restrictive in the past twenty years as well. Test standards have been developed to further quantify statistical information regarding the flame spread and smoke development of each of these above items. With these added restrictions within Group I-2 occupancies, the flame spread and smoke development ratings of these have assisted in the reduction of a greater potential event.

This review and analysis of previous fire tests, studies, and performance data provides a basis for justification to omit smoke dampers in new I-2 healthcare facilities. The performance of a building without automatic sprinkler protection has many variables to consider. The analysis above does look at typical non sprinklered scenarios and shows acceptable performance for at least the first 30 minutes. Emergency responders will be on site to assist the staff in a fire response. The recent fire records in healthcare facilities both sprinklered and non sprinklered show an ability to protect the person not intimate with a fire.

Bibliography

(1) *U.S. Experience with Sprinklers and Other Automatic Fire Extinguishing Equipment*, John R. Hall, Jr. P.E. PhD, National Fire Protection Association, 2010

(2) *Structure Fires in Medical, Mental Health, and Substance Abuse Facilities*; Jennifer D. Flynn; National Fire Protection Association; February 2009

Cost Impact: The code change proposal will reduce the cost of construction and will eliminate on-going maintenance costs.

717.5.5-FS-Williams-AdHocHealthcare

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this proposal based on the following reasons: Ambulatory care facilities should not be included as they have less restrictive parameters than an I-2, such as construction type; removing dampers from the complete HVAC system, even if it is fully ducted, is too broad and would rely too heavily on the sprinkler system performance; and the scope is too broad and should be limited to patient care areas.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

John Williams, CBO, Chair, representing ICC Ad Hoc Committee on Healthcare, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

717.5.5 (IMC 607.5.4) Smoke barriers. A *listed smoke damper* designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a *smoke barrier*. *Smoke dampers* and *smoke damper* actuation methods shall comply with Section 717.3.3.2.

Exceptions:

1. *Smoke dampers* are not required where the openings in ducts are limited to a single smoke compartment and the ducts are constructed of steel.
2. Smoke dampers are not required in <u>smoke barriers required by Section 407.5</u> ~~ambulatory care facilities and~~ <u>for</u> Group I-2 <u>hospitals</u> ~~hospital occupancies~~ where the HVAC system is fully ducted in accordance with Section 603 of the *International Mechanical Code* and where buildings are equipped throughout with an *automatic sprinkler system* in accordance with Sections 903.3.1.1 and equipped with quick response sprinklers in accordance with Section 903.3.2.

Commenter's Reason: This public comment responds to the committee's stated concern that ambulatory care facilities not be included in the code change proposal and clarifies that the omission of smoke dampers is limited to only smoke barriers that create smoke compartments in hospitals as required by IBC Section 407.5. Smoke dampers will remain in vertical shaft walls, floor and ceiling penetrations and other spaces that serve as vertical shafts in both patient and non-patient care areas. A similar revision has already been made in NFPA 101 Life Safety Code

This public comment is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed code changes and public comments. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

Public Comment 2:

John Williams, CBO, Chair, representing ICC Ad Hoc Committee on Healthcare, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

717.5.5 (IMC 607.5.4) Smoke barriers. A *listed smoke damper* designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a *smoke barrier*. *Smoke dampers* and *smoke damper* actuation methods shall comply with Section 717.3.3.2.

Exceptions:

1. *Smoke dampers* are not required where the openings in ducts are limited to a single smoke compartment and the ducts are constructed of steel.
2. Smoke dampers are not required in ambulatory care facilities and Group I-2 Condition 2 ~~hospital occupancies~~ where the HVAC system is fully ducted in accordance with Section 603 of the *International Mechanical Code* and where buildings are equipped throughout with an *automatic sprinkler system* in accordance with Sections 903.3.1.1 and equipped with quick response sprinklers in accordance with Section 903.3.2.

Commenter's Reason: Code change FS114-12 is a technical change which included new text dealing with the omission of smoke dampers in Group I-2 hospitals. This public comment addresses and is limited to the editorial coordination of terminology with approved Code change G257-12 which revised the terminology for Group I-2 occupancies into two use conditions, similar to the way the current code addresses Group I-3. In this case, hospitals fall under Group I-2, Condition 2. Since G257-12 deals only with terminology, this public comment is being submitted to FS42-12 in order to focus the attention only on the coordination of terminology issue.

This public comment is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed code changes and public comments. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

Analysis: Code change G257-12 was Approved as Modified at the Code Development Hearings and a public comment has not been submitted. Accordingly, it has been placed on the consent agenda.

Public Comment 3:

Gene Boecker, AIA, Code Consultants, Inc (CCI), requests Approval as Submitted.

Commenter's Reason: The committee indicated that ambulatory health care should not be included with hospitals in this but offered no rationale for that position. Further, the committee indicated that too great a reliance was placed on sprinklers. The statistics do not indicate a flaw in this approach, however. In the types of facilities in question, sprinklers have been required and have been performing extremely well.

As noted in the Ad-hoc committee's original proposal, staff actions account for a lot of the safety in case of emergencies. While the codes find it difficult to rely on human activities, we do that regularly by including requirements for fire extinguishers and manual pull stations. And, while these two are examples of actions by novices, health care staff is well trained. The Fire Code requires crowd manager for assembly occupancies. These are purely operational procedures. The code should recognize the effectiveness of these individuals.

According to the NFPA report "Structure Fires In Medical, Mental Health, And Substance Abuse Facilities" by Jennifer D. Flynn, dated February 2009, the average number of fire deaths per year in these types of facilities is statistically 2. This includes fires in all facilities, sprinklered and unsprinklered, as well as fires that are intentionally set by patients in an attempt to injure themselves. According to the Centers for Disease Control (CDC), approximately 250,000 people contract an infection while in the hospital each year. The numbers who die from these infections is approximately 90,000. There are many reasons why infections can be contracted while in the hospital. One of these factors is air-borne disease. Ductwork with its creases and turns can accumulate dust and debris in which germs can thrive. Dampers, have many places for dust to collect and provide a suitable breeding ground for disease.

If only one tenth of one percent of all infectious deaths contracted while in the hospital can be contributed to ductwork related conditions, that factors to 90 people. This is the same number as all people who died in all non-residential fires during the year 2010 as reported by the NFPA. And that fraction is still 45 times the number that is reported to die as a result of fire.

If the organization wants to be seen as one that looks at the big picture and not just the small number of fire related deaths and injuries, then this proposal should be approved. It has been tested in jurisdictions which use another code. The Ad-hoc committee's analysis and statistics bear out the safety from a purely fire related standpoint. And, it makes sense from a humanitarian position.

Public Comment 4:

Wade Rudolph, CBET, CHFM, Sacred Heart Hospital, representing Wisconsin Healthcare Engineers Association Codes & Standards Committee, requests Approval as Submitted.

Commenter's Reason: The reasons for rejection of this proposal are not valid. The first reason regarding too much reliance on the fire suppession system is not valid. In our health care facilities the fire supression systems are extreemly oversized for a one or two head event (which is more than what is needed). The amount of water that can be delivered has demonstrated to be more than efficient to extinguish the low hazard fires. We can depend on the fire sprinkler systems as installed, tested, and verified as fully operational at all times.

The quick response sprinkler systems in low hazard occupancies have demonstrated that the fire will be contained in the room of origin as demonstrated by the original proposal.

The transfer of smoke is already prohibited by smoke detectors installed in the duct work at the air handling unit. Once smoke has reached the duct work the unit shuts down and the transfer of smoke is stopped. To require additional dampers to shut down is redundant and unneeded.

A substancial amount of good data was provided with this propsal which was simply rejected by the committee for no logical reason. This proposal should be reconsidered based on the evidence provided.

I am submitting this request for the ICC to reconsider its rejection on behalf of the Wisconsin Healthcare Engineers Association Codes & Standards Committee representing over 700 members in the State of Wisconsin.

Thank you for your time and consideration of my comments.

FS114-12

Final Action: AS AM AMPC____ D

FS118-12
717.8 (New) [IMC 607.8 (New)]

Proposed Change as Submitted

Proponent: Timothy Burgos, InterCode Incorporated, representing 3M Company

Add new text as follows:

717.8 (IMC 607.8) Reflective Ducts. Reflective ducts that are designed and installed to provide light to the interior space of a building shall be constructed, braced, reinforced and installed to provide structural strength and durability in accordance with the requirements of Section 608 of the *International Mechanical Code*. The installation of reflective ducts shall not affect the fire protection requirements specified in this code. Reflective ducts shall not be used for conveying air and are not required to be pressurized.

Reason: The purpose of this code change proposal is to add a new section to the International Building Code in order to differentiate between duct used to convey air and duct used to convey light. There are many new technologies that exist worldwide today that bring light from the exterior of a building to the interior space of a building. These technologies utilize a reflective duct to convey the light into the building. The reflective duct is similar in construction to duct used to convey air in the way it is braced, reinforced, and installed. Reflective duct differs because it is not used to condition a space. Additionally, reflective duct does not need to meet all the requirements of an air conveying duct, i.e. the insulation and pressurization requirements.

The language used to create the new Section 717.8 was adapted from Section 603 of the 2012 International Mechanical Code.

Reflective duct (the two ducts on the outside) in an open ceiling alongside a traditional HVAC duct.

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

717.8 (NEW)-FS-BURGOS

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt including reflective ducts in the code was not necessary as it appeared to more of a product specification. Also, the term fire protection was confusing in that it may not be seen as including fire resistance.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Vickie Lovell, InterCode Incorporated, representing 3M Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

717.8 ~~(IMC 607.8)~~ Reflective Ducts. The installation of reflective ducts that ~~are designed and installed to~~ provide light to the interior space of a building shall not reduce the fire resistance ratings specified in this code. ~~be constructed, braced, reinforced and installed to provide structural strength and durability in accordance with the requirements of Section 608 of the *International Mechanical Code*. The installation of reflective ducts shall not affect the fire protection requirements specified in this code. Reflective ducts shall not be used for conveying air and are not required to be pressurized.~~

Commenter's Reason: The reason for this proposal is because duct systems that convey air and reflective duct systems that convey light penetrate fire resistance rated assemblies and require protection.

The Fire Safety committee narrowly recommended disapproval for this code change proposal by a vote of 7 to 6. One of the concerns the committee had was with the use of the term "fire protection." In the International Building Code "fire protection systems" tend to deal with detection, alarm, and suppression systems. This public comment changed the term "protection" to "resistance" in order to clarify that reflective duct will not reduce the fire resistance rating of any building component.

The mechanical requirements of the original code change proposal have been removed and will be addressed in a separate public comment for code change proposal M158 as recommended by the Fire Safety committee.

Reflective duct systems that convey light are an existing technology worldwide, but new to this code. Section 717 of the International Building Code requires protection of duct penetrations. A reflective duct system can penetrate multiple fire rated horizontal and vertical assemblies, but should not be permitted to reduce the fire resistance rating of those assemblies.

FS118-12

Final Action: AS AM AMPC____ D

FS119-12
718.2.1

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc, representing North American Insulation Manufacturers Association (NAIMA) (tcrimi@sympatico.ca)

Revise as follows:

718.2.1 Fireblocking materials. *Fireblocking* shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 0.719-inch (18.3 mm) wood structural panels with joints backed by 0.719-inch (18.3 mm) wood structural panels.
4. One thickness of 0.75-inch (19.1 mm) particleboard with joints backed by 0.75-inch (19 mm) particleboard.
5. One-half-inch (12.7 mm) gypsum board.
6. One-fourth-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of *mineral wool*, *mineral fiber* or other *approved* materials installed in such a manner as to be securely retained in place.
8. Cellulose insulation installed as tested in accordance with ASTM E119 or UL 263, for the specific application.

Reason: This proposals clarifies the code requirement and prevents potentially unintended test methods from being used for these purposes. The proposal aims to provide more detail to the requirement to test cellulose insulation in accordance with the appropriate fire test standards. During the last cycle, FS118-09/10 added spray-applied cellulose to the list of acceptable fireblocking materials. The proponents statement does identify ASTM E119 as the test standard used by the Cellulose Insulation Manufacturers Association (CIMA) to conduct a variety of fireblocking fire tests.

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

718.2.1-FS-CRIMI

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal lacked acceptance criteria for the cellulose insulation material when it was subject to the testing of ASTM E119 or UL263.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Tony Crimi, A.C. Consulting Solutions Inc., representing North American Insulation Manufacturers' Association (NAIMA), requests Approval as Submitted.

Commenter's Reason: The Committee Reason for disapproval of this proposal was that it lacked acceptance criteria for the cellulose insulation material when it was subject to the testing of ASTM E119 or UL263. While I agree with the Committee, the current language not only lacks acceptance criteria, it also lacks a test method. The test method idntified by the proponent in 2010 was ASTM E119. Furthermore, the proponent only submitted data for spray-applied cellulose insulation, but the Committee modified the proposal to include loose-fill cellulose, for which no test data was presented.

The full justification for FS118-09/10, as published in the ICC Monograph, is presented below for your review:

> **"Reason:** This code change simply adds a new Item 8 to the list of fireblocking materials to recognize spray-applied cellulose insulation as a suitable fireblocking material. It qualifies the use of spray-applied cellulose insulation by indicating that it must be installed as tested for the specific application. The Cellulose Insulation Manufacturers Association (CIMA) has conducted a variety of fireblocking fire tests based on the ASTM E119 time-temperature fire curve exposure to demonstrate that spray-applied cellulose insulation will serve as an adequate fireblocking material.
>
> It should be noted that spray-applied cellulose insulation is different than loose-fill cellulose insulation in that it is sprayed in place using a nozzle under pressure with a small quantity of water added to the insulation to activate the adhesive that, when dried, holds the cellulose insulation in place. Thus, it can be exposed in vertical applications, as well as horizontal applications. Furthermore, it will remain in place after it has dried without any need to restrain or otherwise contain or enclose it."

This Code change proposal is completely consistent with the proponents justification. No criteria is included because none was presented by the original proponents, yet the proposal was accepted and expanded beyond what the proponent justified. This proposal incorporates the test method identified by the proponents for evaluation of spray-applied cellulose insulation for use as fireblocking.

FS119-12

Final Action: AS AM AMPC____ D

FS127-12
722.6.1.2

Proposed Change as Submitted

Proponent: Larry Wainright, Qualtim, representing the Structural Building Components Association (lwainright@qualtim.com)

Revise as follows:

722.6.1.2 Dissimilar membranes. Where dissimilar membranes are used on ~~a~~ an interior wall assembly, the calculation shall be made from the least fire-resistant (weaker) side.

Reason: To avoid confusion between the requirements for interior and exterior walls. Except where required elsewhere in the code to have fire resistance calculated for exterior exposure, the requirements for exterior walls apply only exposure from the interior of the structure (722.6.2.3). This language is intended to provide clarity and is not intended to change any requirement of the code.

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

722.6.1.2-FS-WAINRIGHT

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee preferred the current language. The term "interior" is not needed for clarity.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Larry Wainright, Qualtim, representing SBCA- Structural Building Components Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

722.6.1.2 Dissimilar membranes. Where dissimilar membranes are used on a wall assembly that requires consideration of fire exposure from both sides, the calculation shall be made from the least fire-resistant (weaker) side.

Commenter's Reason: This language is intended to provide clarity and is not intended to change any requirement of the code. Section 722.6.1 contains the general requirements for calculating the fire-resistance of wood framing. Section 722.6.2.3 contains the specific requirements for Exterior walls and states the following:

"**722.6.2.3 Exterior walls.** For an exterior wall with a *fire separation distance* greater than 10 feet (3048 mm), the wall is assigned a rating dependent on the interior membrane and the framing as described in Tables 722.6.2(1) and 722.6.2(2). The membrane on the outside of the nonfire-exposed side of exterior walls with a *fire separation distance* greater than 10 feet (3048 mm) may consist of sheathing, sheathing paper and siding as described in Table 722.6.2(3)."

As a result, 722.6.1.2 is not correct when considering exterior walls with a fire separation distance greater than 10ft. This comment is intended to clarify the general provision so that it is not in conflict with the specific provision.

FS127-12
Final Action: AS AM AMPC____ D

FS128-12
702.1, Table 722.6.2(3), 2603.5.7

Proposed Change as Submitted

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, Products in Fibre-reinforced Cement and self

Revise as follows:

702.1 Definitions. The following terms are defined in Chapter 2:

<u>**FIBER-CEMENT SIDING**</u>

TABLE 722.6.2(3)
MEMBRANE[a] ON EXTERIOR FACE OF WOOD STUD WALLS

SHEATHING	PAPER	EXTERIOR FINISH
$^5/_8$ – inch T & G lumber $^5/_{16}$ – inch exterior glue wood structural panel ½ - inch gypsum wallboard $^5/_8$ – inch gypsum wallboard ½ - inch fiberboard	Sheathing paper	Lumber siding Wood shingles and shakes <u>¼-inch fiber-cement lap, panel or shingle siding</u> ¼-inch wood structural panels-exterior type ¼-inch hardboard Metal siding Stucco on metal lath Masonry veneer Vinyl siding
None		3/8 – inch exterior-grade wood structural panels

For SI: 1 pound/cubic foot = 16.0185 kg/m2.
a. Any combination of sheathing, paper and exterior finish is permitted.

Revise as follows:

2603.5.7 Ignition. Exterior walls shall not exhibit sustained flaming where tested in accordance with NFPA 268. Where a material is intended to be installed in more than one thickness, tests of the minimum and maximum thickness intended for use shall be performed.

Exception: Assemblies protected on the outside with one of the following:

1. A thermal barrier complying with Section 2603.4.
2. A minimum 1 inch (25 mm) thickness of concrete or masonry.
3. Glass-fiber-reinforced concrete panels of a minimum thickness of 3/8 inch (9.5 mm).
4. Metal-faced panels having minimum 0.019-inchthick (0.48 mm) aluminum or 0.016-inch-thick (0.41 mm) corrosion-resistant steel outer facings.
5. A minimum 7/8 inch (22.2 mm) thickness of stucco complying with Section 2510.
6. <u>A minimum ¼-inch (6.4 mm) thickness of fiber-cement lap, panel or shingle siding complying with Section 1405.16 and 1405.16.1 or 1405.16.2.</u>

Reason:
1. A revision to Table 722.6.2(3) is proposed to include “fiber-cement lap, panel and shingle siding”. The term “fiber-cement products” is proposed to be included in the definitions here consistent with the definition published in the Terminology Standard ASTM C1154-06, *Standard Terminology for Non-Asbestos Fiber-Reinforced Cement Products* (see attached Standard) and also proposed for revision in Chapter 2 of the IBC code.

2. The application of ¼-inch fiber-cement lap, panel or shingle siding complying with ASTM C1186, Type A (or ISO 8336 Category A) provides less potential for flame spread and smoke developed than the current wood-based and vinyl siding products currently recognized for use in this table. Fiber-cement siding having a flame spread of 0 and smoke developed index of 5 or less as required in the referenced specifications (see attached ICC-ES ESR-1381[reference Section 3.0], ESR-1572[reference Section 3.0], ESR-1844[reference Section 3.1], ESR-2290[reference Section 3.1], and ESR-2894[reference Section 3.2] as supporting documents) provides a greater level of fire protection than the wood or vinyl siding currently permitted under Section 722.6.2.3 of the Code.
3. ¼-inch thick fiber-cement product complying with the provisions of Section 1405.16 ("complying with the requirements of ASTM C1186, Type A, minimum Grade II [or ISO 8336, Category A, Class 2]) has a flame spread of 0 and smoke developed index of 5 or less. The proposed fiber-cement siding is also classed as noncombustible in accordance with ASTM E 136 (see ICC-ES ESR-1381[reference Section 3.0], ESR-1572[reference Section 3.0], ESR-1844[reference Section 3.1], ESR-2290[reference Section 3.1], and ESR-2894[reference Section 3.2]) documenting these claims (http://www.icc-es.org/).

Cost Impact: The code change proposal will not increase the cost of construction because the change only adds a new term to the definitions section of Chapter 7, and because the proposed addition of fiber-cement siding products to the table [(722.6.2(3)] and to the exceptions (2603.5.7) only provides for the choice and use of a type of siding product having greater fire resistance.

702 FIBER CEMENT PRODUCTS-FS-FULDER AND T722.6.2(3)-FS-MULDER-2603.5.7-FES-MULDER

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

2603.5.7 Ignition. Exterior walls shall not exhibit sustained flaming where tested in accordance with NFPA 268. Where a material is intended to be installed in more than one thickness, tests of the minimum and maximum thickness intended for use shall be performed.

Exception: Assemblies protected on the outside with one of the following:

1. A thermal barrier complying with Section 2603.4.
2. A minimum 1 inch (25 mm) thickness of concrete or masonry.
3. Glass-fiber-reinforced concrete panels of a minimum thickness of 3/8 inch (9.5 mm).
4. Metal-faced panels having minimum 0.019-inchthick (0.48 mm) aluminum or 0.016-inch-thick (0.41 mm) corrosion-resistant steel outer facings.
5. A minimum 7/8 inch (22.2 mm) thickness of stucco complying with Section 2510.
6. ~~A minimum ¼-inch (6.4 mm) thickness of fiber-cement lap, panel or shingle siding complying with Section 1405.16 and 1405.16.1 or 1405.16.2.~~

(Portions of proposal not shown remain unchanged)

Committee Reason: The committee agreed that the addition of fiber-cement siding was appropriate based on the test data provided. The modification deletes portions of the change that were not substantiated.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Chad Diercks, James Hardie Building Products, Inc., requests Approval as Submitted.

Commenter's Reason: We are requesting approval as submitted; substantiating NFPA 268 test data (for Section 2603.5.7) will be available for the Final Action Hearing.

FS128-12
Final Action: AS AM AMPC____ D

FS131-12
803.2

Proposed Change as Submitted

Proponent: Marcelo M Hirschler, GBH International (gbhint@aol.com)

Revise as follows:

803.2 Thickness exemption. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls or ceilings shall not be required to be tested <u>if the surface to which they are applied complies with the requirements of section 703.5.1 or of section 703.5.2, as appropriate</u>.

Reason: This section is intended to avoid the need to test very thin materials (such as the paper covering on gypsum board or other thin layers) applied directly to noncombustible surfaces. That is very reasonable, since very thin layers will not add a significant level of fire safety to a surface when there is no significant flame spread from the substrate itself.

Unfortunately, however, this section has been used as the excuse for applying facings or veneers to wood surfaces and having them exempted. In that case the interpretation of this section results in the use of materials where there is no fire testing of the facing or veneer and no fire testing of the composite system (i.e. the facing or veneer and the wood backing).

If the surface is an untreated wood surface (with a typical flame spread index of 100-200), adding a combustible facing or veneer (and the corresponding adhesive) is likely to increase the flame spread index to exceed 200 and thus to go from a Class C to an unclassified material. If the surface is a fire-retardant-treated wood (FRTW) surface (with always has a flame spread index of less than 25), the effect of adding a combustible facing or veneer (which is not composed of FRTW) together with the corresponding adhesive, is virtually guaranteed to increase the flame spread index so as to exceed 25 and thus to go from a material classified as a Class A material to one classified as a Class B or worse. Note that specific test results cannot be presented because the available information is based on proprietary tests.

Please note that this code change proposal would not affect gypsum board as the language of section 703.5 of the IBC was specifically designed so that gypsum board is classified as a noncombustible material, in accordance with 703.5.2, as shown below:

703.5 Noncombustibility tests. The tests indicated in Sections 703.5.1 and 703.5.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Type I, II, III and IV construction. The term “noncombustible” does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

703.5.1 Elementary materials. Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

703.5.2 Composite materials. Materials having a structural base of noncombustible material as determined in accordance with Section 703.5.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E 84 or UL 723 shall be acceptable as noncombustible materials.

Cost Impact: None

803.2-FS-HIRSCHLER

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that thin materials in this application were not a problem and should not require installation on noncombustible materials. Further, the reference to noncombustible materials or gypsum board is too broad and the committee suggests providing specific material performance criteria instead.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Marcelo M Hirschler, GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

803.2 Thickness exemption. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls or ceilings shall <u>comply with either 803.2.1 or 803.2.2</u> ~~not be required to be tested if the surface to which they are applied complies with the requirements of section 703.5.1 or of section 703.5.2, as appropriate~~.

<u>**803.2.1 Exempt materials.** If a material having a thickness less than 0.036 inch (0.9 mm) is applied to a wall or ceiling surface which complies with the requirements of section 703.5.1 or of section 703.5.2, as appropriate, the material shall be exempt from meeting the requirements of section 803.1</u>.

<u>**803.2.1 Non-exempt materials.** If a material having a thickness less than 0.036 inch (0.9 mm) is applied to a wall or ceiling surface which does not comply with the requirements of section 703.5, the provisions of 803.1 shall apply to the system comprised of the applied material, the wall or ceiling surface and any adhesive used.</u>

Commenter's Reason: The original proposal was clumsily worded and had the potential to be interpreted to mean that the thin materials (or veneers) had to be noncombustible. That was not the intent. The intent of the proposal was to limit the thickness exemption to the case when thin materials are applied to noncombustible surfaces or to gypsum board. It is clear that a thin material applied on a noncombustible surface does not present a fire safety problem. However that is not the case when the surface or substrate is combustible.

The IBC FS technical committee asked for a specific material performance for thin materials applied to a combustible surface and that is was is being provided in this public comment. The comment directs that the fire performance required when the background surface is combustible be the same than that of any interior finish material or system, namely the requirements of section 803.1.

In the absence of the proposed clarification, the thickness exemption in 803.2 could be used to allow a combustible surface (for example a plastic surface) to be covered by a thin veneer without requiring a fire test for either the veneer or the entire system.

It has long been shown that when two combustible materials are combined the fire performance of the combination is very different from that of each material separately. That is the principle that is applied in several places in the IBC and the IMC, including as follows:

1. IBC section 801.8 for requiring foam plastics to use a thermal barrier when covered by a textile or vinyl layer
2. IBC section 803.1.4 for testing textile and expanded vinyl wall and ceiling coverings
3. IBC section 803.13 for testing site-fabricated stretch systems rather than the individual components
4. IBC section 2613.3 for testing reflective plastic core insulation systems rather than the components
5. IMC section 604.3 for testing pipe and duct insulation systems rather than the components

As explained in the actual proposal, applying the requirements of IBC section 703.5 would permit not only the use of noncombustible materials as exempt surface but also the use of materials such as gypsum board, covered in 703.5.2.

For illustration purposes, I include a table of results showing how the application of a thin veneer will normally increase the flame spread index of wood surfaces. In 6 of the 7 tests with added veneer the product ceases to be a Class A product and in one test it becomes a Class C product and not even a Class B product.

ASTM E84 Test Results	FSI	SDI
3/4" Raw FR Particle Board	15	35
3/4" Factory Finished Veneer laminated FR Particle Board	25	35
3/4" Factory Finished Veneer laminated FR Particle Board	30	20
3/4" Factory Finished Veneer laminated FR Particle Board	30	10
3/4" Factory Finished Veneer laminated FR Particle Board	30	15

3/4" Factory Finished Veneer laminated FR Particle Board	35	20
3/4" Factory Finished Veneer laminated FR Particle Board	35	30
3/4" Factory Finished Veneer laminated FR Particle Board	125	120

FS131-12

Final Action: AS AM AMPC____ D

FS133-12
202, 803.14 (New), 803.14.1 (New), 803.14.2 (New)

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing Scranton Products (jbeitel@haifire.com)

Revise definition as follows:

INTERIOR WALL AND CEILING FINISH. The exposed *interior surfaces* of buildings, including but not limited to: fixed or movable walls and partitions; ~~toilet room privacy partitions;~~ columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including *trim*.

Add new text as follows:

803.14 Toilet Room Privacy Partitions. Toilet room privacy partitions shall comply with the requirements of 803.14.1 and 803.14.2.

803.14.1 Flame-spread. Toilet room privacy partitions shall comply with 803.1.1.

803.14.2 Full-scale Testing. If the toilet room privacy partitions exhibit melting or dripping during the ASTM E 84 or UL 723 test, the toilet room privacy partition shall also comply with the requirements of 803.1.2.

Reason: Currently, toilet room partitions must be tested to ASTM E84 or UL 723 (Section 803.1.1). However, if the toilet room privacy partition is constructed of high-density polyethylene or polypropylene then Section 803.12 requires that the material must be tested per NFPA 286 (Section 803.1.2).

Section 803.12 was developed to address the specific issue of melting and dripping materials that might provide a Flame-spread Index that is not indicative of their actual performance. Based on previous full-scale fire testing which identified the burning of melting and dripping material as a potential hazard, the NFPA 286 fire testing was required. One example used to justify this Code section was toilet room privacy partitions.

However, if a high-density polyethylene or polypropylene can be formulated for this application and which show that melting and dripping does not occur, then these products should be allowed to only be tested per ASTM E 84 or UL 723.

Additionally, if melting and dripping is an issue for some polymeric materials used in this application, then the same requirements should be applied to all other polymeric materials used in this application. This Code proposal addresses these issues in the proposed new section.

Cost Impact: The Code change proposal will increase the cost of construction because for those materials used in this application that melt and drip and are not subject to section 803.12, additional testing will be required.

803.14 (NEW)-FS-BEITEL

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that toilet room partitions should be tested to NFPA 286 without the option of ASTM E84.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Jesse J. Beitel, Hughes Associates, Inc., representing Scranton Products, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

803.12 High-density Polyethylene (HDPE) and Polypropylene (PP). Where high-density polyethylene or polypropylene is used as an interior finish it shall comply with Section 803.1.2.

> **Exception:** When high-density polyethylene or polypropylene does not exhibit melting or dripping in an ASTM E84 or UL723 test, then the high-density polyethylene or polypropylene need only comply with Section 803.1.1.

Commenter's Reason: With respect to the Committee's stated reason for denial, currently, all toilet room partitions must meet ASTM E84 in a similar manner as all interior finish. The requirement for NFPA 286 testing is invoked in Section 803.12 when interior finish material is High Density Polyethylene or Polypropylene. Section 803.12 was added to the Code to specifically address fire performance of materials that when used as interior finish will exhibit melting and dripping in the ASTM E84 or UL723 tests. In some cases, the formulation of the High Density Polyethylene or Polypropylene can be formulated such that it does not exhibit melting and dripping and in this case, there would no reason to incur the added expense of performing a full-scale fire test. The material can then be tested in a similar manner as other interior finish materials. This comment more accurately addresses the issue.

Public Comment 2:

Wayne R. Jewell, representing Green Oak Charter Township and IABO - International Association of Building Officials and Stephen Thomas, Colorado Code Consulting, LLC, representing Colorado Chapter ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

INTERIOR WALL AND CEILING FINISH. The exposed *interior surfaces* of buildings, including but not limited to: fixed or movable walls and partitions; columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including *trim*.

~~**803.14 Toilet Room Privacy Partitions.** Toilet room privacy partitions shall comply with the requirements of 803.14.1 and 803.14.2.~~

~~**803.14.1 Flame-spread.** Toilet room privacy partitions shall comply with 803.1.1.~~

~~**803.14.2 Full-scale Testing.** If the toilet room privacy partitions exhibit melting or dripping during the ASTM E 84 or UL 723 test, the toilet room privacy partition shall also comply with the requirements of 803.1.2.~~

Commenter's Reason (JEWEL): Do not see any technical or historical fire data justification presented to demonstrate that there is a problem. Therefore, including toilet partitions as interior finish is unfounded. If any adverse fire history is documented with these products it will be very few incidents due to the limited potential fire risk found in toilet rooms. While called a partition these are not typical of fixed or movable wall partitions; which might have sources of ignition contained within them. Additionally, their application is not in a manner that they are attached to walls and ceilings as interior finish materials are normally installed.

The original proposal was submitted to add additional requirements to the flame spread requirements for toilet room partitions. This proposal maintains the deletion proposed in Section 202, but does not include the new language proposed in the original submittal.

The original proposal is over-restrictive and it is not necessary to regulate the flame spread of these partitions. There is no evidence that these partitions have contributed to a fire within a building or harm to persons due to exposure to products of combustion. The potential fuel load and sources of ignition in restrooms is very low.

(THOMAS): The original proposal was submitted to add additional requirements to the flame spread requirements for toilet room partitions. This proposal maintains the deletion proposed in Section 202, but does not include the new language proposed in the original submittal.

Our position is that the current is currently over-restrictive and it is not necessary to regulate the flame spread of these partitions. There is no evidence that these partitions have contributed to a fire within a building. The potential fire load in restrooms is very low. Therefore, these requirements are not needed in the code.

Public Comment 3:

Derek A. White, Hughes Associates Inc., representing Scranton Products, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

INTERIOR WALL AND CEILING FINISH. The exposed *interior surfaces* of buildings, including but not limited to: fixed or movable walls and partitions; columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including *trim*.

803.14 Toilet Room Privacy Partitions. Toilet room privacy partitions shall comply with the requirements of 803.14.1 and 803.14.2.

803.14.1 Flame-spread <u>Index and Smoke-developed Index</u>. Toilet room privacy partitions shall comply with 803.1.1.

803.14.2 Full-scale Testing. If the toilet room privacy partitions exhibit melting or dripping during the ASTM E 84 or UL 723 test, the toilet room privacy partition shall also comply with the requirements of 803.1.2.

Commenter's Reason: The committee may have misunderstood. All partitions must be tested and pass ASTM E 84. Only partitions that are constructed of high-density polyethylene or polypropylene must be tested per NFPA 286 (Section 803.12).

Section 803.12 was developed to deal with concerns associated with interior finish materials that melt and drip when tested for Flame-spread Index. Melting and dripping behavior can result in a Flame-spread Index that is not representative of the hazard; therefore, testing in accordance with NFPA 286 was required.

Since it was the melting and dripping behavior that resulted in toilet room privacy partitions needing to be tested to NFPA 286 it follows that for high-density polyethylene or polypropylene materials that can be formulated for this application and which show that melting and dripping does not occur, then these products should be allowed to only be tested per ASTM E 84 or UL 723 as other toilet partition materials.

The modification to section 803.14.1 was made based on the testimony at the code development hearings

FS133-12

Final Action: AS AM AMPC____ D

FS136-12
909.20.5.1 (New), Chapter 35

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc, representing International Firestop Council (tcrimi@sympatico.ca)

Add new text as follows:

909.20.5.1 Stair Pressurization Ducts. Where interior *exit stairways* are pressurized, HVAC ducts used to supply uncontaminated air shall be protected with a shaft enclosures in accordance with Section 713, or tested in accordance with ASTM E2816.

Add new standard to Chapter 35 as follows:

ASTM
E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.

Reason: This proposal would require HVAC ducts installed for the purposes of stairwell pressurization to be enclosed within a shaft or protected by a tested and listed assembly conforming to the new *ASTM E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems e*valuated for the specific purpose. The new ASTM Standard evaluates the HVAC duct systems for surface burning characteristics, non-combustibility, fire resistance, durability, and fire engulfment with horizontal and vertical through-penetration firestops. The Standard can evaluate the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, with or without openings. These test methods evaluate the ability of a HVAC duct system to resist the spread of fire from one compartment to another compartment separated by fire resistance rated construction when the HVAC duct system is exposed to fire from the outside of the horizontal or vertical HVAC duct system, or from the outside with hot gases entering the inside of the HVAC duct system from unprotected openings, when subjected to the standard time-temperature curve of ASTM E119. This test is now also referenced as part of ICC-ES AC179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies. The purpose of these acceptance criteria is to establish requirements for fire protection enclosure systems applied to metallic HVAC ducts, which provides an alternate to required fire-resistance-rated shafts or an alternate to required fire dampers in specific locations. This criteria provides an alternate to shaft enclosures for vertical ducts, and an alternate to fire dampers in horizontal ducts (penetrating fire barriers, fire partitions, and or smoke barriers) and vertical ducts connecting multiple stories.

The purpose of a closed pressurization system is to provide fresh air directly to stairwells or egress areas. This design air pressures need to be sufficient to maintain closed doors while preventing smoke from entering the egress path. . Smoke control systems have been required in nearly two thirds of the United States for over a decade. High-rise buildings constructed to the requirements of International Building Code, but without any specific measures to control smoke migration, are all the more vulnerable to property damage and occupants' loss of life.

Pressurization results in airflows of high velocity in the gaps around closed doors and construction cracks, thereby preventing smoke from flowing back into the pressurized space through these openings. Pressurized stairwells are provided with the goal of maintaining a tenable environment within the escape routes in the event of a building fire. While the option to use stairwell pressurization exists, the IBC does not require stairwell pressurization in high-rise buildings, and only requires smoke control in underground buildings, atriums, and covered mall buildings. Section 403.5.4 of the 2012 IBC requires smokeproof exit enclosures for high-rise buildings in every required stairway serving floors more than 75 feet (22.86 m) above the ground. Section 909.20.5 merely permits sprinklered buildings to use stairwell pressurization as an alternate to the smokeproof enclosures. When employed, ducts used for Stair pressurization to provide uncontaminated air within required interior exit stairwells or areas of egress need to be protected from the effect of fire, or constructed as fire resistant systems.

This principle of protecting HVAC ducts used as part of a smoke control system from the effects of fire exposure is already contained in section 909.4 as part of a rational analysis supporting the design of smoke control systems to be employed. Section 909.4.4 requires that the design shall consider the effects of the heating, ventilating and air-conditioning (HVAC) systems on both smoke and fire transport. The analysis must include all permutations of systems status, and the design shall consider the effects of the fire on the HVAC systems.

Particularly in the case of tall buildings, the predominant factors that cause smoke movement are stack effects, the affect of external wind forces, and forced air movement within the building. Smoke removal and venting practices are complicated by stack effects, which will tend to favour natural air movement vertically through the building as a results of differences in temperature and densities between the inside and outside air. [1]

Options such as the use of natural ventilation are only available where openings in exterior stairwells can be accommodated. Even then, a number of problems have been identified with this approach. Firstly, the required volume of fresh air is high. Secondly, natural supply and exhaust through vents may be subject to adverse exterior wind conditions, and even when functioning satisfactorily, would generally require vents located on different exterior walls. Thirdly, the performance of natural vents is influenced by building stack effects, which may be particularly significant on the upper or lowermost stories for tall buildings. This effect can range from either strong inflow or strong outflow from all natural vents on a given storey.[2]

Bibliography:

1. Klote, J.H. and Milke, J.A. Fire Protection Handbook, NFPA 19th Edition, Volume II, Smoke Movement in Buildings, Chapter 6, Section 12-113 –12-126
2. Building Research Establishment, UK, Smoke Ventillation of Common Access Areas of Flats & Maisonettes (BD2410), Final Factual Report, Appendix A (Review), BRE Ltd, 2005

Cost Impact: This change will not affect the cost of construction.

Analysis: FS58, Part III and FS 136 contain similar requirements for stair pressurization ducts. The committee needs to make its intent clear with respect to these provisions. A review of the standard proposed for inclusion in the code, ASTM E2816-11 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

909.20.5.1-FS-CRIMI

Public Hearing Results

For staff analysis of the content of ASTM E2816-011 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf.

Committee Action: Disapproved

Committee Reason: Disapproved based on the committee's action taken on FS102-12. Further, the transmission of super-heated air through the duct and into the stair was also a concern. Lastly, an hourly rating for the protection is not specified.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

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

Modify the proposal as follows:

909.20.5.1 Stair Pressurization Ducts. Where interior *exit stairways* are pressurized, HVAC ducts used to supply uncontaminated air shall be protected with a shaft enclosure ~~in accordance~~ complying with Section 713, or shall have a *fire resistance rating* of not less than 2 hours when tested and *Listed* in accordance with ASTM E2816.

Commenter's Reason: The modifications submitted to this proposal are intended to address the Committee comments identified during the Code Development Hearing last spring.

The language has been modified to identify the required ratings, based on the method used to provide the fire resistive enclosure protection. This language provides consistency with existing provisions for shafts, and identifies the required rating for tested fire resistant enclosures. Section 713 currently requires either 1 or 2 hour fire resistance ratings based upon the number of stories being penetrated.

Section 909 applies to mechanical or passive smoke control systems when they are required by other provisions of this code. The purpose of this section is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants.

Firstly, it should be acknowledged that, currently, there are no requirements in 909.20 to protect the ducts supplying pressurization air to these interior exit stairways at all, even though, when used, they are part of a required smoke control system and when the building is equipped throughout with an *automatic sprinkler system*, the vestibule is not required if the interior *exit stairways* are pressurized to a minimum of 0.10 inches of water (25 Pa) and a maximum of 0.35 inches of water (87 Pa) in the shaft. During their deliberations, the Committee expressed concern about the transmission of super-heated air through the duct and into the stair enclosure, as well as with heated gases and smoke movement to other floors in a fire condition. This proposal introduces a new requirement to provide protection to the duct when they are designed and used for the purpose of stair pressurization. The addition proposed here will provide a much greater level of protection to prevent the transfer of fire, heated gases, and smoke than the current Code requires.

With regards to the installation of dampers in these fire resistive enclosure systems tested in accordance with ASTM E2816, this situation has existed for many years for ISO 6944 tested systems. UL, for example, has had a Listing category which includes fire dampers installed in fire resistive ventilation duct assemblies for almost 10 years.

The ASTM E2816 standard is a full-consensus, fire-resistive test method approved by Committee E05 on Fire after 7 years of development. The Standard evaluates the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, with or without openings. It evaluates the ability of a HVAC duct system to resist the spread of fire from one compartment to another compartment separated by fire resistance rated construction when the HVAC duct system is exposed to fire from the outside of the horizontal or vertical HVAC duct system, or from the outside with hot gases entering the inside of the HVAC duct system from unprotected openings, when subjected to the standard time-temperature curve of ASTM E119. This test is now also referenced as part of ICC-ES AC179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies.

FS136-12

Final Action: AS AM AMPC____ D

FS138-12
202 (New), 909.20.6.1, 3007.9.1, 3008.9

Proposed Change as Submitted

Proponent: Vickie Lovell, InterCode Incorporated representing 3M Company (vickie@intercodeinc.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new definition as follows:

ELECTRICAL CIRCUIT PROTECTIVE SYSTEM. A specific construction of devices, materials, or coatings installed as a fire resistive barrier system applied to electrical system components, such as cable trays, conduits and other raceways, open run cables and conductors, cables, and conductors.

Revise as follows:

909.20.6 Ventilating equipment. The activation of ventilating equipment required by the alternatives in Sections 909.20.4 and 909.20.5 shall be by smoke detectors installed at each floor level at an *approved* location at the entrance to the smokeproof enclosure. When the closing device for the *stair* shaft and vestibule doors is activated by smoke detection or power failure, the mechanical equipment shall activate and operate at the required performance levels. Smoke detectors shall be installed in accordance with Section 907.3.

909.20.6.1 Ventilation systems. Smokeproof enclosure ventilation systems shall be independent of other building ventilation systems. The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the building and directly connected to the smokeproof enclosure or connected to the smokeproof enclosure by ductwork enclosed by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.
2. Equipment, control wiring, power wiring and ductwork shall be located within the smokeproof enclosure with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.
3. Equipment, control wiring, power wiring and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.

   Exceptions:

   1. Control wiring and power wiring utilizing a 2-hour rated cable. ~~or cable system~~
   2. Where encased with not less than 2 inches (51 mm) of concrete.
   3. Control wiring and power wiring protected by a listed electrical circuit protective system with a *fire-resistance rating* of not less than 2 hours.

Revise as follows:

3007.9 Electrical power. The following features serving each fire service access elevator shall be supplied by both normal power and Type 60/Class 2/Level 1 standby power:

1. Elevator equipment.
2. Elevator hoistway lighting.

3. Elevator machine room *ventilation* and cooling equipment.
4. Elevator controller cooling equipment.

3007.9.1 Protection of wiring or cables. Wires or cables that are located outside of the elevator hoistway and machine room and that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, *ventilation* and fire-detecting systems to fire service access elevators shall be protected by construction having a *fire-resistance rating* of not less than 2 hours, ~~or~~ shall be <u>a</u> circuit integrity cable having a *fire-resistance rating* of not less than 2 hours~~.~~<u>, or shall be protected by a listed electrical circuit protective system having a *fire-resistance rating* of not less than 2 hours.</u>

> **Exception:** Wiring and cables to control signals are not required to be protected provided that wiring and cables do not serve Phase II emergency in-car operations.

3008.9 Electrical power. The following features serving each occupant evacuation elevator shall be supplied by both normal power and Type 60/Class 2/Level 1 standby power:

1. Elevator equipment.
2. Elevator machine room *ventilation* and cooling equipment.
3. Elevator controller cooling equipment.

3008.9.1 Protection of wiring or cables. Wires or cables that are located outside of the elevator hoistway and machine room and that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, *ventilation* and fire-detecting systems to fire service access elevators shall be protected by construction having a *fire-resistance rating* of not less than 2 hours, or shall be circuit integrity cable having a *fire-resistance rating* of not less than 2 hours<u>, or shall be protected by a listed electrical circuit protective system having a *fire-resistance rating* of not less than 2 hours.</u>

> **Exception:** Wiring and cables to control signals are not required to be protected provided that wiring and cables do not serve Phase II emergency in-car operations.

Reason: This proposal is intended to add the option of using fire-resistive cables, which are tested to UL 2196 *Tests for Fire Resistive Cables*, and to include the option of using conventional cables with a protective material applied to the them. These materials are called electrical circuit protective systems.

Electrical circuit protective systems are already recognized by NFPA 70 the *National Electrical Code* for protection of fire pump control wiring, emergency system circuit wiring, and critical operations power system circuit wiring. The recognized standards to test fire-resistive electrical circuit protective systems are as follows:

- ASTM E1725 *Standard Test Methods for Fire Tests of Fire-Resistive Barrier systems for Electrical System Components*.
- UL 1724 *Fire Tests for Electrical Circuit Protective Systems*

The UL category for this designation of this type of protective system is FHIT.

This definition is a compilation of excerpts from the terminology section ASTM E1725 the *Standard Test Methods for Fire Tests of Fire-Resistive Barrier systems for Electrical System Components*.

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

909.20.6.1-FS-LOVELL

<u>Public Hearing Results</u>

This code change was heard by the IBC General code development committee.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved as it provides a viable design alternative for the two hour fire-resistance rated protection required. Some concern was noted that in the future a standard reference should be provided to insure that the product is being appropriately tested.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

Marcelo M Hirschler, GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Electrical circuit protective system - <u>A system consisting of components and materials intended for installation as protection for specific electrical wiring systems, with respect to the disruption of electrical circuit integrity upon exterior fire exposure.</u> ~~A specific construction of devices, materials, or coatings installed as a fire resistive barrier system applied to electrical system components, such as cable trays, conduits and other raceways, open run cables and conductors, cables, and conductors.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The proposed definition does not clarify what the protection is supposed to achieve: the electrical circuit protective system is supposed to protect the circuit with respect to ensuring the continuity of electrical service (in other words circuit integrity). The electrical circuit protective system is not intended to have any effect on the fire resistance of the electrical system components nor is it intended to have any effect on their reaction-to-fire properties (meaning that the circuit components can burn). Its effect is a key one and it is to ensure that the electrical signal continue being transmitted.

The revised wording explains the purpose of the electrical circuit protective system.

The proposed wording was also added to the National Electrical Code as a definition into Articles 770 and 800.

FS138-12

Final Action: AS AM AMPC____ D

FS141-12
909.21.1, 909.21.1.1(New)

Proposed Change as Submitted

Proponent: Jonathan Siu, representing City of Seattle Department of Planning & Development (jon.siu@seattle.gov)

Revise as follows:

909.21.1 Pressurization requirements. Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inches of water (25 Pa) and a maximum positive pressure of 0.25 inches of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The pressure differentials shall be measured between the hoistway and the adjacent elevator landing. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

Exceptions:

1. On floors containing only Group R occupancies, the pressure differential is permitted to be measured between the hoistway and a dwelling unit or sleeping unit.
2. Where an elevator opens into a lobby enclosed in accordance with Sections 3007.7 or 3008.7, the pressure differential is permitted to be measured between the hoistway and the space immediately outside the door(s) from the floor to the enclosed lobby.
3. The pressure differential is permitted to be measured relative to the outdoor atmosphere on floors other than the following:
   3.1. The fire floor
   3.2. The two floors immediately below the fire floor, and
   3.3. The floor immediately above the fire floor

909.21.1.1 Use of Ventilation Systems. Ventilation systems, other than hoistway supply air systems, are permitted to be used to exhaust air from adjacent spaces on the fire floor, two floors immediately below, and one floor immediately above the fire floor to the building exterior where necessary to maintain the positive pressure relationships as required in 708.14.2.1 during the operation of the elevator shaft pressurization system.

Reason: The purpose of this code change proposal is to introduce a method of measuring pressure differentials in pressurized hoistways.

The City of Seattle has had a long history of requiring pressurized hoistways in high rise buildings to prevent smoke migration. In 2005, the City of Seattle Department of Planning & Development (DPD) convened a committee which included representatives from industry, the Seattle Fire Department, and DPD, to decide whether to recommend changes to the high rise smoke migration control requirements in place at that time. The committee also consulted with Dr. John Klote, who suggested the approach that Seattle eventually adopted with some small modifications. This proposal takes the Seattle approach and adapts it to the 2012 IBC.

During the 2009/2010 code change cycle, a proposal was made to delete the hoistway pressurization requirements in the IBC without substitution (FS51-09/10), based on a study conducted by Drs. Miller and Beasley. This study showed that requiring the pressure differential of 0.10 inches of water column to be maintained at the recall floor with the elevator doors in the open position resulted in overpressurization of all the other floors—meaning the current standards in the code cannot be met. Based on further modeling by Dr. Miller, the proponent for FS51 submitted a public comment introducing Seattle's requirements into the IBC. The reason statement for the public comment stated Dr. Miller "concluded that the 'Seattle approach' does indeed meet all the prescriptive requirements of the IBC 2009." The proposal and its public comment were ultimately withdrawn by the proponent in anticipation of the formation of the CTC Elevator Lobby Study Group.

While not specifically endorsed by the CTC Elevator Lobby Study Group, the Seattle approach was discussed as one of several viable options for preventing smoke from entering hoistways. Unfortunately, the Study Group did not recommend any changes to the prescriptive hoistway pressurization requirements currently in the code. DPD has chosen to submit this method because we believe the code needs a viable alternative to the currently unworkable requirements. It should be noted that this proposal is independent of the Study Group proposals, and will work regardless of the outcome of the proposals from the Study Group.

Specific changes:
The new text in Section 909.21.1 clarifies between which two points the pressure differential gets measured. In general, the intent of the code is to keep smoke out of the hoistway, so the pressure should be measured between the elevator hoistway and the elevator landing/lobby. However, the first exception allows the pressure to be measured between the hoistway and sleeping or dwelling units in residential buildings, since they are highly compartmented. In addition, the fire source is most likely to be in the dwelling or sleeping unit, and providing positive pressure in the corridor/hallway outside the units (via leakage through the elevator hoistway doors) will help reduce the smoke migrating from the affected unit. The second exception allows the pressure to be measured between the hoistway and the space on the outside the smoke barrier that forms the lobby.
The third exception is the key to this proposal, in that it requires the 0.10 inch water column pressure differential between the hoistway and the floor be met only on the 4 most critical floors—the floor of fire origin, the two floors immediately below, and one floor immediately above. For all other stories, the pressure differential is allowed to be measured between the hoistway and the outside of the building. The purpose of this requirement is to maintain a slightly positive pressure in the building relative to atmospheric, so as to lower the neutral pressure plane in the building, which then reduces the driving force of stack effect. This exception is intended to be permitted to be used in conjunction with Exceptions 1 and 2. The engineers who design this system begin by modeling one floor as the “notionalized” fire floor, and designing the system (fans, dampers, etc.) accordingly. Each floor is subsequently modeled as the notionalized fire floor, and the system is checked to make sure the maximum and minimum pressure differentials are met. (Note that actual models may not have to be run for each floor, if it is clear the worst case has been covered.) Ultimately, the system will need to be designed so it will correctly configure itself for a fire originating on any floor in the building.
New section 909.21.1.1 allows the use of the general building HVAC system to exhaust air to create/maintain the required pressure differential. It is to be noted that the requirements of the rest of Section 909.21, in particular, Section 909.21.10 regarding protection of equipment, would still apply to these components.

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

909.21.1.1-FS-SIU

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The proposal is very usable and provides additional guidance on how to provide pressurization and ultimately code compliance.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., representing City of San Diego Development Services Department, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

909.21.1 Pressurization requirements. Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inches of water (25 Pa) and a maximum positive pressure of 0.25 inches of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The pressure differentials shall be measured between the hoistway and the adjacent elevator landing. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

Exceptions:

1. On floors containing only Group R occupancies, the pressure differential is permitted to be measured between the hoistway and a dwelling unit or sleeping unit.
2. Where an elevator opens into a lobby enclosed in accordance with Sections 3007.7 or 3008.7, the pressure differential is permitted to be measured between the hoistway and the space immediately outside the door(s) from the floor to the enclosed lobby.

3. The pressure differential is permitted to be measured relative to ~~the outdoor atmosphere~~ ambient pressure on floors other than the following:
   3.1. The fire floor
   3.2. The two floors immediately below the fire floor, and
   3.3. The floor immediately above the fire floor.

(Remainder of change should be adopted as approved.)

Commenter's Reason: The Fire Safety Committee approved a code change submitted by the City of Seattle to address elevator hoistway pressurization issues. We request the membership's support of our public comment for approval as modified.

Exception # 3 makes reference to measurement of pressure differential relative to the outdoor atmosphere. That is not generally performed since pressure differences across barriers is what is actually measured and at times depending on climactic conditions and predominant temperature assumptions pressure difference to residential units may be measured with windows in the open position. Ambient pressure is a better term to account for cases when pressure differentials are measured with the residential unit windows in the closed position. We request that the membership approve the proposed modification to the committee's action. Whether testing is performed with operable exterior wall openings placed in the open position is determined by the Building Official in conjunction with the designer of the smoke control system.

FS141-12
Final Action: AS AM AMPC____ D

FS142-12
909.21.3, Chapter 35

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc, representing International Firestop Council (tcrimi@sympatico.ca)

Revise as follows:

909.21.3 Ducts for system. Any duct system that is part of the pressurization system shall be protected with the same
fire-resistance rating as required for the elevator shaft enclosure.

> **Exception:** Ducts tested and *listed* for not less than 2-hour fire-resistance in accordance with ASTM E2816 are permitted.

Add new standard to Chapter 35 as follows:

ASTM
E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.

Reason: This proposal permits an additional exception to the requirement to install fire dampers in duct and air transfer openings through fire barriers provided the HVAC ducts are protected by a tested and listed assembly conforming to the new *ASTM E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems e*valuated for the specific purpose. This test is now also referenced as part of ICC-ES AC179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies. The purpose of these acceptance criteria is to establish requirements for fire protection enclosure systems applied to metallic HVAC ducts, which provides an alternate to required fire-resistance-rated shafts or an alternate to required fire dampers in specific locations. This criteria provides an alternate to shaft enclosures for vertical ducts.

This principle of protecting HVAC ducts used as part of a smoke control system from the effects of fire exposure is also already contained in section 909.4.4 which requires that the design consider the effects of the heating, ventilating and air-conditioning (HVAC) systems on both smoke and fire transport. The analysis must include all permutations of systems status, and the design shall consider the effects of the fire on the HVAC systems.

The ASTM test method achieves this by evaluate the ability of a HVAC duct system to resist the spread of fire from one compartment to other compartments separated by a fire resistance rated construction when the HVAC duct system is exposed to fire under one or more of the following conditions:

Condition A— Fire exposure from the outside of the horizontal HVAC duct system without openings,
Condition B— Fire exposure from the outside of the vertical HVAC duct system without openings,
Condition C— Fire exposure from the outside with hot gases entering the inside of the horizontal HVAC duct system with unprotected openings, and
Condition D— Fire exposure from the outside with hot gases entering the inside of the vertical HVAC duct system with unprotected openings.

The new ASTM Standard evaluates the HVAC duct systems for surface burning characteristics, non-combustibility, fire resistance, durability, and fire engulfment with horizontal and vertical through-penetration firestops. The Standard can evaluate the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, with or without openings. These test methods evaluate the ability of a HVAC duct system to resist the spread of fire from one compartment to another compartment when subjected to the standard time-temperature curve of ASTM E119.

Cost Impact: This change will potentially reduce the cost of construction.

Analysis: FS58, Part V and FS 142 contain similar requirements for elevator hoistway pressurization. The committee needs to make its intent clear with respect to these provisions. A review of the standard proposed for inclusion in the code, ASTM E2816-11 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

909.21.3-FS-CRIMI

Public Hearing Results

For staff analysis of the content of ASTM E2816-011 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf.

Committee Action: Disapproved

Committee Reason: Disapproved based on the committee's action taken on FS102-12. However, the committee did feel that this proposal could be appropriate for exhaust ducts serving as part of the elevator pressurization systems.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

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

Modify the proposal as follows:

909.21.3 Ducts for system. Any duct system that is part of the pressurization system shall be protected with the same *fire-resistance rating* as required for the elevator shaft enclosure.

> **Exception:** <u>Exhaust</u> ducts tested and *listed* for not less than 2-hour fire-resistance in accordance with ASTM E2816 are permitted.

Add new standard to Chapter 35 as follows:

ASTM
E2816-11, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.

Commenter's Reason: This proposal has been modified to reflect the Committee's opinion that the ASTM E2816 Standard is appropriate for exhaust ducts serving as part of the elevator pressurization system. This was acknowledged during the deliberations and published in the Committee Reason Statement.

The original proposal was principally Disapproved based on the reasons provided by the Committee in FS102. During their deliberations on FS 102-12, the Committee expressed concern about the transmission of super-heated air through the duct and into the stair enclosure, as well as with heated gases and smoke movement to other floors in a fire condition. However, many of the reasons identified for Disapproval in FS102 do not apply to this application.

FS143-12, which was an independent proposal, sought to insure that elevator shaft pressurization air is conditioned to the levels required by the elevator manufacturer based on the ASME B17.1 requirements. The Committee Reason Statement on that proposal states that they did not feel that the temperature of the pressurization air was a concern based on the short period of time pressurization is needed. That being the case, the concern about the temperature of "super-heated air" expressed in FS102-12 should not be relevant in this application, and these systems should be permitted to be used as an alternative to protect pressurization ducts.

The ASTM E2816 standard is a full-consensus, fire-resistive test method approved by Committee E05 on Fire after 7 years of development. The Standard evaluates the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, with or without openings. It evaluates the ability of a HVAC duct system to resist the spread of fire from one compartment to another compartment separated by fire resistance rated construction when the HVAC duct system is exposed to fire from the outside of the horizontal or vertical HVAC duct system, or from the outside with hot gases entering the inside of the HVAC duct system from unprotected openings, when subjected to the standard time-temperature curve of ASTM E119. This test is now also referenced as part of ICC-ES AC179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies.

FS142-12
Final Action: AS AM AMPC____ D

FS143-12
909.21.4, 909.21.4.5 (New)

Proposed Change as Submitted

Proponent: Bill Ziegert, Smoke Guard, Inc representing self

Revise as follows:

909.21.4 Fan system. The fan system provided for the pressurization system shall be as required by Sections 909.21.4.1 through ~~909.21.4.4~~ 909.21.4.5.

909.21.4.5 Pressurization Air Temperature. The temperature of elevator shaft pressurization air shall comply with Section 2.7.9.2 of ASME A17.1.

Reason: This proposal clarifies that when the elevator shaft pressurization option is chosen in lieu of fully enclosed elevator lobbies when required by the code, that the pressurization air shall not negatively impact elevator equipment. The Elevator Code restricts that ambient air temperature in elevator machine rooms and control spaces to be within the range specified by the elevator manufacturer which is typically 40 – 105 degrees Fahrenheit.

With the advent of machine room less elevators, the control equipment is often with the elevator shaft. This requirement would insure that elevator shaft pressurization air is conditioned to the levels required by the elevator manufacturer. This is particularly important since pressurization systems will at times be running at the same time as elevator operation including both Pre – Phase 1 and during Phase 2 when the Fire Service may be using the elevator systems to move equipment and personnel and elevator reliability is particularly critical.

Cost Impact: In colder climates this may require conditioning systems to be added to the pressurization intake.

909.21.4.5 (NEW)-FS-ZIEGERT

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee did not feel that the temperature of the pressurization air was a concern based on the short period of time pressurization is needed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bill Ziegert, Smoke Guard, Inc, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

909.21.4 Fan system. The fan system provided for the pressurization system shall be as required by Sections 909.21.4.1 through 909.21.4.5.

(No change to 909.21.4.1 through 909.21.4.4)

909.21.4.5 Pressurization Air Temperature. Where machinery spaces or control spaces are located within the hoistway, the temperature of elevator shaft pressurization air shall comply with Section 2.7.9.2 of ASME A17.1.

Commenter's Reason: When elevator shaft pressurization is chosen in lieu of a fully enclosed elevator lobby it is imperative, to insure the continued safe and reliable operation of the elevators, that the pressurization air not exceed the maximum or minimum temperatures required by elevator manufacturers as mandated in the Elevator Code. Typically this range for most elevator manufacturers is 40 – 105 degrees Fahrenheit.

Machine Room Less Elevators are technology that is permitted in the current Elevator Code and locates the control equipment inside the elevator shaft (instead of remotely in a temperature controlled machinery room) where it will now be subjected to the pressurization air temperature.

The Committee's stated reason for Disapproval is that pressurization is only a short duration, however this is incorrect as the pressurization air system must be capable of pressurizing the elevator shaft for the full duration of a building evacuation which in a High Rise could approach 30 – 60 minutes or more depending upon the building height. Based upon thermal modeling of the impact of the pressurization air, the interior of the elevator shaft will approach outside ambient temperatures in as little as 15 minutes when pressurized due to the very high volumes of air moving through the shaft.

Most importantly, even beyond occupant evacuation, the Fire Service may desire to use the (pressurized) elevators during their emergency operations, and not having the pressurization air within the limits required by the elevator manufacturers to insure safe operation could put the Fire Service at risk due to erratic or inoperable elevator operation.

FS143-12

Final Action: AS AM AMPC____ D

FS144-12
1403.2, 1404.2

Proposed Change as Submitted

Proponent: Jonathan Humble, AIA, NCARB, LEED AP-BD&C, American Iron and Steel Institute representing: American Iron and Steel Institute and the Metal Building Manufacturers Association (Jhumble@steel.org)

Revise as follows:

1403.2 Weather protection. Exterior walls shall provide the building with a weather-resistant *exterior wall envelope*. The *exterior wall envelope* shall include flashing, as described in Section 1405.4. The *exterior wall envelope* shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a means for draining water that enters the wall assembly to the exterior, or by providing an *exterior wall covering* which acts as both a weather-resistant and *water-resistive barrier*. A ~~a~~ *water-resistive barrier* ~~behind the exterior veneer~~, as described in Section 1404.2, shall be provided behind the exterior veneer of a veneered *exterior wall envelope* ~~and a means for draining water that enters the assembly to the exterior~~. Protection against condensation in the *exterior wall* assembly shall be provided in accordance with Section 1405.3.

Exceptions: *(Portions of text remain unchanged)*

1404.2 Water-resistive barrier. A minimum of one layer of No.15 asphalt felt, complying with ASTM D 226 for Type 1 felt or other *approved* materials, shall be attached to the studs or sheathing of a veneered system, with flashing as described in Section 1405.4, in such a manner as to provide a continuous *water-resistive barrier* behind the *exterior wall* veneer.

Reason: This code change proposes to modify Section 1403.2 in two places. The intent is to resolve the confusion of metal wall systems versus veneered wall assemblies.

The intent of the modifications is to make clear the fundamental requirement for providing a means for draining water that enters a veneered or non-veneered wall assembly by moving this requirement to the preceding sentence that focuses on the prevention of accumulation of water within the wall assembly.

This modification also clarifies that the requirement for a water-resistive barrier is only applicable to a veneered system. We propose to allow those non-veneered systems to be exempted from the requirement for a water-resistive barrier as that is redundant. For example, the traditional non-veneered walls used for an engineered metal building utilize an exterior metal cladding attached to girts and a water-resistive barrier behind this exterior metal cladding is not required as the metal skin acts both as the weather-resistant barrier and water-resistive barrier. Another non-veneered example is the metal composite material system or insulated metal panel wall system which also serves in a similar capacity. The MCM and IMP systems constitute another type of metal cladding system where the edges of the panels are both interlocked and gasketed, thus acting as both a weather-resistant barrier and water-resistant barrier.

The remaining provisions of Section 1403.2 remain unchanged.

The change in Section 1404.2 is for clarification and coordination with the changes in Section 1403.2.

Cost Impact: No impact to the cost of construction is anticipated.

1403.2-FS-HUMBLE

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that this proposal was unnecessary and that the information is already in the definitions of exterior wall covering, exterior wall envelope and water-resistive barrier, and in the exceptions to Section 1403.2.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Daniel J. Walker, P.E., Thomas Associates, Inc., representing Metal Building Manufacturers Association, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1403.2 Weather protection. Exterior walls shall provide the building with a weather-resistant *exterior wall envelope*. The *exterior wall envelope* shall include flashing, as described in Section 1405.4. The *exterior wall envelope* shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a *waterresistive barrier* behind the exterior veneer, as described in Section 1404.2, and a means for draining water that enters the assembly to the exterior. Protection against condensation in the *exterior wall* assembly shall be provided in accordance with Section 1405.3.

Exceptions:

1. A weather-resistant *exterior wall envelope* shall not be required over concrete or masonry walls designed in accordance with Chapters 19 and 21, respectively.
2. <u>Metal panel wall systems, where an exterior aluminum or steel panel acts both as the weather-resistant barrier and water-resistive barrier, designed in accordance with Chapters 20 and 22 respectively.</u>

(Exceptions not shown remain unchanged)

1404.2 Water-resistive barrier. A minimum of one layer of No.15 asphalt felt, complying with ASTM D 226 for Type 1 felt or other *approved* materials, shall be attached to the studs or sheathing, with flashing as described in Section 1405.4, in such a manner as to provide a continuous *water-resistive barrier* behind the *exterior wall* veneer.

<u>**Exception:** Metal panel wall systems, where an exterior aluminum or steel panel acts both as the weather-resistant barrier and water-resistive barrier, designed in accordance with Chapters 20 and 22 respectively.</u>

Commenter's Reason: At the May 2012 code hearings those who opposed our proposal were concerned that our proposal contained unintended consequences because of intent to modify the scoping paragraphs. It was felt that we had sufficiently changes the scope to affect other products, rather than our original intent to incorporate exterior metal cladding system. That was not our intent to cause further changes.

In this modification we believe we have removed that concern by listing the metal cladding system as an exception to the scoping paragraphs. This action retains the original language of the scoping paragraph which should address the concerns by the opposition. And in turn, we address our intent to have this system exempted from provisions which are inappropriate to apply to these constructions (e.g. Metal building systems, insulated metal panels, etc.) since both the metal skin of the product acts as both a weather-resistive barrier and a water-resistive barrier.

Further, the exceptions refer to the appropriate sections (e.g. Aluminum and steel) which cover these products currently.

FS144-12

Final Action: AS AM AMPC____ D

FS145-12
1403.2

Proposed Change as Submitted

Proponent: Theresa Weston, PhD., representing DuPont Building Innovations (theresa.a.weston@usa.dupont.com)

Revise as follows:

1403.2 Weather protection. Exterior walls shall provide the building with a weather-resistant *exterior wall envelope*. The *exterior wall envelope* shall include flashing, as described in Section 1405.4. The *exterior wall envelope* shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a *waterresistive barrier* behind the exterior veneer, as described in Section 1404.2, and a means for draining water that enters the assembly to the exterior. In areas with an average annual rainfall exceeding 35 inches, walls shall have an average minimum drainage efficiency of 75 percent when tested in accordance the requirements of ASTM E 2273. Protection against condensation in the *exterior wall* assembly shall be provided in accordance with Section 1405.3.

Exception: *(No change to current text)*

Reason: This proposal adds a method of measuring drainage to the requirement for a means of drainage for high rainfall areas. Drainage is an important component of managing water, especially under high rainfall/ exposure conditions, such as those in the Pacific Northwest (Portland, OR 43.5" avg, Seattle, WA 37.7" avg.). Drainage requirements, including the proposed requirement, have been included in the Oregon State Residential Code.

Cost Impact: The code change proposal will increase the cost of construction in locations with high rainfall.

1403.2-FS-WESTON

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The types of walls that this is intended to apply to should be indicated. The requirement for annual average rainfall may be unenforceable because how to obtain the average rainfall is not part of the proposal.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Theresa Weston, PhD., representing DuPont Building Innovations, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1403.2 Weather protection. Exterior walls shall provide the building with a weather-resistant *exterior wall envelope*. The *exterior wall envelope* shall include flashing, as described in Section 1405.4. The *exterior wall envelope* shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a *water-resistive barrier* behind the exterior veneer, as described in Section 1404.2, and a means for draining water that enters the assembly to the exterior. In Marine climate zones in accordance with Chapter C3 of the International Energy Conservation Code, ~~areas with an average annual rainfall exceeding 35 inches~~, framed walls shall have either a minimum 1/8" (3mm) airspace between the water-resistive barrier and the exterior veneer or an average minimum drainage efficiency of 75 percent when tested in accordance the requirements of ASTM E 2273. Protection against condensation in the *exterior wall* assembly shall be provided in accordance with Section 1405.3.

Commenter's Reason: The original proposal intent was to add the verification of drainage for high rain exposure regions. Drainage is an important component of managing water, especially under high rainfall/ exposure conditions, such as those in the Pacific Northwest. Additionally, it is becoming increasingly important to manage the moisture durability as the industry moves to more highly insulated walls. The modification answers the concerns raised by the committee:

1. The committee suggested the "types of walls that this is intended to apply to should be indicated". Text was added to indicate that this requirement was to be applied specifically to framed walls.
2. The committee was concerned that "the requirement for annual average rainfall may be unenforceable because how to obtain the average rainfall is not part of the proposal." This was addressed by changing the criteria for application of the requirement to marine climate zones, which are defined in the IECC and currently referenced in the IBC (for example Section) rather than to average annual rainfall. Drainage is particularly important in marine climates, as they marine have both high rainfall and temperature / humidity conditions that have low drying potential.

Additionally, the modification adds an option for drainage by having a minimum thickness airspace in addition to the standard drainage test method. This was to better coordinate the proposed change with the Oregon State Residential Code provisions that were adopted in 2010.

FS145-12

Final Action: AS AM AMPC____ D

FS147-12
1403.5

Proposed Change as Submitted

Proponent: Theresa Weston, PhD., representing DuPont Building Innovations (theresa.a.weston@usa.dupont.com)

Revise as follows:

1403.5 Vertical and lateral flame propagation. Exterior walls on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible water-resistive barrier shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

> **Exception:** Walls that contain less than 500 gm/m^2 combustible material and where the water-resistive barrier has a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E 84 or UL 723.

Reason: Section 1403.5 (new in 2012) requires NFPA 285 testing for exterior walls containing a combustible water-resistive barrier. Since walls are required by Section 1402.3 to incorporate a water-resistive barrier and virtually all water-resistive barriers currently on the market are combustible, the introduction of this section into the code is requiring testing of all walls. This proposal exempts walls in which the only combustible material is a water-resistive barrier with low flame spread and low mass so that it will have an insignificant contribution to the total fuel load of the wall system.

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

Analysis: FS14 7 revised the provisions for flame propagation in noncombustible exterior walls. FS148 deletes these requirements. The committee needs to make its intent clear with respect to these provisions.

1403.5-FS-WESTON

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that it was appropriate to exempt walls in which the only combustible material is a water-resistive barrier that will not have a significant contribution to the fuel load of the wall system.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Jesse J. Beitel and Marcelo M. Hirschler (GBH International), Hughes Associates, Inc., representing Extruded Polystyrene Foam Association, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1403.5 Vertical and lateral flame propagation. Exterior walls on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible water-resistive barrier shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

Exceptions:

1. Walls in which the water-resistive barrier is the only combustible component and the exterior wall has a wall covering of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1405.2.
2. Walls in which the water-resistive barrier is the only combustible component and the water-resistive barrier has a Peak Heat Release Rate of less than 150 kW/m^2, a Total Heat Release of less than 20 MJ/m^2 and an Effective Heat of Combustion of less than 18 MJ/kg as determined in accordance with ASTM E1354 and has a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723. The ASTM E1354 test shall be conducted on specimens at the thickness intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.
3. Windows and doors and flashing for windows and doors shall not be considered to be part of a water resistive barrier for purposes of this section.

Commenter's Reason: This proposed comment is in response to the committee findings and subsequent industry discussions regarding an exception to conduct full scale NFPA 285 testing in cases where the only combustible material is a water-resistive barrier with low combustibility and mass so low that it will have an insignificant contribution to the total fuel load of the wall system.

In general, this public comment agrees with the proponent of FS147-12 that NFPA 285 testing is not required where the only combustible material in the exterior wall is a water resistant barrier. However, the exceptions have been improved and are as follows:

Exception 1 – Recognizes that "heavy" types of noncombustible exterior wall veneers can provide protection to the water-resistive barrier to eliminate the need for NFPA 285 testing when the water resistive barrier is the only combustible component in the exterior wall. A pointer to Table 1405.2 which describes the allowable minimum thicknesses of brick, concrete, stone, terra cotta, stucco or steel is provided.

Exception 2 – Provides an exception for NFPA 285 testing when the water resistive barrier is the only combustible material in any exterior wall and demonstrates low combustibility characteristics when tested in accordance with ASTM E1354 and ASTM E84. The pass criteria are based upon a proprietary test program that evaluated a number of market available water-resistive barriers.

Exception 3 – Recognizes the fact that windows and doors and flashing for windows and doors are limited in area and do not present a significant avenue for fire spread.

This public comment is technically supported and coordinates with other applicable sections of the IBC.

Analysis: FS147 and FS148 delete these requirements. Public comments to FS147 and FS148 deal with the requirements of Section 1403.5 differently. The membership needs to make its intent clear with respect to these provisions.

Public Comment 2:

Julie Ruth, JRuth Code Consulting, representing American Architectural Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

FENESTRATION. Skylights, roof windows, vertical windows (fixed or moveable), opaque doors, glazed doors, glazed block and combination opaque/glazed doors. Fenestration includes products with glass and nonglass glazing materials.

Revise existing Section 1403.5 as follows:

1403.5 Vertical and lateral flame propagation. Exterior walls on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible water-resistive barrier shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. For the purposes of this section, fenestration products and flashing of fenestration products shall not be considered part of the water resistive barrier.

> **Exception:** Walls that contain less than 500 gm/m^2 combustible material and where the water-resistive barrier has a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E 84 or UL 723.

Commenter's Reason: The purpose of this Public Comment is to clarify that Section 1403.5 does not apply to fenestration products, and the flashing of fenestration products. The intent of Section 1405.3 is to apply to the installation of water resistive barriers over the opaque section of exterior walls. When water resistive barriers are installed in such a large quantity, such as over the entire opaque section of exterior walls, they can add a significant fuel load to the exterior wall.

On the other hand, typically fenestration products and the flashing of fenestration products are not included in NFPA 285 testing. The amount of combustible material used in the flashing of fenestration products is insignificant. There have been no documented instances of fenestration products and their flashing contributing to the fuel load or spread of fire over an exterior wall in any significant manner. Therefore, fenestration products and their flashing should not be included in the application of Section 1403.5.

Analysis: FS147 and FS148 delete these requirements. Public comments to FS147 and FS148 deal with the requirements of Section 1403.5 differently. The membership needs to make its intent clear with respect to these provisions.

FS147-12

Final Action: AS AM AMPC____ D

FS148-12
1403.5

Proposed Change as Submitted

Proponent: David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects (dcollins@preview-group.com); Henry Green, President, National Institute of Building Sciences, representing NIBS BETEC Committee (hgreen@nibs.org)

Delete without substitution:

~~**1403.5 Vertical and Lateral Flame Propagation.** Exterior walls on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible water-resistive barrier shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.~~

Reason: There are materials that are available, tried and tested by long-term proven history of performance as weather barriers that are not able to meet the standards in this test. Section 1403.2 of the IBC requires weather-resistive barriers while Section 1403.5 requires them to be tested to a standard if they contain a combustible water resistive barrier that many materials that are traditionally used and have proven their value can't meet.

Section 2603.5 establishes requirements for protection and testing of combustible water resistive barriers that include foam plastic insulation, so Section 1403.5 is not necessary for those products. Given that 75% of construction litigation relates to water leakage suggests that this paragraph should be deleted or we are likely to face significant problems in the future with the failure of exterior water barriers.

Cost Impact: The change will reduce the cost of construction.

Analysis: FS14 7 revised the provisions for flame propagation in noncombustible exterior walls. FS148 deletes these requirements. The committee needs to make its intent clear with respect to these provisions.

1403.5-FS-COLLINS-GREEN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Lack of substantiation to remove provisions that have been well vetted in the past. The proponent is urged to consider providing alternatives rather the complete deletion of the requirements.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA and Henry Green, President, The Preview Group, Inc. and National Institute of Building Sciences, representing The American Institute of Architects and NIBS BETEC Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1403.5 Vertical and Lateral Flame Propagation. Exterior walls on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane ~~and contain~~ including a combustible water-resistive barrier shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

Exceptions:

1. Exterior walls fireblocked in accordance with Section 718.2.6.
2. Exterior walls constructed with a noncombustible exterior finish materials including brick, stone veneer, terra cotta, concrete, steel or stucco. Joints in these materials shall have joint protection conforming with section 715.
3. For the purposes of this section, windows and flashing of windows shall not be considered part of the water resistive barrier.
4. Water-resistive barrier having a Total Heat Release of less than 20 MJ/m2 and Effective Heat of Combustion of less than 18 MJ/kg as determined in accordance with ASTM E1354 when tested on a 100 mm x 100 mm specimen, in a horizontal orientation, using a radiant heat flux of 50 kW/m2 and a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E 84 or UL 723.

Commenter's Reason: The code committee felt that removing the requirements weren't warranted and that alternatives should be pursued. The proponents and opponents to this change have met and reviewed the change and the application within the context of the current code provisions. We have agreed that the exceptions identified in this comment provide clear direction for the limitation on the spread of flame on the exterior of a building.

NFPA 285 provides a test for a flame that comes through an opening in the exterior wall of a building. The application of the test is only to walls where they are located more than 40 feet above grade plane. All buildings are required to be protected by a sprinkler system when the occupied floor is more than 55 feet above grade plane, reducing the likelihood of a fire spreading through openings in an exterior wall.

Exception 1 - By installing fire blocking as prescribed in Section 718.2.6 the limits on the spread of fire are achieved.

Exception 2 - Installing a noncombustible exterior finish material, the exposure to the combustible water barrier within the wall assembly is significantly reduced to the point where a level of acceptable safety is achieved.

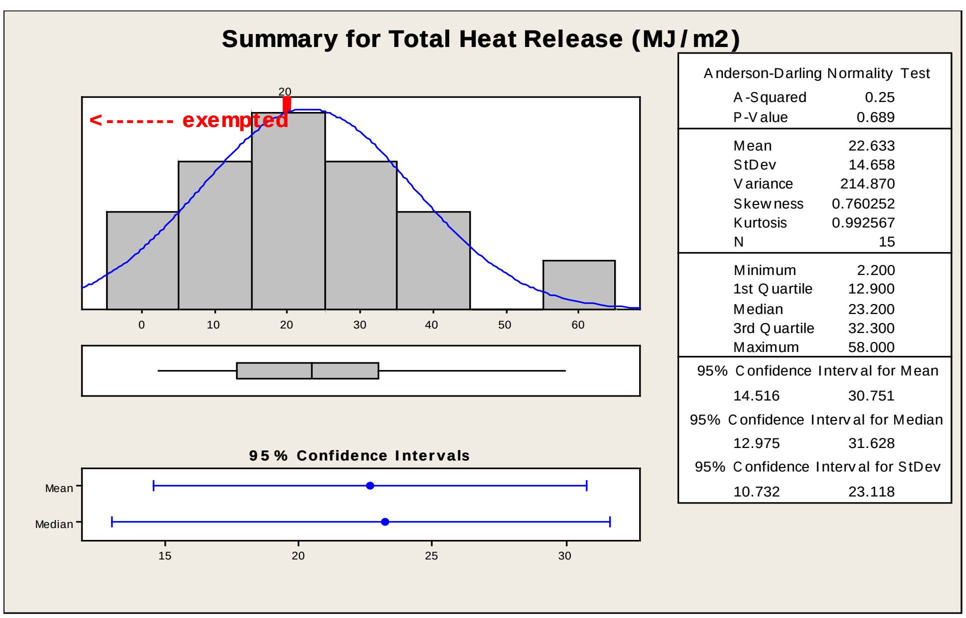
Exception 3 - Clarifies that Section 1403.5 does not apply to windows, and the flashing of windows. The intent of Section 1405.3 is to apply to the installation of water resistive barriers over the opaque section of exterior walls. When water resistive barriers in installed in such a large quantity they add a significant fuel load to the exterior wall.

Typically windows and the flashing of windows, on the other hand, are not usually included in NFPA 285 testing. The amount of combustible material used in the flashing of windows is insignificant. There have been no documented instances of a fire safety risk simply from window flashing.

Exception 4 – This exception removes the need to test wall assemblies in which the water-resistive barrier has low heat release and low flame spread so that it will have an insignificant contribution to the total fuel load of the wall assembly. The exception is based on cone calorimeter testing conducted on commercially available combustible water-resistive barriers. The exemption includes materials that had the lowest 50% tested heat release (see chart below).

Not all the proponents and opponents agree 100% with the limits within this change, but a compromise was the best available resolution. It is important to the entire construction industry that a solution be found to the problem of including water-resistive barriers in walls. We believe this comment incorporates that direction for the code.

Analysis: FS147 and FS148 delete these requirements. Public comments to FS147 and FS148 deal with the requirements of Section 1403.5 differently. The membership needs to make its intent clear with respect to these provisions.



FS148-12

Final Action: AS AM AMPC____ D

FS150-12
1403.6

Proposed Change as Submitted

Proponent: Philip Line, American Wood Council, representing American Wood Council

Revise as follows:

1403.6 Flood resistance. For buildings in flood hazard areas as established in Section 1612.3, *exterior walls* extending below the elevation required by Section 1612 shall be constructed with flood-damage-resistant materials. ~~Wood shall be pressure-preservative treated in accordance with AWPA U1 for the species, product and end use using a preservative *listed* in Section 4 of AWPA U1 or decay-resistant heartwood of redwood, black locust or cedar.~~

Reason: The specific requirement for preservative treated wood in *exterior walls* extending below the base flood elevation is deleted because wood products such as plywood sheathing, plywood panel siding and wall studs have been shown to be resistant to effects of flood exposure without aid of preservatives required elsewhere in the code for protection of wood from decay and termites.

Primary considerations for material performance and use in flood hazard areas are outlined in FEMA *TB2 Flood Damage Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas*. A flood damage resistant material is one that is "capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage". Evaluation consists of consideration of material performance following 72 hr immersion and presence of only limited damage requiring no more than cosmetic repair (e.g. cleaning, sanitizing, and resurfacing such as sanding, repair of joints, repainting). Research conducted by Oak Ridge National Laboratory and Tuskegee University (ORNL/TM-2005/34 Field Testing of Energy-Efficient Flood-Damage-Resistant Residential Envelope Systems Summary Report, June 2004) and field observations of material performance from actual floods were considerations in the update of FEMA TB2-2008. Within TB2, examples of wood that are not required to be preservative treated for flood damage resistance that may form a part of *exterior walls* include studs and Exterior and Marine Plywood used as wall sheathing. While preservative treated studs and preservative treated exterior plywood sheathing were not tested in the ORNL/Tuskegee study, it is not expected that presence of preservative treatment would improve the already acceptable performance of these materials.

Requirements for preservative treated wood for protection from decay and termites are addressed elsewhere in the code (see 2303.1.8, 2304.11 and Chapter 18) and will continue to be in effect including in flood hazard areas. These include required preservative treatment of: i) wood framing members, including wood sheathing, that rest on exterior foundation walls and are less than 8 inches from exposed earth, ii) wood framing members and furring strips attached directly to the interior of exterior masonry or concrete walls below grade, iii) sleepers and sills on a concrete or masonry slab that is in direct contact with earth, iv) wood siding where clearance is less than 6 inches from earth or less than 2 inches horizontal surfaces such as concrete porch or similar surface, and v) wood in contact with ground.

A similar requirement for preservative-treated wood along with reference to FEMA TB2 is in the 2012 IRC. A companion change to this proposal will be submitted to the IRC to make provisions of the IRC and IBC consistent.

1403.6-FS-LINE

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed with the deletion as these requirements are covered in other portions of the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mark Nowak, Steel Framing Alliance, requests Disapproval.

Commenter's Reason: The Committee approved FS150-12 as submitted. This action deleted language that describes requirements for preservative treated wood on the basis that this language is found elsewhere in the code.

Should this proposal receive final approval, however, there would be no definition of what constitutes flood-damage-resistant materials within any provision of the 2012 IBC for exterior walls (Chapter 14) or any reference to an accepted standard that provides such a definition. Deletion of the existing language provides no guidance for designers, installers or inspectors and thus leaves the interpretation open to a "best guess" and inconsistent application and enforcement.

We also do not agree with the proponent's suggestion that FEMA *TB2 Flood Damage Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas* defines untreated wood to be acceptable as a flood-resistant material across the board. Only one wood product, solid structural wood, is rated in the publication as "acceptable," although the text in the document also states "experience has shown that buildings with those materials can be rendered unacceptable for habitation after being subjected to floodwaters with significant quantities of petroleum-based products such as home heating oil."

A definition of Flood Damage Resistant Materials is being developed as an ASTM standard, and we recommend any revisions or actions on this section of the code be held until the ASTM standard can be adopted by reference so that there are no conflicts between the standard and what is in the building code.

FS150-12

Final Action: AS AM AMPC____ D

FS151-12
1404.2, Chapter 35

Proposed Change as Submitted

Proponent: Theresa Weston, PhD., representing DuPont Building Innovations
(theresa.a.weston@usa.dupont.com)

Revise as follows:

1404.2 Water-resistive barrier. A minimum of one layer of ~~No.15 asphalt felt~~ water-resistive barrier, complying with ASTM ~~D 226 for Type 1 felt~~ E 2556 or other *approved* materials, shall be attached to the studs or sheathing, with flashing as described in Section 1405.4, in such a manner as to provide a continuous *water-resistive barrier* behind the *exterior wall* veneer.

Add new standard to Chapter 35 as follows:

ASTM

E2556-10	Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment

Reason: The proposal updates the water-resistive barrier reference to the most recent consensus standard. ASTM E2556 includes housewrap materials, building papers and felt, instead of just felt and therefore is more representative of the state of the industry. ASTM E2556 is consistent with the current ICC-ES acceptance criteria for water-resistive barriers (AC-38) and therefore should not limit the use of current WRBs.

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

Analysis: A review of the standard proposed for inclusion in the code, ASTM E2556-10 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1404.2-FS-WESTON

Public Hearing Results

For staff analysis of the content of ASTM E2556-10 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf.

Committee Action: **Disapproved**

Committee Reason: There was a concern that the proposed standard did not take into account the installation methods of the water-resistive barriers. Also, there was concern over the deletion of the asphalt felt material as a code complying material. The committee suggested that all parties involved work together to submit a public comment that addresses these issues.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Theresa Weston, PhD., representing DuPont Building Innovations, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1404.2 Water-resistive barrier. A minimum of one layer of water-resistive barrier complying with ASTM E 2556, No.15 asphalt felt complying with ASTM D 226 for Type 1 felt or other *approved* materials, shall be attached shingle-fashion to the studs or sheathing in accordance with manufacturer's installation instructions, with flashing as described in Section 1405.4, in such a manner as to provide a continuous *water-resistive barrier* behind the *exterior wall* veneer.

(Potions of code change proposal not shown remain unchanged)

Commenter's Reason: This modification retains the goal of the original proposal to update the water-resistive barrier reference to include the most recent industry standard, ASTM E2556, however, it maintains the current ASTM D226 Type I felt to allow for industry continuity. In addition the modification addresses the concern expressed by the Committee that "the proposed standard did not take into account the installation methods of the water-resistive barriers" by the addition of the requirement for shingle-fashion installation and a requirement to install in accordance with manufacturer's installation instructions to the already existing performance requirement "to provide a continuous water-resistive barrier". The materials included in ASTM E2556 – felt, Grade D Paper, and building wraps – are installed in traditional shingle-fashion, but individual products use different fasteners, fastening schedules and have different taping requirements. These product-based variations are best addressed in the manufacturer's installation instructions. Manufacturers develop installation using a variety of test methods and field experience. This proposal does not constitute a change in existing industry practice as ASTM E2556 is consistent with ICC-ES acceptance criteria for water-resistive barriers (AC-38) and the inclusion of manufacturer's installation instructions in ICC-ES Evaluation reports.

Public Comment 2:

Jay Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1404.2 Water-resistive barrier. A minimum of one layer of water-resistive barrier complying with ASTM E 2556, such as Type 1 No. 15 asphalt felt, or other *approved* materials~~,~~ shall be attached to the studs or sheathing~~,~~ with flashing as described in Section 1405.4, in such a manner as to provide a continuous *water-resistive barrier* behind the *exterior wall* veneer.

1404.2.1 Water penetration resistance. Installation methods for other approved water-resistive barrier materials, including polymer-based barriers complying with ASTM E2556, shall be tested for water penetration resistance, without a covering material exterior to the water-resistive barrier layer, in accordance with ASTM E331 under the following conditions:

1. Water-resistive barrier installation method test assemblies shall include at least one opening, one horizontal joint, and one vertical joint. All tested openings, penetrations, and joint details shall be representative of the intended end use configuration.
2. Water-resistive barrier installation method test assemblies shall be at least 4 feet by 8 feet (1219mm by 2438mm) in size.
3. Water-resistive barrier installation method assemblies shall be tested at a minimum differential pressure of 2.86 pounds per square foot (psf)(137 Pa).
4. Water-resistive barrier installation method assemblies shall be subjected to a minimum test exposure duration of 15 minutes.

(Portions of the proposals not shown remain unchanged)

Commenter's Reason: ASTM E 2556 is not a complete specification or standard for water-resistive barrier performance. It only addresses water-resistive barrier material properties. It does not address a critical issue: the water resistive performance of the WRB method as installed. This limitation is clearly stated in the scope of ASTM E2556: "This specification is limited to the evaluation of materials and does not address installed performance." Thus, referencing ASTM E 2556 may establish transparent material properties for some types of WRB products, but it fails to address the critical issue of installed assembly performance. This problem has persisted in the code and evaluation criteria and is now continued in ASTM E 2556 by grouping building wraps (polymeric-based barriers) together with traditional WRB materials such as No. 15 asphalt felt and Grade D paper. As a result of this problem, varied and sometimes poor performance among the different types of building wraps has been observed and documented in the literature (Hall, G.D. and Hoigard, K.R., "Water-Resistive Barriers: How do they compare?", *Interface*, November 2005). In particular, this reference evaluated current code requirements, acceptance criteria, and field experience. It also reports on comparative testing under installed moisture exposure conditions. The primary conclusions from the study include:

"Current building code provisions offer no rational means of assessing the equivalency of alternative WRB products to ASTM D-266 type 1 asphalt-saturated felt…"

"The three water resistance test methods specified in AC38 vary so significantly in test duration and applied hydrostatic pressure that no meaningful comparison of test data can be made. They fail to address several important moisture transport mechanisms that affect the in-service performance of WRBs."

"Laboratory tests performed by the authors to simulate potential in-service conditions not addressed by AC38 resulted in water penetration through several commercially available WRB materials that, according to published manufacturer information, passed the requirements of AC38 for Grade D barriers."

Clearly, these issues must be addressed in the building code to ensure acceptable performance and consistent evaluation of various types of other approved WRB materials, including polymeric-based barriers included in ASTM E2556.

Therefore, this PC provides appropriate water penetration test requirements that are parallel to the requirements of Section 1403.2, but which are applicable to testing of water-resistive barrier assemblies without an exterior covering. The minimum pressure differential and test duration to be used with ASTM E331 is the same as that specified in ASTM E2570 for WRB coatings, also without the presence of a covering material. The test criteria are also more conservative than applied to water-resistant air barriers in accordance with ASTM E1677 as would be appropriate for the more stringent application and function of a water-resistive barrier assembly.

Your approval of this PC will establish a sound and consistent basis for evaluation of WRB materials and their installation methods while appropriately introducing a new material standard to the code for a specific class of WRB materials that does not address installed performance.

FS151-12

Final Action: AS AM AMPC____ D

FS152-12
1404.2, 1405.4 (New)

Proposed Change as Submitted

Proponent: Jay Crandell, ARES Consulting, representing the Foam Sheathing Committee of the American Chemistry Council- Plastics Division (jcrandell@aresconsulting.biz)

Revise as follows:

1404.2 Water-resistive barrier. A water-resistive barrier material shall be ~~a minimum of one layer of~~ No.15 asphalt felt~~,~~ complying with ASTM D 226 for Type 1 felt, Grade D paper in accordance with Section 2510.6, or other *approved* materials and installations performance tested for water resistance and durability and determined to be at least equivalent to a typical installation of No. 15 asphalt felt over a continuous substrate. At a minimum, water resistance tests of the water-resistive barrier installation without cladding installed shall be conducted using ASTM E 331 with a minimum 15 minute test duration and a minimum 2.86 psf (137 Pa) pressure differential using minimum 4-foot (1.2 m) by 8-foot (2.4 m) wall specimens including at least one horizontal and one vertical joint with joints and attachments installed in the manner intended for end use~~, shall be attached to the studs or sheathing, with flashing as described in Section 1405.4, in such a manner as to provide a continuous *water-resistive barrier* behind the *exterior wall* veneer~~. Where water-resistive barriers are evaluated as part of a wall assembly with cladding installed, the water resistance performance testing provisions of Section 1403.2 exception 2 shall apply.

1405.4 Water-resistive barrier. Water-resistive barrier materials and flashing shall be installed in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall cladding. Where No. 15 asphalt felt complying with ASTM D226 for Type 1 felt is used as a water-resistive barrier material, a minimum of one layer shall be required with minimum 2-inch (51 mm) horizontal shingle-style lap joints and minimum 6-inch (152 mm) vertical lap joints. No. 15 asphalt felt and other approved membrane-type water-resistive barrier materials shall be attached to sheathing for backing or an approved water-resistive barrier sheathing installation shall be used.

(Renumber subsequent sections)

Reason: Current section 1404.2 includes installation requirements as well as material requirements while Section 1404 Materials is meant to apply to materials only. Installation requirements for exterior wall covering assembly components or materials are intended to be addressed in Section 1405. Therefore, this proposal moves installation requirements from Section 1404.2 to a new Section 1405.4, just ahead of existing section 1405.4 which deals with the closely associated requirements for flashing installation. Material requirements only are retained in Section 1404.2 and the performance requirement for "other approved materials" is clarified to ensure equivalency to No. 15 felt which defines the traditional benchmark for WRBs. Performance testing requirements for alternatives are clarified for the case when the WRB is tested without cladding installed. In addition, installation requirements for No. 15 felt and other membrane WRBs are strengthened in proposed Section 1405.4 by requiring installation over sheathing to ensure lap joints remain closed and wind pressure fluctuations do not create a "pumping effect" drawing air in and out of the wall cavity.

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

1404.2-FS-CRANDELL

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There was a concern about the application of the test requirements proposed. Further, the proposed language in Section 1404.2 requires durability testing, but it does not appear that there is testing prescribed. Also, it seems to eliminate open stud construction by requiring a continuous substrate.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Jay Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1404.2 Water-resistive barrier. A water-resistive barrier material shall be No.15 asphalt felt complying with ASTM D 226 for Type 1 felt, Grade D paper in accordance with Section 2510.6, or other *approved* materials. Water-resistive barrier installations shall comply with Section 1405.4. ~~and installations performance tested for water resistance and durability and be at least equivalent to a typical installation of No. 15 asphalt felt over a continuous substrate. At a minimum, water resistance tests of the water-resistive barrier installation without cladding installed shall be conducted using ASTM E 331 with a minimum 15 minute test duration and a minimum 2.86 psf (137 Pa) pressure differential using minimum 4-foot (1.2 m) by 8-foot (2.4 m) wall specimens including at least one horizontal and one vertical joint with joints and attachments installed in the manner intended for end use. Where water-resistive barriers are evaluated as part of a wall assembly with cladding installed, the water resistance performance testing provisions of Section 1403.2 exception 2 shall apply.~~

1405.4 Water-resistive barrier. Water-resistive barrier materials, including ~~and~~ flashing as described in Section 1405.5, shall be installed in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall cladding. Where No. 15 asphalt felt complying with ASTM D226 for Type 1 felt is used as a water-resistive barrier material, a minimum of one layer shall be required with minimum 2-inch (51 mm) horizontal shingle-~~style~~fashion lap joints and minimum 6-inch (152 mm) vertical lap joints. ~~No. 15 asphalt felt and other approved membrane-type water-resistive barrier materials shall be attached to sheathing for backing or an approved water-resistive barrier sheathing installation shall be used.~~ Other approved water-resistive barrier materials shall be installed in accordance with the manufacturer's installation instructions using an installation method complying with Section 1405.4.1.

1405.4.1 Water penetration resistance. Installation methods for other approved water-resistive barrier materials shall be tested for water penetration resistance without a covering material exterior to the water-resistive barrier layer in accordance with ASTM E331 under the following conditions:

1. Water-resistive barrier installation method test assemblies shall include at least one opening, one horizontal joint, and one vertical joint. All tested openings, penetrations, and joint details shall be representative of the intended end use configuration.
2. Water-resistive barrier installation method test assemblies shall be at least 4 feet by 8 feet (1219mm by 2438mm) in size.
3. Water-resistive barrier installation method assemblies shall be tested at a minimum differential pressure of 2.86 pounds per square foot (psf)(137 Pa).
4. Water-resistive barrier installation method assemblies shall be subjected to a minimum test exposure duration of 15 minutes.

Commenter's Reason: This public comment addresses code development committee comments and narrowly focuses the scope of the proposal on two key issues that are needed improvements to the code:

1. Separate existing water-resistive barrier material requirements (Section 1404) from installation instructions (Section 1405). This aspect of the proposal is purely an editorial/formatting improvement.
2. Establish a clear, appropriate and consistent minimum water penetration resistance performance requirement for testing of water-resistive barrier installation methods without the presence of an exterior covering.

The formatting improvement moves WRB installation requirements from the material section (Section 1404) to the section dealing with installation requirements (Section 1405). This separation of material requirements and installation requirements is a clarification and formatting improvement consistent with the organization of Chapter 14. Included also are some editorial improvements such as coordinating "shingle-fashion" terminology with successful committee action on proposal G21 (Ehrlich, NAHB). In addition, an installation requirement is added to address requirements for alternative water-resistive barriers (e.g., manufacturer installation instructions).

The second reason above, dealing with water penetration performance requirements, addresses a critical gap in the code and establishes a uniform water penetration performance requirement for all types of "other approved" water resistive barriers. The requirements are organized to closely parallel requirements in Section 1403.2, except in this case the requirements are being applied to an exposed water-resistive barrier without the presence of an exterior covering. Thus, the test requirements (pressure differential and test duration) are adjusted to be consistent with this condition. These requirements are identical to requirements for water penetration testing of water-resistive barrier coatings in accordance with ASTM E2570 and are appropriately more restrictive than the water-resistance criteria applied to water-resistive air-barrier materials per ASTM E1677.

This change is necessary because some alternative water-resistive barrier materials, such as polymer-based barriers (i.e., “building wraps”) are approved for use only requiring a material property to be tested and standards for this type of material, such as ASTM E2556 (see proposal FS151-12), do not address actual installed performance of the water-resistive barrier including penetrations, fastenings, joint detailing and other factors representative of end-use conditions. In fact, ASTM E 2556 states in its scope that “this specification is limited to the evaluation of materials and does not address installed performance.” Therefore, the proponent of this PC on FS152 also has submitted a PC on FS 151 to address omission of requirements for assuring installed performance of polymer-based barriers complying with ASTM E2556.

The main reason for this PC is that WRB performance is largely governed by how it performs as an installed assembly under in-service moisture exposure conditions. This concern is addressed for some types of WRB materials and installations (e.g., WRB panels, WRB coatings, etc.), but not for others (e.g, polymer-based barriers or wraps).

The significance of this concern over the lack of a uniform water-penetration resistance requirement is documented in the literature (Hall, G.D. and Hoigard, K.R., “Water-Resistive Barriers: How do they compare?”, *Interface*, November 205). In particular, this reference evaluated current code requirements, acceptance criteria, and field experience. It also reports comparative test data under installed water exposure conditions. The primary conclusions from the study include:

“Current building code provisions offer no rational means of assessing the equivalency of alternative WRB products to ASTM D-266 type 1 asphalt-saturated felt…”

“The three water resistance test methods specified in AC38 vary so significantly in test duration and applied hydrostatic pressure that no meaningful comparison of test data can be made. They fail to address several important moisture transport mechanisms that affect the in-service performance of WRBs.”

“Laboratory tests performed by the authors to simulate potential in-service conditions not addressed by AC38 resulted in water penetration through several commercially available WRB materials that, according to published manufacturer information, passed the requirements of AC38 for Grade D barriers.”

Clearly, these issues must be addressed in the building code to ensure acceptable and consistent performance of various types of WRB materials and assemblies. Your approval of this PC will establish a sound foundation for evaluation of WRB materials and installations to avoid inconsistent requirements resulting in poor or inconsistent performance among alternative WRB materials.

Public Comment 2:

Theresa Weston, PhD., representing DuPont Building Innovations, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1404.2 Water-resistive barrier. ~~A water-resistive barrier material shall be~~ A minimum of one layer of No.15 asphalt felt, complying with ASTM D 226 for Type 1 felt~~, Grade D paper in accordance with Section 2510.6,~~ or other *approved* materials shall be attached shingle-fashion to the studs or sheathing as described in Section 1405.4 and with flashing as described in Section 1405.5, in such a manner as to provide a continuous *water-resistive barrier* behind the *exterior wall* veneer. ~~and installations performance tested for water resistance and durability and determined to be at least equivalent to a typical installation of No. 15 asphalt felt over a continuous substrate. At a minimum, water resistance tests of the water-resistive barrier installation without cladding installed shall be conducted using ASTM E 331 with a minimum 15 minute test duration and a minimum 2.86 psf (137 Pa) pressure differential using minimum 4-foot (1.2 m) by 8-foot (2.4 m) wall specimens including at least one horizontal and one vertical joint with joints and attachments installed in the manner intended for end use. Where water-resistive barriers are evaluated as part of a wall assembly with cladding installed, the water resistance performance testing provisions of Section 1403.2 exception 2 shall apply.~~

1405.4 Water-resistive barrier. Water-resistive barrier materials and flashing shall be installed in accordance with manufacturer's instructions, The manufacturer's installation instructions shall comply with the water penetration resistance and durability testing in Section 1405.4.1 ~~in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall cladding. Where No. 15 asphalt felt complying with ASTM D226 for Type 1 felt is used as a water-resistive barrier material, a minimum of one layer shall be required with minimum 2-inch (51 mm) horizontal shingle-style lap joints and minimum 6-inch (152 mm) vertical lap joints. No. 15 asphalt felt and other approved membrane-type water-resistive barrier materials shall be attached to sheathing for backing or an approved water-resistive barrier sheathing installation shall be used.~~

1405.4.1 Water penetration resistance and durability. Installation methods for water-resistive barrier materials shall be tested for water penetration resistance without a covering material exterior to the water-resistive barrier layer in accordance with ASTM E331 under the following conditions:

1. Water-resistive barrier installation method test assemblies shall be at least 4 feet by 8 feet (1219mm by 2438mm) in size.
2. Water-resistive barrier installation method test assemblies shall include at least one opening, one horizontal joint, and one vertical joint.
3. Test assemblies shall be pre-exposed as follows:
   - 3.1 Loaded using 10 positive cycles of 10 psf (480 Pa) followed by 10 negative cycles of 10 psf (480 Pa)
   - 3.2 Subjected to 14 twelve hour temperature cycles from 120^{o}F (49 ^{o}C) to -22^{o}F (-30 ^{o}C)

4. Water-resistive barrier installation method assemblies shall be tested at a minimum differential pressure of 2.86 pounds per square foot (psf) (137 Pa) for 15 minutes.

Commenter's Reason: This modification directly addresses several concerns raised by the committee while maintaining the original intention of the proposal:

1. The committee expressed concern about "the application of test requirements." The original proposal required "installations to be performance tested". This was vague enough to imply that every installation would need to be tested, which was impossible given that the test method proposed was a laboratory test. The modification requires that installation be in accordance with manufacturer's instructions and those installation procedures be evaluated by the test protocol.
2. The committee also expressed concern that although the proposed language required durability testing, none was included in the test protocol. This concern is addressed in the modification by including pre-stressing and thermal cycling of the test assembly prior to water resistance testing. The pre-stressing and thermal cycling conditions are consistent with industry standards for durability testing of wall systems (for example AAMA-504), and with procedures that we as manufacturers of water-resistive barriers, have used for many years to aid in the design of our installation instructions. As water-resistive barriers have low accessibility after construction and are critical to moisture performance of the wall system, the inclusion of durability testing in the development of products, systems and installation methods is critical.
3. The committee was also concerned about the elimination of open stud construction in the original proposal. The modification restores the languages which allows for attachment to the studs or sheathing.

FS152-12

Final Action: AS AM AMPC____ D

FS153-12

202 (New), 1402.1, 1404.3 (New), 1405.5 (New)

Proposed Change as Submitted

Proponent: Jay Crandell, ARES Consulting, representing the Foam Sheathing Committee of the American Chemistry Council- Plastics Division (jcrandell@aresconsulting.biz)

Add new definition as follows:

SECTION 202
DEFINITIONS

AIR BARRIER. Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material or a combination of materials.

Revise as follows:

1402.1 Definitions. The following terms are defined in Chapter 2:

ADHERED MASONRY VENEER.
AIR BARRIER
ANCHORED MASONRY VENEER.
BACKING.
EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS).
EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS) WITH DRAINAGE.
EXTERIOR WALL.
EXTERIOR WALL COVERING.
EXTERIOR WALL ENVELOPE.
FIBER-CEMENT SIDING.
HIGH-PRESSURE DECORATIVE EXTERIOR-GRADE COMPACT LAMINATE (HPL).
HIGH-PRESSURE DECORATIVE EXTERIOR-GRADE COMPACT LAMINATE (HPL) SYSTEM.
METAL COMPOSITE MATERIAL (MCM).
METAL COMPOSITE MATERIAL (MCM) SYSTEM.
POLYPROPYLENE SIDING.
PORCELAIN TILE.
VENEER.
VINYL SIDING.
WATER-RESISTIVE BARRIER.

1404.3 Air barriers. Air barrier materials shall comply with Section C402.4.1.2.1 of the *International Energy Conservation Code*. Air barrier wall assemblies shall comply with Section C402.4.1.2.2 of the *International Energy Conservation Code*.

(Renumber subsequent sections)

1405.5 Air barrier installation. Air barriers shall be provided and installed in exterior walls in accordance with Section C402.4.1.1 of the *International Energy Conservation Code* and the additional requirements of this section. An air barrier shall be provided in or by an exterior wall assembly. Where using air permeable cavity insulation in an exterior frame wall assembly, air barriers shall be provided on both the inside and outside face of the wall cavity. Where air-barriers are installed on the exterior side of an exterior wall, it shall be a sheathing material or placed on a sheathing material for backing.

(Renumber subsequent sections)

Reason: Air barriers should not just be a requirement for energy code compliance from the standpoint of controlling overall building air leakage. Air barriers also play an important role in controlling access of warm, moist air into building cavities where they can condensate on cold surfaces (exterior surface in cold climates or interior surface of cavity in warm/humid climates). In this regard, air barriers should be considered as important as vapor retarders which are addressed in current Section 1405.3 of the IBC. Air barriers also provide wall boundary conditions (interior and exterior surfaces) for air permeable cavity insulation products to ensure that they perform as intended and in a condition that is consistent with the basis of insulation material thermal property testing. Thus, it is important to include air barriers in the IBC to address their role in a manner that compliments the IECC. With the above purpose in mind, this proposal coordinates with and builds on information and requirements already found in the IECC. The definition is directly from the IECC.

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

1404.3 (NEW)-FS-CRANDELL

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt that air barrier requirements belonged in the IECC. Further, there was concern over the language in Section 1405.5, particularly how to determine an air barrier being "in or by an exterior wall assembly."

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Jay Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1405.5 Air barrier installation. Air barriers shall be provided and installed in exterior walls in accordance with Section C402.4.1.1 <u>or Section R402.4.1.1</u> of the *International Energy Conservation Code*<u>.</u> ~~and the additional requirements of this section. An air barrier shall be provided in or by an exterior wall assembly. Where using air permeable cavity insulation in an exterior frame wall assembly, air barriers shall be provided on both the inside and outside face of the wall cavity. Where air-barriers are installed on the exterior side of an exterior wall, it shall be a sheathing material or placed on a sheathing material for backing.~~

(Portions of code change not shown remain unchanged)

Commenter's Reason: This proposed modification of FS 153 eliminates any change to air-barrier requirements in the IECC and focuses only on referencing air-barrier requirements as they exist in the IECC for both commercial and residential building classes. The modification (deleted text) also resolves the committee's concern with wording in the original proposal.

In response to the code development committee's opinion, it is important to reference air-barrier requirements in the IBC for several reasons. First, moist air transport into and through exterior walls is a major cause of moisture problems and can expose walls to a much greater amount of moisture vapor than might otherwise be controlled by use of vapor retarders (which the IBC does address). Without including air-barriers, the IBC omits a major means of controlling moisture vapor transport into walls. Clearly, air barriers are not just an energy code concern. Also, air barriers are a building construction material that must be included in wall assemblies. The omission of any mention of air-barriers creates a gap in the building code which might affect other considerations such as wind loading on components and cladding, fire concerns, vapor diffusion control (depending on the properties of the air-barrier material) and other matters of concern to building wall design. Your approval of this PC will fill an important gap in the IBC for exterior wall assemblies.

FS153-12

Final Action: AS AM AMPC____ D

FS161-12
1405.4, Chapter 35

<u>Proposed Change as Submitted</u>

Proponent: Theresa Weston, PhD., representing DuPont Building Innovations theresa.a.weston@usa.dupont.com)

Revise as follows:

1405.4 Flashing. Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it to the exterior. Flashing shall be installed at the perimeters of exterior door and window assemblies, penetrations and terminations of *exterior wall* assemblies, *exterior wall* intersections with roofs, chimneys, porches, decks, balconies and similar projections and at built-in gutters and similar locations where moisture could enter the wall. Flashing with projecting flanges shall be installed on both sides and the ends of copings, under sills and continuously above projecting *trim*.<u> When self-adhered membranes are used as flashing, those self-adhered flashings shall comply with AAMA 711. When fluid applied membranes are used as flashing, those fluid applied membrane flashings shall comply with AAMA 714.</u>

Add new standards to Chapter 35 as follows:

<u>AAMA 711-07</u>	<u>Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products</u>
<u>AAMA 714-11</u>	<u>Voluntary Specification for Liquid Applied Flashing Used to Create a Water-Resistive Seal around Exterior Wall Openings in Buildings</u>

Reason: This proposal will add new requirements to the code. Self-adhered membranes and fluid –applied membranes comprise growing segments of the flashing material market, but no material property or performance requirements for these materials are currently included in the code. Industry developed standards, AAMA 711 and AAMA 714, were developed to insure that these types of material meet minimum performance specifications. This proposal incorporates these industry standards by reference into the code. The properties and quality of flashing materials are crucial to successful implementation of the water management in wall systems.

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

Analysis: A review of the standard proposed for inclusion in the code, AAMA 711-07 and AAMA 714-11, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1405.4-FS-WESTON

<u>Public Hearing Results</u>

For staff analysis of the content of AAMA 711-07 and AAMA 714-11 relative to CP#28, Section 3.6, please visit: <u>http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf</u>.

Committee Action: **Disapproved**

Committee Reason: The committee was concerned that not all parities with material interests were involved in the promulgation of the proposed standards. Further, there were concerns over the consensus process used by AAMA in terms of how the members of the committee are chosen.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Theresa Weston, PhD, representing DuPont Building Innovations, requests Approval as Submitted.

Commenter's Reason: This proposal will add new requirements to the code. Self-adhered membranes and fluid–applied membranes comprise growing segments of the flashing material market, but no material property or performance requirements for these materials are currently included in the IBC. Standards, AAMA 711 and AAMA 714, were developed to insure that these types of material meet minimum performance specifications. This proposal incorporates these industry standards by reference into the code. The properties and quality of flashing materials are crucial to successful implementation of the water management in wall systems.

The committee disapproved the proposal because of concerns over the consensus process used by the AAMA. AAMA uses a consensus process which is complies with ICC standards and has broad industry participation. AAMA standards have been referenced in several ICC codes. In fact, one of the proposed reference standards AAMA 711 has been referenced in the International Residential Code since 2009.

Public Comment 2:

Jeff Inks, representing Window & Door Manufacturers Association, requests Approval as Submitted.

Commenter's Reason: For the reasons stated by the proponent. Inclusion of these standards in the building code provides needed guidance for when self-adhered and fluid-applied membranes are used as flashing for these fenestration installations. For fenestration installations using these types of flashing that may be not covered or adequately addressed by the standards, the use of alternative methods, designs and/or materials may be employed as provided by the code.

Public Comment 3:

Julie Ruth, JRuth Code Consulting, representing American Architectural Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1405.4 Flashing. Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it to the exterior. Flashing shall be installed at the perimeters of exterior door and window assemblies, penetrations and terminations of *exterior wall* assemblies, *exterior wall* intersections with roofs, chimneys, porches, decks, balconies and similar projections and at built-in gutters and similar locations where moisture could enter the wall. Flashing with projecting flanges shall be installed on both sides and the ends of copings, under sills and continuously above projecting *trim*. When self-adhered membranes are used as flashing, those self-adhered flashings shall comply with AAMA 711. When fluid applied membranes are used as flashing, those fluid applied membrane flashings shall comply with AAMA 714.

Add new standards to Chapter 35 as follows:
AAMA 711-07 Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products

AAMA 714-~~11~~ <u>12</u> Voluntary Specification for Liquid Applied Flashing Used to Create a Water-Resistive Seal around Exterior Wall Openings in Buildings

Commenter's Reason: This Public Comment seeks the approval of the original proposal as submitted, with the update of one of the proposed reference standards. Specifically, the reference to the 2011 edition of AAMA 714 is updated to the 2012 edition. The update of AAMA 714-11 to AAMA 714-12 was completed prior to the ICC Group A Code Development Hearings in May 2012. AAMA 714-12 was made available to the members of the Fire Safety Committee for their review prior to those hearings.
We believe the process used to develop and maintain the proposed reference standards complies with ICC procedures, and that this proposal includes an appropriate application of both AAMA 711 and AAMA 714. We encourage the membership to approve FS161, either as submitted, or as modified by this public comment.

AAMA's process to develop standards has previously been found to be in compliance with ICC Council Process #28. Specifically:

- All portions of AAMA standards intended to be enforced are written in mandatory language.
- All terms in AAMA Standards that deviate from an ordinarily accepted meaning or a dictionary definition are defined.

- The scope or application of all AAMA standards is clearly described in the document.
- No AAMA standard has th
- e effect of requiring proprietary materials.
- No AAMA standard prescribes any proprietary agency for quality control or testing.
- All AAMA standards describe in detail preparation of any test samples, and sample selection, if required by the standard.
- All AAMA standards prescribe the reporting format to be used for test results. The format identifies the key performance criteria for the element tested.
- All AAMA standards clearly define the measure of performance for which the test is to be conducted.
- No AAMA standard states that its provisions shall govern if there is a conflict with the requirements of a referencing code. Many AAMA standards instead state that if there is a conflict between the standard and the local governing code, the requirements of the local governing code, as determined by the Authority Having Jurisdiction (AHJ) shall prevail.
- All AAMA standards are developed and maintained through a consensus process that is similar to ASTM or ANSI, although the process used is uniquely AAMA's.

During testimony on FS161 at the ICC Group A Code Development Hearings opponents to the proposal challenged the compliance of the two standards offered for consideration (AAMA 711 and AAMA 714) with the criteria of CP#28. Specifically, some proponents challenged the statement that both standards had been developed through a consensus process.
In response to that challenge, the following is offered:

- The AAMA process is open to participation by any party. Although it is primarily members of AAMA who choose to participate in the process, participation by non-members is welcomed. Non-members are able to participate in the discussion at any point in the development process, and they are able to submit comments via a link on the AAMA website at http://www.aamanet.org/general/1/112/aama-ballots when the standard is at the Product Group Level. The stages of standard development within AAMA are:

    - 1. Task Group
    - 2. Committee
    - 3. Product Group
    - 4. Full AAMA membership (only used if a particular standard affects more than one Product Group).
- Notification of the intent to create, revise, reaffirm or withdraw an AAMA standard is provided by email correspondence to the appointed AAMA voting representative and to all task group members who worked on revising or creating said document (whether voting members or not). All non-members of AAMA can be made aware of all documents posted on the "AAMA Ballots" section of the AAMA website by signing up for AAMA's RSS feed. The notice includes a clear and meaningful description of the purpose of the proposed activity and identifies the appropriate source for further information regarding that particular activity. Any changes in stringency requirements in the balloted document are accompanied by a justification for the change.
- All comments accompanying ballots received prior to the ballot closing date are considered. All individuals who submitted comments on a ballot (whether voting or non-voting members of AAMA) are invited via email communication to any conference calls where their comments will be discussed by the developing group. Actions on all comments, including those accompanying negative votes as well as those accompanying approve with comment votes and non-voting comments are recorded in the task group or committee meeting minutes. Actions recorded include the vote record (whether the comment is found to be persuasive editorial, non-persuasive editorial, persuasive substantive, non-persuasive substantive, or non-germane) and the accompanying task group or committee reasons for their action. All minutes are available to voters on the AAMA website once published for AAMA members, and all non-AAMA members can request a copy of minutes from AAMA staff. Those items that are determined to be Persuasive substantial or Non persuasive substantial are re-balloted to the appropriate task group or committee (followed by balloting to general Product Group) in order to afford all members of that task group or committee an opportunity to respond, reaffirm or change their vote.
- AAMA written procedures govern the methods used for standard development and are available to any interested party.
- Any interested party can appeal any decision made by any AAMA task group or committee to the Product Group or Council that governs that task group or committee.
- A variety of interest groups participate in the development of AAMA standards.
    - Participation in AAMA task groups is open to testing laboratories, industry consultants, suppliers and end product producers.
    - Participation in AAMA committees is open to testing laboratories, suppliers and end product producers.
    - Final approval of AAMA standards is provided by members who support the overall product(s) being referenced (called "Product Groups").
- Records of drafts of a proposed standard, proposed amendments, action on amendments and final promulgation of the standard are maintained within the AAMA archives until the greater of either the "life of the principal document which it supports" or 3 years.
- Standards are reviewed at a frequency of five years by the AAMA Document Management Committee. Any standard or document more than five years in age is referred to the appropriate product group or council for review. The product group or council will then review the document in its entirety and make a recommendation that the standard be reapproved, revised or withdrawn from publication by AAMA (all withdrawal recommendations are forwarded to the AAMA Document Management Committee for approval).

We believe the process used by AAMA is consensus, provides adequate notice to those parties who may be interested in participating in the development or revision of a standard, and permits those interested parties an opportunity to participate in that activity. As an example, review of AAMA records showed that 7 members of EIMA are also members of AAMA, and 5 of them had participated in the balloting of the most recent edition of both AAMA 711 and AAMA 714. This is true in spite the claim by the opponents of FS161 at the ICC Group A Code Development Hearings that no members of EIMA had been aware of the revision of AAMA 711 or AAMA 714. It is quite clear that not only were some members of EIMA aware of the revision, but they also had an opportunity to participate in the revision and some did.

The only change between AAMA 714-11 and AAMA 714-12 was a modification to Section 1. Scope. Specifically, in AAMA 714-11 Section 1.4 reads "This document is maintained by representative members of AAMA as advisory information". Section 1.4 has been revised in AAMA 714-12 to read "This document was developed in an open and consensus process and is maintained by representative members of AAMA as advisory information." This change to Section 1.4 was made to more closely comply with ICC Council Policy #28 Code Development.

Public Comment 4:

Julie Ruth, JRuth Code Consulting, representing American Architectural Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

AAMA 711-~~07~~ 12 Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products

(Remainder of proposal unchanged)

Commenter's Reason: The purpose of this Public Comment is to seek approval of the original proposal as submitted, with the update of one of the proposed reference standards. Specifically, the reference to the 2007 edition of AAMA 711 is updated to the 2012 edition. The update of AAMA 711-07 to AAMA 711-12 was not completed prior to the ICC Group A Hearings in May 2012. Therefore, AAMA 711-07 was made available to the members of the Fire Safety Committee for their review prior to those hearings. AAMA anticipates the completion of the 2012 revision of AAMA 711 before the ICC Group A Final Action Hearings in October 2012. AAMA 711-07 is referenced in the 2009 and 2012 International Residential Code. The primary changes between AAMA 711-07 and AAMA 711-12 are:

- Update of referenced standards
- Testing of larger size specimens (100 mm instead of 25 mm) will be permitted.
- The range of temperature and humidity tolerances for conditioning of test specimens will be expanded from +/- 1 oC (2 oF) to 2 oC (3.6 oF) and from 5% RH to 10% RH.
- Use of ASTM G155 will be permitted as an alternate to ASTM G154 for UV exposure testing.
- An installation detailing figure was revised.
- Scope will be revised to indicate that the standard was developed in an open and consensus process, as required by ICC CP#28.

AAMA's process to develop standards has previously been found to be in compliance with CP#28. Specifically:

- All portions of AAMA standards intended to be enforced is written in mandatory language.
- All terms in AAMA Standards that deviate from an ordinarily accepted meaning or a dictionary definition are defined.
- The scope or application of all AAMA standards is clearly described in the document.
- No AAMA standard has the effect of requiring proprietary materials.
- No AAMA standard prescribes any proprietary agency for quality control or testing.
- All AAMA standards describe in detail preparation of any test samples, and sample selection, if required by the standard.
- All AAMA standards prescribe the reporting format to be used for test results. The format identifies the key performance criteria for the element tested.
- All AAMA standards clearly define the measure of performance for which the test is to be conducted.
- No AAMA standard states that its provisions shall govern if there is a conflict with the requirements of a referencing code. Many AAMA standards instead state that if there is a conflict between the standard and the local governing code, the requirements of the local governing code shall prevail.
- All AAMA standards are developed and maintained through a consensus process that is similar to ASTM or ANSI, although the process used is uniquely AAMA's.

During testimony on FS161 at the ICC Code Development Hearings opponents to the proposal questioned the compliance of the two standards offered for consideration (AAMA 711 and AAMA 714) with the criteria of CP#28. Specifically, some proponents challenged the statement that both standards had been developed through a consensus process.
In response to that challenge, the following is offered:

- The AAMA process is open to participation by any party. Although it is primarily members of AAMA who choose to participate in the process, participation by non-members is welcomed. Non-members are able to participate in the discussion at any point in the development process, and they are able to submit comments via a link on the AAMA website at http://www.aamanet.org/general/1/112/aama-ballots when the standard is at the Product Group Level. The stages of standard development within AAMA are:
    - 1. Task Group
    - 2. Committee

- 3. Product Group
- 4. Full AAMA membership (only used if a particular standard affects more than one product group).

- Notification of the intent to create, revise, reaffirm or withdraw an AAMA standard is provided by _email correspondence to the AAMA Main Representative and to all task group members who worked on revising/creating said document (whether voting members or not). All non-members can be made aware of all documents posted on the "AAMA Ballots" section of the AAMA website by signing up for AAMA's RSS feed. The notice includes a clear and meaningful description of the purpose of the proposed activity and identifies the appropriate source for further information regarding that particular activity. Any changes in stringency requirements in the balloted document are accompanied by a justification for the change.
- All comments accompanying ballots received prior to the closing date are considered. All individuals who submitted comments on a ballot (whether voting or non-voting members) are invited via email communication to any conference calls where their comments will be discussed by the developing group. Actions on all comments, including those accompanying negative votes as well as those accompanying approve with comment votes and non-voting comments are recorded in the task group or committee meeting minutes. Actions recorded include the vote record (whether the comment is found to be persuasive editorial, non-persuasive editorial, persuasive substantive, non-persuasive substantive, or non-germane) and the accompanying task group or committee reasons for their action. All minutes are available to voters on the AAMA website once published for AAMA members, and all non-AAMA members can request a copy of minutes from AAMA staff. Those items that are determined to be Persuasive substantial or Non persuasive substantial are re-balloted to the appropriate task group or committee (followed by balloting to general product group) in order to afford all members of that task group or committee an opportunity to respond, reaffirm or change their vote.
- AAMA written procedures govern the methods used for standard development and are available to any interested party.
- Any interested party can appeal any decision made by any AAMA task group or committee to the Product Group or Council that governs that task group or committee.
- A balance of interest groups participate in the development of AAMA standards.
  - Participation in AAMA task groups is open to testing laboratories, industry consultants, suppliers and end product producers.
  - Participation in AAMA committees is open to testing laboratories, suppliers and end product producers.
  - Final approval of AAMA standards is provided by members who support the overall product(s) being referenced (called "Product Groups").
- Records of drafts of a proposed standard, proposed amendments, action on amendments and final promulgation of the standard are maintained within the AAMA archives until the greater of either the "life of the principal document which it supports" or 3 years.
- Standards are reviewed at a frequency of five years by the AAMA Document Management Committee. Any standard or document more than five years in age is referred to the appropriate Product Group or Council for review. The Product Group or Council will then review the document in its entirety and make a recommendation that the standard be reapproved, revised or withdrawn from publication by AAMA (all withdrawal recommendations are forwarded to the AAMA Document Management Committee for approval).

We believe the process used by AAMA is consensus, provides adequate notice to those parties who may be interested in participating in the development or revision of a standard, and permits those interested parties an opportunity to participate in that activity. As an example, the opponents of FS161 as submitted claimed that no members of the association they represented (EIMA) had been aware of the revision of AAMA 711 or AAMA 714. Review of the AAMA records however, showed that 7 members of EIMA are also members of AAMA, and 5 of them had participated in the balloting of the most recent edition of both standards. This would indicate that some members of EIMA were aware of the revisions that were taking place, they had opportunity to participate and some did.

FS161-12

Final Action: AS AM AMPC____ D

FS163-12
1405.8

Proposed Change as Submitted

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute (bmanley@steel.org)

Revise as follows:

1405.8 Slab-type veneer. Slab-type veneer units not exceeding 2 inches (51 mm) in thickness shall be anchored directly to masonry, concrete or ~~stud~~ light-frame construction. For veneer units of marble, travertine, granite or other stone units of slab form ties of corrosion-resistant dowels in drilled holes shall be located in the middle third of the edge of the units, spaced a maximum of 24 inches (610 mm) apart around the periphery of each unit with not less than four ties per veneer unit. Units shall not exceed 20 square feet (1.9 m2) in area. If the dowels are not tight fitting, the holes shall be drilled not more than 0.063 inch (1.6 mm) larger in diameter than the dowel, with the hole countersunk to a diameter and depth equal to twice the diameter of the dowel in order to provide a tight-fitting key of cement mortar at the dowel locations when the mortar in the joint has set. Veneer ties shall be corrosion-resistant metal capable of resisting, in tension or compression, a force equal to two times the weight of the attached veneer. If made of sheet metal, veneer ties shall be not smaller in area than 0.0336 by 1 inch (0.853 by 25 mm) or, if made of wire, not smaller in diameter than 0.1483-inch (3.76 mm) wire.

Reason: This minor editorial change corrects terminology to match the defined term found in IBC, Section 202, *Light-Frame Construction.*

Cost Impact: No impact to the cost of construction is anticipated.

1405.8-FS-MANLEY

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that substituting "light-frame" for "stud" construction could lead to confusion and that the term stud construction was a well understood term.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jonathan Humble, AIA, NCARB, LEED BD&C, representing American Iron and Steel Institute, requests Approval as Submitted.

Commenter's Reason: At the May 2012 (Dallas, TX) code hearings representatives from the steel and wood industry stood up and supported this proposal, and they were the only two parties who testified on this proposal.

Unfortunately, the committee during their deliberations moved into discussions which questioned the impact of "stud" versus the proposal to use "light-frame". This extended from questions related to the attachment of veneers to the framing, and moved to the belief that the proposal might include attachment to wood panels (e.g. sheathing) and not to the framing members as required by the code. This discussion is moot since the definition of "light-frame" only refers to the framing and nothing else, as shown in the definitions below.

*"**LIGHT-FRAME CONSTRUCTION.** A type of construction whose vertical and horizontal structural elements are primarily formed by a system of repetitive wood or cold-formed steel framing members." (Copyright ICC 2012)*

"CONVENTIONAL LIGHT-FRAME CONSTRUCTION. *A type of construction whose primary structural elements are formed by a system of repetitive wood-framing members. See Section 2308 for conventional light-frame construction provisions" (Copyright ICC 2012).*

In view of this fact we ask the membership to overturn the committee recommendation for "disapproval" and change the result to "approved as submitted."

FS163-12
Final Action: AS AM AMPC____ D

FS167-12
1405.14.1

Proposed Change as Submitted

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute (bmanley@steel.org)

Revise as follows:

1405.14.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied to conform with the *water-resistive barrier* requirements in Section 1403. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding and accessories shall have a minimum 0.313-inch (7.9 mm) head diameter and 1/8-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 3/4 inch (19 mm). For cold-formed steel light-frame construction, corrosion-resistant fasteners shall be used and shall penetrate the cold-formed steel framing at least three exposed threads. Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.

Reason: The section should include guidance on fastener requirements for cold-formed steel light-frame construction similar to those specified in IBC Section 1405.16. In adding the language from Section 1405.16, a change was made from "all weather screws" to "corrosion-resistant fasteners," which is the more appropriate and more commonly used term. Additionally, the language was corrected from "three full threads" to "three exposed threads." This matches language used in AISI S200, Section D1.3. Also, it avoids confusion on what a "full thread" is; as long as three threads can be seen from any side of the screw, it's sufficient. A separate, coordinating proposal for Section 1405.16 corrects the language there.

Cost Impact: No impact to the cost of construction is anticipated.

1405.14.1-FS-MANLEY

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that the proposal provided a good technical addition on how to connect vinyl siding to steel framing.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jonathan Humble, AIA, NCARB, LEED BD&C, representing American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1405.14.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied to conform with the *water-resistive barrier* requirements in Section 1403. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding and accessories shall have a minimum 0.313-inch (7.9 mm) head diameter and 1/8-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 3/4 inch (19 mm). For cold-formed steel light-frame construction, corrosion-resistant fasteners shall be used. Screw fasteners ~~and~~ shall penetrate the cold-formed steel framing at least three exposed threads. Other fasteners shall be installed in accordance with the approved construction documents and manufacturer's instructions. Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.

Commenter's Reason: Following the May 2012 code hearings AISI representatives were approached by individuals who raised questions regarding the proposed terminology application to the minimum installation requirements. In this case they observed a disconnect between "fastener" types including pneumatically driven fasteners, powder-actuated fasteners, rivet fasteners and clinch joining versus the requirement of a minimum penetration for screws of "three exposed threads."

AISI agrees, and is proposing for further modification this proposal. Following further discussions with those interested parties we believe we have addressed the irregularities which were brought to our attention.

FS167-12

Final Action: AS AM AMPC____ D

FS168-12

1405.14.1, 1405.14.2 (New), 1405.14.2.1 (New), 1405.14.2.2 (New), 1405.14.2.3 (New)

Proposed Change as Submitted

Proponent: Jay Crandell, ARES Consulting, representing the Foam Sheathing Committee of the American Chemistry Council- Plastics Division (jcrandell@aresconsulting.biz); Matt Dobson, Vinyl Siding Institute (mdobson@vinylsiding.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Revise as follows:

1405.14.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Vinyl siding installed over foam plastic sheathing shall comply with Section 1405.14.2. Siding shall be applied to conform with the *water-resistive barrier* requirements in Section 1403. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding and accessories shall have a minimum 0.313- inch (7.9 mm) head diameter and 1/8-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 3/4 inch (19 mm). Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.

1405.14.2 Foam Plastic Sheathing. Vinyl siding used with foam plastic sheathing shall be installed in accordance with Section 1405.14.2.1, 1405.14.2.2, or 1405.14.2.3.

Exceptions:

1. Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing, or other *approved* backing capable of independently resisting the design wind pressure, the requirements of Section 1405.14.1 shall apply.
2. Where the foam plastic sheathing is capable of independently resisting the design wind pressure, including its connections to the wall structure, the requirements of Section 1405.14.1 shall apply.

1405.14.2.1 Basic wind speed not exceeding 90 miles per hour (V_{asd}) and Exposure Category B. Where the basic wind speed does not exceed 90 miles per hour (40 m/s) (V_{asd}), the Exposure Category is B and gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 11/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C 578, 1/2-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C 1289, or 1-inch-thick (25 mm) (nominal) expanded polystyrene per ASTM C 578.

1405.14.2.2 Basic wind speed exceeding 90 miles per hour (V_{asd}) or Exposure Categories C and D. Where the basic wind speed exceeds 90 miles per hour (40 m/s) (V_{asd}) or the Exposure Category is C or D, or all conditions of Section 1405.14.2.1 are not met, the design pressure rating for the assembly shall meet or exceed the components and cladding wind load determine in accordance with Section 1609. The design wind pressure rating of the vinyl siding for installation over backing capable of independently resisting the design wind pressure as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

1. <u>For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.</u>
2. <u>For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.</u>

<u>**1405.14.2.3 Manufacturer specification.** Where the vinyl siding manufacturer's product specifications provide an *approved* design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.</u>

Reason: Vinyl siding is commonly installed over foam plastic insulation (sheathing) for energy code compliance. Provisions are needed to ensure appropriate installation of vinyl siding over foam sheathing to resist wind load. These provisions are consistent with provisions included in the 2009 and 2012 IRC. The provisions are based on testing of various foam sheathing materials and vinyl siding materials with a range of wind pressure ratings to ensure broad applicability and adequate performance. A summary of the research and testing can be found at www.foamsheathing.org, including accredited test laboratory test reports. Additional confirmatory testing is on-going at the IBHS full-scale wind tunnel with initial results supporting the proposed adjustment of vinyl siding wind pressure ratings. The adjustments to vinyl siding wind pressure ratings for use of foam sheathing include an increase in safety factor from 1.5 to 2.0 as well as an increase in the net wind load acting on the vinyl siding to account for the combined wind pressure acting across the foam sheathing and vinyl siding layers of the wall. These provisions will ensure compliance with wind load provisions in Section 1609 of the IBC as applicable to exterior walls in Chapter 14 of the IBC.

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

1405.14.1-FS-CRANDELL

Public Hearing Results

This code change was heard by the IBC Structural code development committee.

Committee Action: **Disapproved**

Committee Reason: The committee felt there was insufficient justification for this proposal, such as data available in a report that the committee can review. There is a concern with the section reference in the proposed exception being circular. There's also concern that the proposed requirements for installing vinyl siding over foam sheathing could create problems rather than solve them.
.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Jay Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1405.14.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Vinyl siding installed over foam plastic sheathing shall comply with Section 1405.14.2<u> unless the exceptions to Section 1405.14.2 apply.</u> Siding shall be applied to conform with the *water-resistive barrier* requirements in Section 1403. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding and accessories shall have a minimum 0.313-inch (7.9 mm) head diameter and 1/8-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 3/4 inch (19 mm). Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.

1405.14.2 Foam Plastic Sheathing. Vinyl siding used with foam plastic sheathing shall be installed in accordance with Section 1405.14.2.1, 1405.14.2.2, or 1405.14.2.3.

Exceptions:

1. Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing, or other *approved* backing capable of independently resisting the design wind pressure, the requirements of Section 1405.14.1 shall apply.
2. Where the foam plastic sheathing is capable of independently resisting the design wind pressure, including its connections to the wall structure, the requirements of Section 1405.14.1 shall apply.

1405.14.2.1 Basic wind speed not exceeding 90 miles per hour (V_{asd}) and Exposure Category B. The siding installation requirements of this section apply to enclosed buildings with a mean roof height not greater than 30 feet (9144 mm), a topographic factor (K_{zt}) of 1.0, ~~Where the~~ basic wind speed ~~does~~ not exceeding 90 miles per hour (40 m/s) (V_{asd}), and ~~the~~ Exposure Category ~~is~~ B. ~~and~~ Where gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 1-1/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C 578, 1/2-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C 1289, or 1-inch-thick (25 mm) (nominal) expanded polystyrene per ASTM C 578.

1405.14.2.2 Basic wind speed exceeding 90 miles per hour (V_{asd}) or Exposure Categories C and D. The requirements of this section shall apply w~~W~~here ~~the basic wind speed does not exceeds 90 miles per hour (40 m/s) (V_{asd}) or the Exposure Category is C or D, or all~~ any condition~~s~~ of Section 1405.14.2.1 is ~~are~~ not met and where the basic wind speed does not exceed 110 miles per hour (48.9 m/s) (V_{asd}).~~,~~ ~~t~~The design pressure rating for the assembly shall meet or exceed the components and cladding wind load determine in accordance with Section 1609. The design wind pressure rating of the vinyl siding for installation over backing capable of independently resisting the design wind pressure as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

1. For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.
2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall or where the basic design wind speed is greater than 100 miles per hour (44.5 m/s)(V_{asd}) and does not exceed 110 miles per hour (48.9 m/s)(V_{asd}), the vinyl siding's design wind pressure rating shall be multiplied by 0.27.

1405.14.2.3 Manufacturer specification. Where the vinyl siding manufacturer's product specifications provide an *approved* design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.

Commenter's Reason: Appropriate wind-resistant requirements for installation of vinyl siding over foam sheathing are needed in the building code to provide a means of complying with energy code requirements when foam sheathing is used together with vinyl siding. The proposal is based on provisions approved in the 2009 IRC and which have continued use in the 2012 IRC. This PC adds limitations appropriate for use in the IBC and which agree with recent action taken by the ICC 600 committee in preparation for balloting at the time of this writing.

One of the reasons for CDC disapproval was related to justification, particularly research reports. There are several research studies which have investigated appropriate requirements for application of vinyl siding over foam sheathing in recent years to ensure adequate wind pressure resistance of this exterior wall covering assembly and to resolve concerns observed in high wind events. The applicable research reports include laboratory wind pressure studies using ASTM E330 procedures or similar, laboratory studies using a dynamic (cyclic) wind pressure test apparatus, and also a full-scale wind tunnel test conducted at the IBHS research facility with multiple project partners and sponsors including IBHS, DOE, NAHB Research Center, Inc., VSI, State Farm Insurance, and ACC-FSC. These studies are listed under references at the end of this statement and they all serve as substantiation or confirmation of the proposed provisions as further modified by this public comment

The second concern of the CDC was purely editorial in that the exceptions in Section 1405.14.2 were circular (i.e., kicked the user back up to Section 1405.14.1 which directs to go to back to 1405.14.2 when foam sheathing is used). This editorial problem has been corrected by language added to 1405.14.1.

The third concern of the CDC was if the proposal might create problems. In short, the problem exists without this proposal. The problem is in the status quo and this proposal is a significant improvement by placing significant limits on vinyl siding when used over foam sheathing, including pressure resistance rating reductions that de-rate the vinyl siding wind pressure ratings by a factor of nearly three to four to ensure adequate safety margins and performance when used over foam sheathing.

Finally, this PC also addresses direction received from the ICC 600 committee in its recent deliberations on this same proposal for inclusion in the high wind construction standard. To be consistent with this action (pending ballot as of this writing), an additional wind speed limit of 110 mph (V_{asd}) has been added to this PC. While this wind speed limitation is a judgment call and does not reflect performance capability, it does reflect a reasonable balance of confidence and caution after consideration of all the data and practical experience justifying this proposal. In addition, specific limitations on building height and topographic effect are added to Section 1405.14.2.1 to ensure that the prescribed solution for the 90/B wind condition is consistent with the wind load conditions upon which it is based.

. Your approval of this public comment will ensure an appropriate and high level of wind-resistant performance for use of vinyl siding over foam sheathing. It is needed to provide code users and enforcers with the necessary information to solve a problem, not create one.

References:
Cope, A., Crandell, J., Johnston, D, Kochkin, V., Liu, Z., Stevig, L., and Reinhold, T. (2012) "Wind Pressure Performance Evaluation and Building Code Improvements for Energy Efficient Exterior Wall Assemblies Including Continuous Insulation – Phase 1", ATC/SEI Hurricane Conference, Miami, FL.
NAHB Research Center, Inc., 2012, Evaluation of the Wind Pressure Performance of Walls with Exterior Rigid Foam Sheathing, Upper Marlboro, MD.
Kopp, G., and Gavanski, E. (2012) "Effects of pressure equalization on the performance of residential wall systems under extreme wind loads", Journal of Str Engr, doi:10.1061(ASCE)ST. 1943-541X.0000476
NAHB Research Center, Inc. 2008. Wind Pressure Testing of Wall Assemblies with Foam Sheathing an Vinyl Siding Products, Upper Marlboro, MD.

Public Comment 2:

Jay Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1405.14.1 General Application. The siding shall be applied over sheathing or materials ~~listed in~~ meeting requirements of Section 2304.6. Siding shall be applied to conform with the *water-resistive barrier* requirements in Section 1403. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding and accessories shall have a minimum 0.313-inch (7.9 mm) head diameter and 1/8-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 3/4 inch (19 mm). Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.

1405.14.2 Application over Foam Plastic Sheathing. Vinyl siding and accessories applied over foam plastic sheathing shall be installed in accordance with the vinyl siding manufacturer's installation instructions. Where the vinyl siding manufacturer's installation instructions do not include a design wind pressure rating specifically intended for use over foam plastic sheathing and which provides resistance to 100% of the negative (suction) design wind pressures determined in accordance with Section 1609, the design wind pressure rating for the vinyl siding shall be multiplied by 0.36.

Exceptions:

1. Where the foam plastic sheathing meets the requirements of Section 2304.6, the requirements of Section 1405.14.1 shall apply.
2. Where the foam plastic sheathing is applied directly over other sheathing or materials meeting the requirements of Section 2304.6, the requirements of Section 1405.14.1 shall apply.

For installations within the wind-borne debris region, foam sheathing shall be applied directly over other sheathing or materials meeting the requirements of Section 2304.6 and the requirements of Section 1405.14.1 shall apply.

Commenter's Reason: This public comment ensures that vinyl siding products with appropriate wind pressure rating and installation requirements for use over foam sheathing are properly addressed in the building code.

This PC provides an approach where the vinyl siding wind pressure rating is assured to provide resistance to 100% of the design wind load (not rely on wind pressure equalization reductions implicit to standard vinyl siding wind pressure ratings) when the vinyl siding product is used over foam plastic sheathing. This simple and effective 100% wind pressure approach has the benefit of removing complicated and confusing adjustment factors, criteria, and limitations which were originally proposed for the IBC. The proponent also intends to use this approach to update the IRC provisions which already addressing this matter but using a more complicated approach.

This proposal also coordinates with approval of S287 which provides exterior wall sheathing performance requirements in Section 2304.6 in addition to retaining prior prescriptive exterior wall sheathing options. The removal of "listed in" in section 1405.14.1 and reference to 2304.6 in Section 1405.4.2 coordinates those provisions with the performance requirements in Section 2304.6 based on Committee approval of S287.

This proposal also incorporates a limitation in wind-borne debris regions to prevent foam plastic sheathing and vinyl siding from being used as the only exterior wall covering material on the exterior side of a wall (i.e., a separate sheathing material of other material complying with Section 2304.6 must be included on the exterior side of the wall assembly). This is intended compliment a similar limitation being considered by the ICC 600 committee.

Your approval of this public comment is necessary to ensure appropriate wind-resistant performance of vinyl siding and its attachment when used over foam sheathing.

Public Comment 3:

Philip Line, PE, representing American Wood Council, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1405.14.1 General Application. The siding shall be applied over sheathing or materials ~~listed in~~ meeting requirements of Section 2304.6. Siding shall be applied to conform with the *water-resistive barrier* requirements in Section 1403. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding and accessories shall have a minimum 0.313-inch (7.9 mm) head diameter and 1/8-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 3/4 inch (19 mm). Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.

1405.14.2 Application over Foam Plastic Sheathing. Vinyl siding and accessories applied over foam plastic sheathing shall be installed in accordance with the vinyl siding manufacturer's *approved* instructions for installation over foam plastic sheathing. Vinyl siding shall be capable of resisting 100% of the negative (suction) design wind pressures determined in accordance with Section 1609.

Exceptions:

1. Where the foam plastic sheathing meets the requirements of Section 2304.6, the requirements of Section 1405.14.1 shall apply.
2. Where the foam plastic sheathing is applied directly over sheathing or materials meeting the requirements of Section 2304.6, the requirements of Section 1405.14.1 shall apply.

Commenter's Reason: This public comment ensures that vinyl siding products with appropriate wind pressure rating and installation requirements for use over foam sheathing are properly addressed in the building code.

This PC focuses the approach on specific vinyl siding products approved for use over foam sheathing and capable of resisting 100% of the negative (suction) wind pressures from 1609. This product-specific approach has the benefit of removing complicated and confusing adjustment factors, criteria, and limitations which where originally proposed for the IBC. This proposal requires install instructions for the specific application of vinyl siding used to secure the exterior foam sheathing layer to the wall be designed to resist 100% pressure requirement which is consistent with design loads for other exterior sheathing materials.

This proposal also coordinates with approval of S287 which provides exterior wall sheathing performance requirements in Section 2304.6 in addition to retaining prior prescriptive exterior wall sheathing options. The removal of "listed in" in section 1405.14.1 and reference to 2304.6 in Section 1405.4.2 coordinates those provisions with the performance requirements in Section 2304.6 based on Committee approval of S287.

Your approval of this public comment is necessary to ensure appropriate wind-resistant performance of vinyl siding and its attachment when used over foam sheathing.

FS168-12

Final Action: AS AM AMPC____ D

FS169-12
1405.16

Proposed Change as Submitted

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute (bmanley@steel.org)

Revise as follows:

1405.16 Fiber-cement siding. Fiber-cement siding complying with Section 1404.10 shall be permitted on exterior walls of Type I, II, III, IV and V construction for wind pressure resistance or wind speed exposures as indicated by the manufacturer's listing and *label* and *approved* installation instructions. Where specified, the siding shall be installed over sheathing or materials *listed* in Section 2304.6 and shall be installed to conform to the *water-resistive barrier* requirements in Section 1403. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding to wood studs shall be corrosion-resistant round head smooth shank and shall be long enough to penetrate the studs at least 1 inch (25 mm). For cold-formed steel light-frame construction ~~metal framing~~, ~~all-weather screws~~ corrosion-resistant fasteners shall be used and shall penetrate the the cold-formed steel framing ~~metal framing~~ at least three exposed ~~full~~ threads.

Reason: The editorial modifications correct the terminology to reflect what is adopted in Section 2211. A change was made from “all weather screws” to “corrosion-resistant fasteners,” which is the more appropriate and more commonly used term. Additionally, the language was corrected from “three full threads” to “three exposed threads.” This matches language used in AISI S200, Section D1.3. Also, it avoids confusion on what a “full thread” is; as long as three threads can be seen from any side of the screw, it’s sufficient.

Cost Impact: No impact to the cost of construction is anticipated.

1405.16-FS-MANLEY

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that the proposal provided a good technical addition on how to connect fiber-cement siding to cold-formed steel framing.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jonathan Humble, AIA, NCARB, LEED BD&C, representing American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1405.16 Fiber-cement siding. Fiber-cement siding complying with Section 1404.10 shall be permitted on exterior walls of Type I, II, III, IV and V construction for wind pressure resistance or wind speed exposures as indicated by the manufacturer's listing and *label* and *approved* installation instructions. Where specified, the siding shall be installed over sheathing or materials *listed* in Section 2304.6 and shall be installed to conform to the *water-resistive barrier* requirements in Section 1403. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding to wood studs shall be corrosion-resistant round head smooth shank and shall be long enough to penetrate the studs at least 1 inch (25 mm). For cold-formed steel light-frame construction corrosion-resistant fasteners shall be used. ~~and~~ Screw fasteners shall penetrate the ~~the~~ cold-formed steel framing at least three exposed full threads . Other fasteners shall be installed in accordance with the approved construction documents and manufacturer's instructions.

Commenter's Reason: Following the May 2012 code hearings AISI representatives were approached by individuals who raised questions regarding the proposed terminology application to the minimum installation requirements. In this case they observed a disconnect between "fastener" types including pneumatically driven fasteners, powder-actuated fasteners, rivet fasteners and clinch joining versus the requirement of a minimum penetration for screws of "three exposed threads."

AISI agrees, and is proposing for further modification this proposal. Following further discussions with those interested parties we believe we have addressed the irregularities which were brought to our attention.

FS169-12

Final Action: AS AM AMPC____ D

FS173-12
1407.1.1

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing Centria (jbeitel@haifire.com)

Revise as follows:

1407.1 General. The provisions of this section shall govern the materials, construction and quality of metal composite materials (MCM) for use as *exterior wall coverings* in addition to other applicable requirements of Chapters 14 and 16.

1407.1.1 **Core Material** **~~Plastic core~~.** MCMs that contain a core material of foam plastic insulation as defined in Section 2602.1 shall comply with the requirements of Chapter 26.
~~The plastic core of the MCM shall not contain foam plastic insulation as defined in Section 2602.1.~~

Reason: MCMs contain a solid plastic core and are regulated by Section 1407. A factory-manufactured panel consisting of steel skins and a foam plastic insulation core is regulated by Chapter 26. However, some Code officials and others have interpreted the existing Section 1407.1.1 such that the factory-manufactured panel consisting of steel skins and foam plastic insulation core is not allowed by the Code and thus cannot be used.

The proposed wording clarifies the intent of the Code and will hopefully avoid future misinterpretations.

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

1407.1.1-FS-BEITEL

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that MCM by definition do not contain foam plastic and the proposed language would only be confusing.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jesse J. Beitel, Hughes Associates, Inc., representing Centria, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

METAL COMPOSITE MATERIAL (MCM). A factory-manufactured panel consisting of metal skins bonded to both faces of a solid plastic core.

1407.1 General. The provisions of this section shall govern the materials, construction and quality of metal composite materials (MCM) for use as *exterior wall coverings* in addition to other applicable requirements of Chapters 14 and 16.

~~**1407.1.1 Plastic core.** The plastic core of the MCM shall not contain foam plastic insulation as defined in Section 2602.1.~~

Commenter's Reason: The Committee's statement is correct in that the core of an MCM should not contain foam plastic, however, the definition of an MCM does not specifically say that. In fact, the definition of MCM does not currently specify a "solid" core. This was suggested by one of the Committee members during the hearings in Dallas.

The proposed amendment to the original proposal addresses this and thus, clarifies the situation. Additionally, with this change, Section 1407.1.1 is no longer needed.

FS173-12

Final Action: AS AM AMPC____ D

FS177-12
809 (New), 1410 (New), 2103.15 (New)

Proposed Change as Submitted

Proponent: John Woestman, Kellen Company, representing Masonry Veneer Manufacturers Association (MVMA) (jwoestman@kellencompany.com)

Add new text as follows:

SECTION 809
INTERIOR ADHERED MASONRY VENEER

809.1 Adhered masonry veneer. Interior adhered masonry veneer shall comply with the applicable requirements in Section 809 and Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5.

809.2 Interior adhered masonry veneers. Interior adhered masonry veneers shall have a maximum weight of 20 psf (0.958 kg/m2) and shall be installed in accordance with Section 809 and the requirements of Section 1410 applicable to interior adhered masonry veneer. Where the interior adhered masonry veneer is supported by wood construction, the supporting members shall be designed to limit vertical deflection to L/600 of the span of the supporting members.

Revise as follows:

~~**1405.10 Adhered masonry veneer.** Adhered masonry veneer shall comply with the applicable requirements in Section 1405.10 and Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5.~~

~~**1405.10.1 Exterior adhered masonry veneer.** Exterior adhered masonry veneer shall be installed in accordance with Section 1405.10 and in accordance with the manufacturer's instructions.~~

~~**1405.10.1.1 Water-resistive barriers.** Water-resistive barriers shall be installed as required in Section 2510.6.~~

~~**1405.10.1.2 Flashing at foundation.** A corrosion resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26 gauge galvanized or plastic with a minimum vertical attachment flange of 31/2 inches (89 mm) shall be installed extend a minimum of 1 inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section 1405.4. The water-resistive barrier shall lap over the exterior of the attachment flange of the screed or flashing.~~

~~**1405.10.1.3 Clearances.** On exterior stud walls, adhered masonry veneer shall be installed a minimum of 4 inches (102 mm) above the earth, or a minimum of 2 inches (51 mm) above paved areas, or a minimum of 1/2 inch (12 mm) above exterior walking surfaces which are supported by the same foundation that supports the exterior wall.~~

~~**1405.10.2 Exterior adhered masonry veneers—porcelain tile**. Adhered units shall not exceed 5/8 inch (15.8 mm) thickness and a maximum of 24 inches (610 mm) in any face dimension nor more than 3 square feet (0.28 m2) in total face area and shall not weigh more than 9 pounds psf (0.43 kN/m2). Porcelain tile shall be adhered to an approved backing system.~~

~~**1405.10.3 Interior adhered masonry veneers.** Interior adhered masonry veneers shall have a maximum weight of 20 psf (0.958 kg/m2) and shall be installed in accordance with Section 1405.10. Where the interior adhered masonry veneer is supported by wood construction, the supporting members shall be designed to limit deflection to L/600 of the span of the supporting members.~~

SECTION 1410
EXTERIOR ADHERED MASONRY VENEER

1410.1 General. The provisions of this section shall govern the materials, construction, and quality of adhered masonry veneer for use as exterior wall coverings in addition to the applicable requirements of Chapters 14, 16, 21, and 25. Interior adhered masonry veneer shall comply with Section 809.

1410.2 Exterior adhered masonry veneer. Exterior adhered masonry veneer shall be installed in accordance with Section 1410 and in accordance with the manufacturer's instructions and shall comply with the applicable requirements in Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5..

1410.2.1 Flashing. Flashing shall comply with the applicable requirements of Section 1405.4 and the following.

1410.2.1.1 Flashing at foundation. A corrosion resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26 gauge galvanized or plastic with a minimum vertical attachment flange of 31/2 inches (89 mm) shall be installed extend a minimum of 1 inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section 1405.4. The water-resistive barrier shall lap over the exterior of the attachment flange of the screed or flashing.

1410.2.2 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section 2510.6.

1410.2.3 Clearances. On exterior stud walls, adhered masonry veneer shall be installed a minimum of 4 inches (102 mm) above the earth, or a minimum of 2 inches (51 mm) above paved areas, or a minimum of 1/2 inch (12 mm) above exterior walking surfaces which are supported by the same foundation that supports the exterior wall.

1410.2.4 Adhered masonry veneer installed with lath and mortar. Exterior adhered masonry veneer installed with lath and mortar shall comply with the following.

1410.2.4.1 Lathing. Lathing shall comply with the requirements of Section 2510.

1410.2.4.2 Scratch Coat. A nominal ½" thick layer of mortar complying with the material requirements of Sections 2103.15 and 2512.2 shall be applied encapsulating the lathing. The surface of this mortar shall be scored horizontally resulting in a scratch coat.

1410.2.4.3 Adhering veneer. The masonry veneer units shall be adhered to the mortar scratch coat with a nominal ½" thick setting bed of mortar complying with Sections 2103.15 and 2512.2 applied to create a full setting bed for the back of the masonry veneer units. The masonry veneer units shall be worked into the setting bed resulting in a nominal 3/8" setting bed after the masonry veneer units are applied.

1410.2.5 Adhered masonry veneer applied directly to masonry and concrete. Adhered masonry veneer applied directly to masonry or concrete shall comply with the applicable requirements of Section 1410 and with the requirements of Section 2510.7 or Section 1410.2.4.

1410.2.6 Cold weather construction. Cold weather construction of adhered masonry veneer shall comply with the requirements of Sections 2104.3 and 2512.4.

1410.2.7 Hot weather construction. Hot weather construction of adhered masonry veneer shall comply with the requirements of Section 2104.4.

1410.3 Exterior adhered masonry veneers—porcelain tile. Adhered units shall not exceed 5/8 inch (15.8 mm) thickness and a maximum of 24 inches (610 mm) in any face dimension nor more than 3 square feet (0.28 m2) in total face area and shall not weigh more than 9 pounds psf (0.43 kN/m2). Porcelain tile shall be adhered to an approved backing system.

Add new text as follows:

2103.15 Mortar for adhered masonry veneer. Mortar for use with adhered masonry veneer shall conform to ASTM C270 for Type N or Type S, or shall comply with ANSI A118.4 for latex-modified Portland cement mortar.

Reason: This proposal seeks to clarify requirements for adhered masonry veneer (AMV).

This proposal moves the requirements for exterior AMV to a new section at the end of Chapter 14, Exterior Walls, and then expands on the requirements for exterior AMV. The requirements for interior AMV are moved to a new section at the end of Chapter 8, Interior Finishes (as AMV installed in the interior is essentially an interior finish).

For ease of presenting the new sections at the ends of Chapter 8 and Chapter 14, the original text in Section 1405.10 is shown as deleted. However, the current technical requirements of the IBC in 1405.10 are included in the two new sections for interior AMV (proposed Section 809) and exterior AMV (proposed Section 1410)

AMV is similar in some ways to masonry, and also similar in some ways to cement plaster. But AMV is also dissimilar to both of these well-known materials. With this proposal, we have attempted to reference existing code requirements where appropriate. Also, where we believe appropriate, we have presented specific requirements for AMV.

Regarding the mortar used for AMV systems, we're proposing a new section at the end of Section 2103 clearly defining the requirements for mortars used with AMV.

Cost Impact: None

809 (NEW)-FS-WOESTMAN

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that this proposal clarifies requirements for adhered masonry veneer (AMV) by creating a separate section dealing only with AMV in Chapter 14. Further, the additions to Chapter 8 are appropriate as they are current provisions dealing with AMV used in interior applications.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Woestman, Kellen Company, representing Masonry Veneer Manufacturers Association (MVMA), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1405.10 Adhered masonry veneer. Adhered masonry veneer shall comply with the applicable requirements in Section 1405.10 and Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5.

1405.10.1 Exterior adhered masonry veneer. Exterior adhered masonry veneer shall be installed in accordance with Section 1405.10 and in accordance with the manufacturer's instructions.

1405.10.1.1 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section 2510.6.

1405.10.1.2 Flashing. Flashing shall comply with the applicable requirements of Section 1405.4 and the following.

1405.10.1.2.1 Flashing at foundation. A corrosion resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26 gauge galvanized or plastic with a minimum vertical attachment flange of 31/2 inches (89 mm) shall be installed to extend a minimum of 1 inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section 1405.4. The water-resistive barrier shall lap over the exterior of the attachment flange of the screed or flashing.

1405.10.1.3 Clearances. On exterior stud walls, adhered masonry veneer shall be installed a minimum of 4 inches (102 mm) above the earth, or a minimum of 2 inches (51 mm) above paved areas, or a minimum of 1/2 inch (12 mm) above exterior walking surfaces which are supported by the same foundation that supports the exterior wall.

1405.10.1.4 Adhered masonry veneer installed with lath and mortar. Exterior adhered masonry veneer installed with lath and mortar shall comply with the following.

1405.10.1.4.1 Lathing. Lathing shall comply with the requirements of Section 2510.

1405.10.1.4.2 Scratch Coat. A nominal ½" thick layer of mortar complying with the material requirements of Sections 2103.15 and 2512.2 shall be applied encapsulating the lathing. The surface of this mortar shall be scored horizontally resulting in a scratch coat.

1405.10.1.4.3 Adhering veneer. The masonry veneer units shall be adhered to the mortar scratch coat with a nominal ½" thick setting bed of mortar complying with Sections 2103.15 and 2512.2 applied to create a full setting bed for the back of the masonry veneer units. The masonry veneer units shall be worked into the setting bed resulting in a nominal 3/8" setting bed after the masonry veneer units are applied.

1405.10.1.5 Adhered masonry veneer applied directly to masonry and concrete. Adhered masonry veneer applied directly to masonry or concrete shall comply with the applicable requirements of Section 1410 and with the requirements of Section 2510.7 or Section 1405.10.1.4.

1405.10.1.6 Cold weather construction. Cold weather construction of adhered masonry veneer shall comply with the requirements of Sections 2104.3 and 2512.4.

1405.10.1.7 Hot weather construction. Hot weather construction of adhered masonry veneer shall comply with the requirements of Section 2104.4.

1405.10.2 Exterior adhered masonry veneers—porcelain tile. Adhered units shall not exceed 5/8 inch (15.8 mm) thickness and a maximum of 24 inches (610 mm) in any face dimension nor more than 3 square feet (0.28 m2) in total face area and shall not weigh more than 9 pounds psf (0.43 kN/m2). Porcelain tile shall be adhered to an approved backing system.

1405.10.3 Interior adhered masonry veneers. Interior adhered masonry veneers shall have a maximum weight of 20 psf (0.958 kg/m2) and shall be installed in accordance with Section 1405.10. Where the interior adhered masonry veneer is supported by wood construction, the supporting members shall be designed to limit deflection to L/600 of the span of the supporting members.

2103.15 Mortar for adhered masonry veneer. Mortar for use with adhered masonry veneer shall conform to ASTM C270 for Type N or Type S, or shall comply with ANSI A118.4 for latex-modified Portland cement mortar.

Commenter's Reason: The goals of this public comment are to not move the requirements for interior adhered masonry veneer to Chapter 8 as in the original FS177-12 proposal, retain all of the original language of 1405.10 of the 2012 IBC, and retain the proposed / new technical requirements of FS177-12 which were approved during the committee hearings.

This public comment is a "replace the original proposal with the following" for ease of understanding what's proposed for revision of the IBC.

The reason for this public comment: following the committee hearings, a concern was raised with FS177 which proposed moving the requirements for interior adhered masonry veneer to Chapter 8. The concern is Chapter 8 is focused on fire-related performance requirements of interior finishes and these (non-fire-related) provisions for interior adhered masonry veneer really shouldn't be placed in Chapter 8. Looking at Chapter 8 from that perspective . . . . we agree.

To address that concern, we're proposing in this public comment to leave the requirements for adhered masonry veneer where they have been located in the IBC since the 2000 IBC.

FS177-12

Final Action: AS AM AMPC____ D

FS180-12
2603.4

Proposed Change as Submitted

Proponent: William E. Koffel, P.E., Koffel Associates, Inc., representing self (wkoffel@koffel.com)

Revise as follows:

2603.4 Thermal barrier. Except as provided for in Sections 2603.4.1 and 2603.10, foam plastic shall be separated from the interior of a building by an approved thermal barrier of ½- inch (12.7 mm) gypsum wallboard or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275. <u>Penetrations of the thermal barrier shall be protected to maintain the integrity of the thermal barrier.</u> Combustible concealed spaces shall comply with Section 718.

Reason: It is not uncommon to find penetrations of a thermal barrier. NFPA 275 does not include any provisions for the testing of penetrations. Therefore, one could interpret the Code to say that penetrations are not permitted. Unfortunately, no current test protocol specifically addresses penetrations of thermal barriers. Therefore, the language proposed is performance oriented and requires the registered design professional to document to the satisfaction of the building official (through the construction document process) how such penetrations are being protected.

Cost Impact: None

2603.4-FS-KOFFEL

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that the proposed language was appropriate to require penetrations through thermal barriers to be protected.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Jay Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Disapproval.

Commenter's Reason: The proposal should be disapproved for several reasons:

1. **This proposal provides no technical justification that a problem exists, but is based on a theoretical assumption**. Where is the fire record that identifies penetrations in the thermal barrier as responsible for increased fire incidents? The requirement for a 15 minute thermal barrier has been in the model codes since the late 1970s. The IBC commentary to Section 2603.4 Thermal Barriers states, "… experience had shown that foam plastics covered with plaster or 1/2- inch (12.7 mm) gypsum wallboard had performed satisfactorily in building fires. For this reason, 1/2-inch (12.7 mm) gypsum wallboard was included in the code as a minimum requirement."
2. **This proposal is unenforceable**. While the reasoning statement claims that this new language is "performance based", it also admits there is no test to prove performance. So it is left to the "registered design professional to document to the satisfaction of the building official (through the construction document process) how such penetrations are being protected." Is this proposal intended to protect membrane penetrations or through penetrations or any penetration? This proposal does not define what a "penetration" is, nor does it provide any guidance on how the protection will be proven. Furthermore, the proposed language demands that the penetration "shall be protected to maintain the integrity of the thermal barrier." What is meant by "integrity" of the thermal barrier? In its scope, NFPA 275 Chapter 5 (Part II) is entitled

Integrity Fire Test. Does this proposal envision a definition for integrity of the thermal barrier that is different than that addressed by the current code referenced NFPA 275?

3. **This proposal appears to impose more stringent requirements for a 15 minute thermal barrier than is described in Section 714 which addresses membrane penetrations and through penetrations for horizontal assemblies and fire resistance rated walls.** This proposal requires that any penetration, no matter how small or of any material, must be protected, in some undefined, unproven manner.

However, there are many examples in Section 714 where exceptions for certain penetrations – like ferrous pipe of certain diameters, or steel electrical boxes of a certain aggregate area are unprotected. For example, Section 714.3.2 Exception 1 allows for unprotected membrane penetration if the "Membrane penetrations of maximum 2-hour fire resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0 103 m2) in area, provided the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m2) in any 100 square feet (9.29 m2) of wall area. The *annular space* between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm)." Other provisions also apply if the boxes are on opposite sides of the wall.

Summary: This proposal presents no substantiating data that a problem even exists, yet directs the registered design professional to use anything to protect any penetration, regardless of size or composition, that will convince the building official it is safe. Or is this a marketing attempt to sell more fire caulk?

Public Comment 2:

Jeffrey M. Shapiro, P.E., FSFPE, International Code Consultants, representing National Mulit-Housing Council, requests Disapproval.

Commenter's Reason: The proposal brings to light an issue that warrants consideration, but further work is clearly needed. The code text, as it is currently proposed, is so vague that it is unsuitable for adoption. There are no specified benchmarks by which a design professional or a code official can determine compliance, which means competing code interpretations are inevitable, likely leading to construction delays and associated costs.

For example, some might interpret the proposed text to require that all penetrations must be sealed with caulking or assemblies that are suitable for membrane penetration firestops since there are no other validated methods for maintaining the integrity of a penetrated thermal barrier. On what basis would a design professional or a code official accept less? See Section 714.

The text could also be interpreted such that any electrical or HVAC box requires complete wrapping with materials equivalent to the thermal barrier. Is that necessary or justifiable? Will marking and identification in accordance with Section 703.7 now be required because protection of penetrations is called for? Will fire dampers be required for duct openings that may be placed in an exterior wall per Section 705.10?

Contrary to the cost statement offered in the proposal, this change will certainly lead to increased cost because, at a minimum, there will be increased research, documentation and negotiation time required of the design professional to sort out how code compliance might be achieved and agreed to with the code official. Depending on how the text is interpreted, costs could dramatically increase beyond that.

The issues of concern can probably be addressed given time and research. Unfortunately, there is no identifiable quick fix solution suitable for adoption as a final action modification. Lacking that, to approve this change as-is with the thought of fixing it in the next cycle would be a great disservice to countless jurisdictions who adopt the 2015 code. The only option at this time appears to be disapproval.

FS180-12

Final Action: AS AM AMPC____ D

FS182-12
2603.4.1.5

Proposed Change as Submitted

Proponent: Mike Ennis, representing SPRI Inc. (m.ennis@mac.com)

Delete and substitute as follows:

~~**2603.4.1.5 Roofing.** Foam plastic insulation under a roof assembly or roof covering that is installed in accordance with the code and the manufacturer's instructions shall be separated from the interior of the building by wood structural panel sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints or other approved type of edge support, or an equivalent material. A thermal barrier is not required for foam plastic insulation that is a part of a Class A, B or C roof-covering assembly, provided the assembly with the foam plastic insulation satisfactorily passes FM 4450 or UL 1256.~~

2603.4.1.5 Roofing. The foam plastic insulation is a part of a Class A, B or C roof-covering assembly that is installed in accordance with the code and the manufacturer's instructions and is either constructed as described in 1 or tested as described in 2:

1. The roof assembly is separated from the interior of the building by wood structural panel sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints or other approved type of edge support, or an equivalent material.
2. The assembly with the foam plastic insulation satisfactorily passes FM 4450 or UL 1256.

Reason: The proposed wording is intended to clarify exceptions for the use of a thermal barrier to separate foam plastic insulation from the interior of the building. The current wording does not clearly convey that there are two exceptions for the use of a thermal barrier. One is a prescriptive construction technique; the other describes specific testing requirements.

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

2603.4.1.5-S-Ennis

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed language is not mandating any requirements and is therefore incomplete and inappropriate.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mike Ennis, representing Single Ply Roofing Industry Inc. (SPRI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2603.4.1.5 Roofing. A thermal barrier is not required for ~~The~~ foam plastic insulation that is ~~a~~ part of a Class A, B or C roof-covering assembly that is installed in accordance with the code and the manufacturer's instructions and is either constructed as described in

1 or tested as described in 2:

1. The roof assembly is separated from the interior of the building by wood structural panel sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints or other approved type of edge support, or an equivalent material.
2. The assembly with the foam plastic insulation satisfactorily passes FM 4450 or UL 1256.

Commenter's Reason: The Committee recommended this proposal for disapproval because they felt the proposed language was not mandating any requirements and is therefore incomplete and inappropriate. The above-proposed additional language provides the mandate.

FS182-12
Final Action: AS AM AMPC____ D

FS186-12
2603.5, 2603.5.1 (New)

Proposed Change as Submitted

Proponent: Jason Thompson, National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards

Revise as follows:

2603.5 Exterior walls of buildings <u>of Type I, II, III or IV construction</u> of any height. *Exterior walls* of buildings of Type I, II, III or IV construction of any height shall comply with Sections 2603.5.1 through 2603.5.7. *Exterior walls* of cold storage buildings required to be constructed of noncombustible materials, where the building is more than one *story* in height, shall also comply with the provisions of Sections 2603.5.1 through 2603.5.7.

> <u>**Exception:** Walls constructed of concrete or masonry where the foam plastic insulation is covered on each face by a minimum of 1-inch (25 mm) thickness of masonry or concrete.</u>

<u>**2603.5.1 Exterior walls of buildings**</u> <u>**of Type V construction**</u> *Exterior walls* of buildings of Type V construction shall comply with Sections 2603.2, 2603.3 and 2603.4.

(Renumber subsequent sections)

Reason: The purpose of this code change is to reinstate the exception that was contained in Section 2602.5.2.2 of the 1997 Uniform Building Code (UBC) that exempted masonry and concrete exterior walls containing foam plastic insulation from the requirements of that section where the foam plastic insulation is covered by a minimum of 1-inch thickness of masonry or concrete. Based on research of the ICC code merging process, it appears that this exception was inadvertently omitted when the three legacy model building codes were originally merged into the First Working Draft of the IBC.

Section 2602.5.2.2 of the 1997 UBC was titled "Buildings of Any Height." It contained requirements for regulating the use of foam plastic insulation in the exterior walls of buildings where the exterior walls were required to be of noncombustible construction. These requirements are very similar to the requirements that were in Section 2603.5 of the 2000 IBC, as well as the current requirements contained in Section 2603.5 of the 2012 IBC. The proposed wording for this new Exception, based on the 1997 UBC, is the same wording used in IBC Section 2603.4.1.1 Masonry or Concrete Construction that allows the omission of the thermal barrier that is otherwise required to protect foam plastic insulation from the interior of the building. And it is similar to Item 2 in IBC Section 2603.5.7 Ignition that exempts exterior wall assemblies containing foam plastic insulation from being tested in accordance with NFPA 268 to determine ignition resistance to an exterior radiant heat source where the assembly is protected on the exterior with a minimum 1-inch thickness of concrete or masonry.

In a review of the legacy codes and development of the IBC there does not appear to be any technical reason justifying why this Exception was not included or should not be reinstated, nor are we aware of any adverse fire experience that precludes its application.

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

2603.5-FS-THOMPSON

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was no justification to exempt concrete or masonry and foam plastic sandwich panels from all of the requirements of Section 2603.5.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jason Thompson and Jason Krohn, National Concrete Masonry Association representing Masonry Alliance for Codes and Standards & Precast/Prestressed Concrete Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2603.5 Exterior walls of buildings ~~of Type I, II, III, or IV construction~~ of any height. Exterior walls of buildings of Type I, II, III or IV construction of any height shall comply with Sections 2603.5.1 through 2603.5.7. Exterior walls of cold storage buildings required to be constructed of noncombustible materials, where the building is more than one story in height, shall also comply with the provisions of Sections 2603.5.1 through 2603.5.7.

> ~~**Exception:** Walls constructed of concrete or masonry where the foam plastic insulation is covered on each face by a minimum of 1-inch (25 mm) thickness of masonry or concrete.~~

~~**2603.5.1 Exterior walls of buildings of Type V construction.**~~ Exterior walls of buildings of Type V construction shall comply with Section 2603.2, 2603.3 and 2603.4.

2603.5.5 Vertical and lateral fire propagation. The exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

Exceptions:

1. One-story buildings complying with Section 2603.4.1.4.
2. Wall assemblies where the foam plastic insulation is covered on each face by a minimum of 1-inch (25 mm) thickness of masonry or concrete and meeting one of the following:

a. there is no air space between the insulation and the concrete or masonry; or

b. the insulation has a flame spread index of not more than 25 as determined in accordance with ASTM E 84 or UL 723 and the maximum air space between the insulation and the concrete or masonry is not more than 1-inch (25 mm).

Commenter's Reason: As submitted, the changes proposed on FS186-12 could have been interpreted as exempting the testing and acceptance requirements for foam plastic insulation materials, which was not the intent. Instead, the purpose of FS186-12 was simply to exempt the need for testing in accordance with NFPA 285 for those assemblies where past testing has demonstrated successful performance.

Testing conducted by the National Research Council of Canada showed that insulating materials within the cavity of concrete and masonry construction did not exhibit fire propagation when there was no intervening air space within the assembly, even for insulation materials that had a flame spread index substantially higher than 75. Further, similar results were seen when the assembly included an intervening air space; provided that the air space was no larger than 1 inch in thickness and the flame spread index of the insulation material was 25 or less. The modifications proposed here reflect the results and recommendations of this testing.

Lie, T.T., "Contribution of Insulation in Cavity Walls to Propagation of Fire", National Research Council of Canada, Division of Building Research, Fire Study No. 29, November, 1972, (NRCC 12878).
http://www.nrc-cnrc.gc.ca/obj/irc/doc/pubs/fs/fs29/fs29.pdf

FS186-12

Final Action: AS AM AMPC____ D

FS187-12
2603.5

Proposed Change as Submitted

Proponent: David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects (dcollins@preview-group.com); Henry Green, President, National Institute of Building Sciences, representing NIBS BETEC Committee (hgreen@nibs.org)

Revise as follows:

2603.5 Foam plastic insulation in exterior walls of buildings ~~of any height~~. Exterior walls of buildings ~~of Type I, II, III or IV construction of any height~~ including foam plastic insulation shall comply with Sections 2603.5.1 through 2603.5.~~7~~8.

2603.5.1 Exterior walls of Cold Storage Buildings. Exterior walls of cold storage buildings required by Section 503.1 to be constructed of noncombustible materials, where the building is more than one story in height, shall ~~also~~ comply with the provisions of Sections 2603.5.1 through 2603.5.~~7~~8.

2603.5.2 Exterior walls of Type V Construction. Exterior walls of buildings of Type V construction shall comply with Sections 2603.2, 2603.3 and 2603.4.

2603.5.3 Buildings of Type I, II, III or IV Construction. Foam plastic insulation in exterior walls of buildings of Type I, II, III or IV construction shall comply with Section 2603.5.3.1, 2603.5.3.2, 2603.5.3 or 2603.5.4.

2603.5.3.1 One-story buildings complying with Section 2603.4.1.4.

2603.5.3.2 Building shall be sprinklered throughout in accordance with Section 903.3.1.1 or 903.3.1.2.

2603.5.3.3 The exterior walls shall be fireblocked per Section 718.2.6.

2603.5.3.4 The exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

~~**2603.5.1 Fire-resistance-rated walls.** Where the wall is required to have a fire-resistance rating, data based on tests conducted in accordance with ASTM E 119 or UL 263 shall be provided to substantiate that the fire-resistance rating is maintained.~~

~~**2603.5.2**~~ **2603.5.4 Thermal barrier.** Any foam plastic insulation shall be separated from the building interior by a thermal barrier meeting the provisions of Section 2603.4, unless special approval is obtained on the basis of Section 2603.10.

Exception: One-story buildings complying with Section 2603.4.1.4.

~~**2603.5.3**~~ **2603.5.5 Potential heat.** The potential heat of foam plastic insulation in any portion of the wall or panel shall not exceed the potential heat expressed in Btu per square feet (mJ/m2) of the foam plastic insulation contained in the wall assembly tested in accordance with Section 2603.5.5.
The potential heat of the foam plastic insulation shall be determined by tests conducted in accordance with NFPA 259 and the results shall be expressed in Btu per square feet (mJ/m2).

Exception: One-story buildings complying with Section 2603.4.1.4.

~~**2603.5.4**~~ **2603.5.6 Flame spread and smoke-developed indexes.** Foam plastic insulation, exterior coatings and facings shall be tested separately in the thickness intended for use, but not to exceed 4 inches (102 mm), and shall each have a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E 84 or UL 723.

Exception: Prefabricated or factory-manufactured panels having minimum 0.020-inch (0.51 mm) aluminum facings and a total thickness of 1/4 inch (6.4 mm) or less are permitted to be tested as an assembly where the foam plastic core is not exposed in the course of construction.

~~**2603.5.5 Vertical and lateral fire propagation.** The exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.~~

~~**Exception:** One-story buildings complying with Section 2603.4.1.4.~~

(Renumber subsequent sections)

Reason: In 1978, the U.S. Department of Energy (DOE) initiated a national program plan to address building enclosure systems. This program evolved into one of the National Institute of Building Science's first councils, the Building Enclosure Technology and Environment Council (BETEC). Today, DOE and more than 125 corporate and individual members support BETEC. An elected Board of Direction guides the Council. Government agency and association personnel, design and construction professionals, researchers and academics serve on BETEC committees and working groups, propose and review research, and organize symposia and publications.

Currently, Section 2603.5 requires all foam plastic exterior insulation materials to conform to the limits of NFPA 285. This test replicates the response of materials to a fire extending through an exterior window of a building. The code does not differentiate as to whether there is a potential for such a fire to occur in a building. Flashover fires which would cause the flame to break out of the building will not occur in a building that has a fully operational sprinkler system. Similar provisions in the code for other materials that are combustible and may lead to vertical and lateral spread of fire are required to provide fireblocking. In recreating Section 2603.5 we have incorporated various options to the use of this testing to address the risk of fire spreading on the exterior wall of a building where foam plastic insulation is found.

2603.5 The existing section includes three separate criteria, none of which has anything to do with height except for the provisions for cold storage buildings that only applies when they are over one story in height, so the title of the section is incorrect. In addition, to avoid additional confusion this code change breaks the section down into its various parts.

New 2603.5.1 The requirement for combustible or noncombustible walls is based on the construction type allowed in Section 503.1. The use of the term "also" implies there are other requirements that are not clearly spelled out.

New 2603.5.3 This is a new section that reflects the requirements for the use of combustible materials on the exterior of a building. The maximum height of an unsprinklered building is 55 feet to the occupied floor per Section 903.2.11.3. Current requirements for protection of combustible wood veneer materials on the exterior of a building are limited in Section 1405.5 to 40 feet in height. Fireblocking is required in Section 718.2.6 for concealed spaces on the exterior of a building.

2603.5.1 This existing section in the code is redundant with Section 703 of the IBC which requires all fire resistance rated walls to conform with ASTM E119 or UL 263. It isn't necessary to state everywhere in the code that if a wall is required to be fire resistance rated that it must pass these tests.

Cost Impact: The change will reduce the cost of construction.

2603.5-FS-COLLINS-GREEN

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee felt the proposal was less restrictive than the current code without justification. Further, how to achieve the fireblocking requirements in Section 2603.5.5 was unclear. Lastly, no data has been provided showing the benefit of a sprinkler system in reducing the effect of fire on the exterior of the building.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects and Henry Green, President, National Institute of Building Sciences, representing NIBS BETEC Committee

Modify the proposal as follows:

2603.5 Foam plastic insulation in exterior walls of buildings. Exterior walls of buildings including foam plastic insulation shall comply with Sections 2603.5.1 through 2603.5.~~8~~3.

2603.5.1 Exterior walls of Cold Storage Buildings. Exterior walls of cold storage buildings required by Section 503.1 to be constructed of noncombustible materials, and where the building is more than one story in height, shall comply with the provisions of Section~~s~~ ~~2603.5.1 through 2603.5.8~~ 2603.5.3.

2603.5.2 Exterior walls of Type V Construction. Exterior walls of buildings of Type V construction shall comply with Sections 2603.2, 2603.3 and 2603.4.

2603.5.3 Buildings of Type I, II, III or IV Construction. Foam plastic insulation in exterior walls of buildings of Type I, II, III or IV construction and where required by Section 2603.5.1 shall comply with this Section ~~2603.5.3.1, 2603.5.3.2, 2603.5.3 or and 2603.5.4.~~

~~**2603.5.3.1** One-story buildings complying with Section 2603.4.1.4.~~

~~**2603.5.3.2** Building shall be sprinklered throughout in accordance with Section 903.3.1.1 or 903.3.1.2.~~

~~**2603.5.3.3** The exterior walls shall be fireblocked per Section 718.2.6.~~

~~**2603.5.3.4** The exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.~~

2603.5.3.1 Thermal barrier. Any foam plastic insulation shall be separated from the building interior by a thermal barrier meeting the provisions of Section 2603.4, unless special approval is obtained on the basis of Section 2603.10.

> **Exception:** One-story buildings complying with Section 2603.4.1.4.

2603.5.3.2 ~~**2603.5.5**~~ **Potential heat.** The potential heat of foam plastic insulation in any portion of the wall or panel shall not exceed the potential heat expressed in Btu per square feet (mJ/m2) of the foam plastic insulation contained in the wall assembly tested in accordance with Section 2603.5.5. The potential heat of the foam plastic insulation shall be determined by tests conducted in accordance with NFPA 259 and the results shall be expressed in Btu per square feet (mJ/m2).

> **Exception:** One-story buildings complying with Section 2603.4.1.4.

2603.5.~~6~~3.3 Flame spread and smoke-developed indexes. Foam plastic insulation, exterior coatings and facings shall be tested separately in the thickness intended for use, but not to exceed 4 inches (102 mm), and shall each have a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E 84 or UL 723.

> **Exception:** Prefabricated or factory-manufactured panels having minimum 0.020-inch (0.51 mm) aluminum facings and a total thickness of 1/4 inch (6.4 mm) or less are permitted to be tested as an assembly where the foam plastic core is not exposed in the course of construction.

2603.5.3.4 Vertical and lateral fire propagation. The exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

> **Exception:** One-story buildings complying with Section 2603.4.1.4.

2603.5.~~6~~3.5 Label required. The edge or face of each piece, package or container of foam plastic insulation shall bear the label of an approved agency. The label shall contain the manufacturer's or distributor's identification, model number, serial number or definitive information describing the product or materials' performance characteristics and approved agency's identification.

2603.5.~~7~~3.6 Ignition. Exterior walls shall not exhibit sustained flaming where tested in accordance with NFPA 268. Where a material is intended to be installed in more than one thickness, tests of the minimum and maximum thickness intended for use shall be performed.

Exception: Assemblies protected on the outside with one of the following:

1. A thermal barrier complying with Section 2603.4.
2. A minimum 1 inch (25 mm) thickness of concrete or masonry.
3. Glass-fiber-reinforced concrete panels of a minimum thickness of 3/8 inch (9.5 mm).
4. Metal-faced panels having minimum 0.019-inch-thick (0.48 mm) aluminum or 0.016-inch-thick (0.41 mm) corrosion-resistant steel outer facings.
5. A minimum 7/8-inch (22.2 mm) thickness of stucco complying with Section 2510.

Commenter's Reason: When AIA and NIBS BETEC (Building Envelope Technology and Environment Council) began looking at the issues associated with testing of walls because they include combustibles, one issue that became clear was that the provisions of 2603.5 were very confusing. In this comment we are simply revising the section to reflect what was intended.

The existing section includes separate criteria for Types I, II, III and IV construction, cold storage warehouses, and Type V construction, none of which has anything to do with height except for the provisions for cold storage buildings. This change changes the title of the section to be incorrect. To avoid additional confusion this comment breaks the section down into its various parts; cold storage buildings, Type V buildings, and Types I, II, III or IV construction. Finally, Section 2603.5.1 regarding fire resistance rated walls was deleted as it duplicates the requirements for walls in Chapter 7, and nothing in this section changes those requirements of whether the wall is rated or not because of the foam plastic insulation.

New 2603.5.1 The requirements for cold storage warehouses is broken out from other types of buildings because it contains requirements for both combustible and noncombustible exterior walls. However, as with any building are limited in their types of construction by Section 503.1. With this change we have noted where the code establishes that limit. The use of the term "also" implies there are other requirements that are not clearly spelled out, and since there is no provision identified that word was removed.

New 2603.5.2 This section includes the requirements for buildings of Type V construction. This language is found at the end of the current section.

New 2603.5.3 This section establishes the requirements for the use of combustible materials on the exterior of a Type I, II, III or IV building. The criteria for fire-resistance-ratings duplicates the requirements in Chapter 7. Thermal barriers, potential heat, flame spread and smoke-developed indexes, vertical and lateral fire propagation provisions are simply renumbered to be part of the new section 2603.5

Public Comment 2:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects and Henry Green, President, National Institute of Building Sciences, representing NIBS BETEC Committee

Replace the proposal as follows:

2603.5.5 Vertical and lateral fire propagation. ~~The~~ Exterior wall ~~assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.~~ assemblies containing foam plastic insulation shall provide protection against vertical and lateral flame propagation in accordance with one of the methods in this section.

Exception: One-story buildings complying with Section 2603.4.1.4.

2603.5.5.1 Testing to NFPA 285. Exterior wall assemblies shall be tested in accordance with NFPA 285 and comply with the acceptance criteria of NFPA 285.

2603.5.5.2 Fireblocking. Concealed spaces within exterior wall assemblies shall be fireblocked in such a manner so as to cut off the concealed openings (both vertical and horizontal), and form an effective barrier between floors.

2603.5.5.2.1 Location of fireblocking. Fireblocking shall be installed within concealed spaces of exterior wall assemblies at every floor level, and at every ceiling level where the ceiling is part of an assembly required to have a fire-resistance rating. Fireblocking shall be installed at horizontal intervals not exceeding 10 feet in exterior walls of combustible construction and 65 feet in exterior walls of noncombustible construction. Fireblocking shall be installed at maximum vertical intervals not exceeding 10 feet in noncombustible and combustible construction.

2603.5.5.2.2 Materials. Materials used for fireblocking in exterior wall assemblies shall comply with one of the following:

1. Materials demonstrated to remain in place and that prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for a time period of 15 minutes.
2. Gypsum board having a minimum thickness of 1/2 inch (12.7 mm) provided all joints have continuous support.
3. Sheet steel not less than 26 ga (0.38 mm) thickness provided all joints have continuous support.
4. Cement-based millboard having a minimum thickness of ¼ -inch (6.4 mm).

5. Batts or blankets of mineral wool, mineral fiber or other approved materials installed in such a manner to securely remain in place.
6. Cellulose insulation installed as tested for the specific application.
7. In buildings of noncombustible construction, wood nailing and furring strips in accordance with Section 603.1
8. In buildings of combustible construction, materials listed in Section 718.2.1

2603.5.5.3 Exterior wall assemblies having all concealed spaces, including furred spaces and parallel rows of studs or staggered studs, filled with an approved material to resist the free passage of flame and products of combustion.

2603.5.5.4 Noncombustible wall assemblies. Exterior wall assemblies constructed of noncombustible material and having noncombustible insulation.

2603.5.5.5 Flame spread index. Exterior wall assemblies constructed of materials, and any insulation installed within, having flame spread index not greater than 25 when tested in accordance with ASTM E 84 or UL 723.

2603.5.5.6 Solidly filled concealed spaces. Exterior wall assemblies that are solidly filled such that there is are no concealed air spaces having a depth more than 1 inch.

Commenter's Reason: The committee felt the proposal was less restrictive than the current code without justification. Further, how to achieve the fireblocking requirements in Section 2603.5.5 was unclear.

This proposed revision provides for fireblocking reducing the areas within a wall assembly. The requirements set forth for fireblocking takes into account the various methodologies to achieve effective barriers to the passage of fire and smoke.

Exterior walls are required to be constructed with a fire resistance rating as provided by table 602.

The need to balance the requirements for fire protection with the needs for thermal protection is addressed by providing a systematic approach to limiting the vertical and lateral fire propagation within exterior wall cavities. This approach provides this protection and allows for the use of recognized effective wall insulation materials.

The original concept of applying the NFPA 285 test was designed to address a ". . . "typical" (undefined) fire scenario in which a fire occurs inside a room, vents through a window opening and exposes the wall assembly to a fire plume exiting the window opening.

"The Specific fire performance characteristics that were of concern and thus needed to be addressed were:

- Vertical and lateral flame propagation over the exterior face of the wall assembly;
- Vertical flame propagation within the combustible core, air cavities, or within combustible components from one story to the next;
- Vertical flame propagation over the interior surface of the wall assembly from one story to the next; and
- Lateral flame propagation from the compartment of fire origin to adjacent compartments or spaces.

This proposal addresses the vertical flame propagation within the combustible core containing foam plastic insulation, air cavities and within combustible components from one story to the next by limiting the space within the core cavity and providing fire blocking within the cavity space by forming an effective barrier to resist the free passage of flame and products of combustion.

FS187-12

Final Action: AS AM AMPC____ D

FS190-12
2603.10, 2603.10.1

Proposed Change as Submitted

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing The Extruded Polystyrene Foam Association (jbeitel@haifire.com)

Revise as follows:

2603.10 Special approval. Foam plastic shall not be required to comply with the requirements of Sections 2603.4, 2603.6, 2603.7 and ~~through~~ 2603.8 where specifically approved based on large-scale tests such as, but not limited to, NFPA 286 (with the acceptance criteria of Section 803.2), FM 4880, UL 1040 or UL 1715. Such testing shall be related to the actual end-use configuration and be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as interior finish on the basis of special tests shall also conform to the flame spread and smoke developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

~~**2603.10.1 Exterior walls.** Testing based on Section 2603.10 shall not be used to eliminate any component of the construction of an exterior wall assembly when that component was included in the construction that has met the requirements of Section 2603.5.5.~~

Reason: This proposal prevents using a room/corner fire test to eliminate the requirements of 2603.5. A room corner test cannot definitively determine the vertical and lateral fire propagation characteristics of an exterior wall assembly and should not be used to eliminate the need for the appropriate test namely NFPA 285. Additionally, with the proposed change, Section 2603.10.1 is no longer needed.

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

2603.10-FS-BEITEL

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

2603.10 Special approval. Foam plastic shall not be required to comply with the requirements of Sections 2603.4~~,~~ and 2603.6, ~~2603.7 and 2603.8~~ where specifically approved based on large-scale tests such as, but not limited to, NFPA 286 (with the acceptance criteria of Section 803.2), FM 4880, UL 1040 or UL 1715. Such testing shall be related to the actual end-use configuration and be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as interior finish on the basis of special tests shall also conform to the flame spread and smoke developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Committee Reason: The committee felt that limiting the exemptions allowed by the large scale testing in this section was appropriate based on the fire exposure that the large scale testing addresses. The modification further limits what the large scale testing exempts, again based on the fire exposure that the large scale testing addresses.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Tony Crimi, A.C. Consulting Solutions Inc., representing North American Insulation Manufacturers' Association (NAIMA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

2603.10 Special approval. Foam plastic shall not be required to comply with the requirements of ~~Sections~~ Section 2603.4 ~~and 2603.6~~ where specifically approved based on large-scale tests such as, but not limited to, NFPA 286 (with the acceptance criteria of Section 803.2), FM 4880, UL 1040 or UL 1715. Such testing shall be related to the actual end-use configuration and be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as interior finish on the basis of special tests shall also conform to the flame spread and smoke developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Commenter's Reason: This proposal is a further modification to the Committee action on this item. Section 2603.6 deals with foamed plastics used as roof insulations, and needs to be deleted from 2603.10 as shown. Section 2603.6 requires that foam plastic insulation meeting the requirements of Sections 2603.2, 2603.3 and 2603.4 be permitted as part of a roof-covering assembly**, provided** the assembly with the foam plastic insulation is a Class A, B or C roofing assembly where tested in accordance with ASTM E108 or UL 790. Exempting roof insulation complying with 2603.6 in 2603.10 creates a "do-loop" and causes confusion.

Furthermore, 2603.10 requires testing be related to the actual end-use configuration and be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. All of the tests in 2603.10 are interior room fire tests. None of the methods identified in 2603.10 test roofing materials from an exterior fire exposure condition.

Public Comment 2:

Timothy T Earl, GBH International, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

2603.10 Special approval. Foam plastic shall not be required to comply with the requirements of Section 2603.4 ~~and~~ or those of Section 2603.6 where specifically approved based on large-scale tests such as, but not limited to, NFPA 286 (with the acceptance criteria of Section 803.2), FM 4880, UL 1040 or UL 1715. Such testing shall be related to the actual end-use configuration and performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as interior finish on the basis of special tests shall also conform to the flame spread and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Commenter's Reason: This is simply a primarily editorial clarification. Foam plastic that passes one of the large-scale tests does not need to meet the requirements of Section 2603.4 or those of Section 2603.6. They are independent requirements and there is no need, in any application, for the foam plastic insulation materials to meet both but the word "and" might be interpreted that way.

FS190-12

Final Action: AS AM AMPC____ D

FS191-12
2603.10, 2603.10.2 (New)

Proposed Change as Submitted

Proponent: Marcelo M Hirschler, GBH International (gbhint@aol.com)

Revise as follows:

2603.10 Special approval. Foam plastic shall not be required to comply with the requirements of Sections 2603.4 through 2603.8 where specifically approved based on testing in accordance with large-scale tests such as, but not limited to, NFPA 286~~,~~ ~~(~~with the acceptance criteria of Section 803.2~~), FM 4880, UL 1040 or UL 1715~~. Such testing shall be related to the actual end-use configuration and be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as interior finish on the basis of special tests shall also conform to the flame spread and smoke developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

2603.10.1 Exterior walls. Testing based on Section 2603.10 shall not be used to eliminate any component of the construction of an exterior wall assembly when that component was included in the construction that has met the requirements of Section 2603.5.5.

2603.10.2 Listed systems. Listed foam plastics tested to FM 4880, UL 1040 and UL 1715 shall be permitted to be used for the application for which they are listed.

Reason: Of the four tests included in this section, three have been in place since the legacy codes, namely FM 4880, UL 1040 and UL 1715. None of these tests actually measure smoke obscuration, while NFPA 286 does, and that is included in the criteria of section 803.2. In the case of UL 1715 smoke obscuration is being measured, but normally only qualitatively.

The ignition sources in these legacy tests are wood cribs or wood pallets and the one in NFPA 286 is a gas burner.

In actual fact, two of these legacy tests are not really intended for testing foam plastics as interior finish but are intended for systems intended for insulated wall construction (UL 1040) or insulated roof and wall construction (FM 4880). They are also extremely severe or onerous tests, since UL 1040 uses a 764 pound wood crib and FM 4880 uses a series of wood pallets adding up to 750 pounds (340 kg). Therefore the probability of them being used for approval of foam plastics for interior finish is low.

UL 1715 is actually intended for testing interior finish materials but exposes the test specimen on two walls only (and only 8 ft of the 12 ft wall), in a corner, to a 30 pound wood crib. NFPA 286 uses the same room dimensions except that the room is actually a full room and the test specimen is placed covering three walls and the ceiling, and the ignition source is a gas burner at 40 kW and then at 160 kW, with direct heat and smoke release and flame spread measurements.

Cost Impact: None

2603.10-FS-HIRSCHLER

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Although the proponent's modification was ruled out of order the committee did recognize that some revisions to the proposal were necessary for clarification. The proponent requested disapproval based on recognition that their proposed wording needs further clarification. Further, the committee felt that the language in Section 2603.10.2 was not necessary as it simply appears to say that you are permitted to use the foam plastic as it is supposed to be used. Clarification of the intent of these provisions is required.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Marcelo M Hirschler, GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**2603.10 Special approval.** Foam plastic shall not be required to comply with the requirements of Sections 2603.4 through 2603.8 where specifically approved based on testing in accordance with large-scale tests such as, but not limited to, NFPA 286, (with the acceptance criteria of Section 803.2), FM 4880, UL 1040 or UL 1715. Such testing shall be related to the actual end-use configuration and be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as interior finish on the basis of special tests shall also conform to the flame spread and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.~~

~~**2603.10.1 Exterior walls.** Testing based on Section 2603.10 shall not be used to eliminate any component of the construction of an exterior wall assembly when that component was included in the construction that has met the requirements of Section 2603.5.5.~~

~~**2603.10.2 Listed systems.** Listed foam plastics tested to FM 4880, UL 1040 and UL 1715 shall be permitted to be used for the application for which they are listed.~~

2603.10 Special approval. Foam plastic shall not be required to comply with the requirements of Section 2603.4 or those of Section 2603.6 where specifically approved based on testing in accordance with large-scale tests. Such testing shall be related to the actual end-use configuration and performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. The large-scale tests shall be such as, but not limited to, those indicated in Sections 2603.10.1 through 2603.10.3. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

2603.10.1 Interior finish. Foam plastic approved based on testing in accordance with any one of the following sections shall be permitted for use as interior finish without a thermal barrier.

2603.10.1.1 NFPA 286. Testing in accordance with NFPA 286 with the acceptance criteria of Section 803.2;

2603.10.1.2 UL1715. Testing in accordance with UL 1715 including smoke measurements, with the total smoke released throughout the test not to exceed 1,000 m^2;

2603.10.1.3 FM4880. Testing in accordance with FM 4880, with additional testing for smoke obscuration in accordance with NFPA 286 with the total smoke released throughout the test not to exceed 1,000 m^2, as shown in Section 803.1.2.1;

2603.10.1.4 UL1040. Testing in accordance with UL 1040, with additional testing for smoke obscuration in accordance with NFPA 286 with the total smoke released throughout the test not to exceed 1,000 m^2, as shown in Section 803.1.2.1; or

2603.10.1.5 Large scale test. A large scale fire test related to a full room configuration and compliance with the flame spread and smoke developed requirements of Chapter 8.

2603.10.2 Roofing. Foam plastic used as part of a roof-covering assembly in accordance with Section 2603.6 without a thermal barrier shall be tested in accordance with NFPA 286 with the acceptance criteria of Section 803.2, FM 4880, UL 1040 or UL 1715

2603.10.3 Other applications. Foam plastic used in accordance with Sections 2603.4.1.1 through 2603.4.1.14 without the use of a thermal barrier shall be tested in accordance with NFPA 286 with the acceptance criteria of Section 803.2, FM 4880, UL 1040 or UL 1715.

Commenter's Reason: As the committee noted, there is a need for revision of this section for clarification. The following are the reasons for this proposal as modified by the present public comment.

1. The section has been subdivided for clarity depending on the application of the foam plastic, starting with the requirements for interior finish.
2. NFPA 286 is the only one of the four tests contained in the section that specifically requires the measurement of smoke quantitatively.
3. NFPA 286 is the only one of the four tests that does not have its own pass/fail criteria for either heat release or smoke release and therefore the pass/fail criteria needs to be specifically included in the code (as it is in the 2012 code also).

4. NFPA 286 is a test developed specifically to quantitatively assess heat and smoke release from interior finish materials and to indicate whether flashover occurs. It does so in a room with four walls and a ceiling and where the material to be tested is applied to three of the walls and the ceiling. The ignition source is a reproducible gas burner.
5. NFPA 286 is the only test that can assess the effect, in a room, of radiation from the ceiling and from all four walls (with material potentially burning on the ceiling and on three walls) on the fire performance of the product to be tested. It has been shown that radiation from the walls and ceilings can have a significant effect on the fire performance of materials to be used as interior finish. That is one of the reasons that Chapter 8 (section 8.3.1.2.1) of the IBC not only requires that the material not cause flashover when tested to NFPA 286 but also that the material exhibit a heat release rate not exceeding 800 kW and a total smoke released not exceeding 1,000 m^2 throughout the test.
6. FM 4880 and UL 1040 are very severe fire tests, but they are not conducted inside a compartment and do not assess smoke obscuration. The tests are of excellent applicability to assess the fire performance of foam plastics in roofing applications and in applications where the overall fire performance of the foam plastics is to be determined, such as those in sections 2603.4.1.1 through 2603.4.1.14. They do not assess radiation from walls and ceilings, which is an important issue for interior finish. They are not related, as the code requires, to the “actual use configuration” of interior finish in a room.
7. UL 1715 is a test conducted in a corner in a room with the test specimen applied to the back wall and part of one of the side walls only. The ignition source is a wood crib. The test was developed to assess qualitatively the fire performance of foam plastic materials and of thermal barriers and it does an excellent job in that respect. The test does not require quantitative assessment of the heat release or the smoke released by the material when burning in the room. Optional smoke measurement systems are included in the test and can be used to determine smoke release quantitatively, when required by the code. However past tests did not use to involve smoke measurements, which are critical for interior finish.
8. NFPA 286 is the only one of the four tests to provide the results required by section 8.3.1.2.1 on the IBC.
9. For the reasons above this public comment recommends that FM 4880, UL 1040 and UL 1715 are well suited for testing to assess foam plastics for use in (a) roofing assemblies and (b) the applications in 2603.4.1.1 through 2603.4.1.14.
10. Also, this public comment recommends that FM 4880, UL 1040 and UL 1715 be allowed to be used for assessing foam plastics as interior finish if smoke obscuration is also assessed.
11. UL 1715 can be used to quantitatively smoke obscuration, if required by the code. Therefore, for testing by both UL 1715 and NFPA 286, this comment requires the total smoke obscuration pass/fail criteria from Chapter 8.
12. With the changes above the added sentence stating that “Foam plastics that are used as interior finish on the basis of special tests shall also conform to the flame spread and smoke-developed requirements of Chapter 8.” is unnecessary for use with NFPA 286 because NFPA 286 (with the appropriate pass/fail criteria) already does that.
13. The sentence about the requirements of Chapter 8 also is unnecessary for UL 1715 because it adequately covers the flame spread requirements and, with the additional requirement for smoke, covers the smoke requirements.
14. The sentence about the requirements of Chapter 8 also is unnecessary for FM 4880 and UL 1040 when smoke is tested by NFPA 286 because they adequately cover the flame spread requirements and testing to NFPA 286 covers the smoke requirements.
15. The sentence about the requirements of Chapter 8 needs to be added only if a test other than one of these 4 standard tests is used.

FS191-12

Final Action: AS AM AMPC____ D

FS192-12
2603.11 (New), Chapter 35

<u>Proposed Change as Submitted</u>

Proponent: Jay Crandell, ARES Consulting, representing the Foam Sheathing Committee of the American Chemistry Council- Plastics Division (jcrandell@aresconsulting.biz)

THIS CODE CHANGE WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new text as follows:

<u>**2603.11 Wind Resistance.** Foam plastic insulation complying with ASTM C 578 and ASTM C 1289 and used as exterior wall sheathing on framed wall assemblies shall comply with ANSI/FS 100 for wind pressure resistance.</u>

Add new standard to Chapter 35 as follows:

<u>**Structural Building Components Association (SBCA)**</u>
<u>6300 Enterprise Lane</u>
<u>Madison, Wisconsin 53719</u>

Standard Reference number	Title	Referenced in code section
<u>ANSI/FS 100-12</u>	<u>Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies</u> ………	<u>2603.11</u>

Reason: This ANSI standard (FS 100-12) is needed to address the use of foam plastic insulating sheathing in exterior wall covering assemblies where resistance to wind pressure is required. This standard provides a methodology by which a manufacturer can qualify their product, through testing, to meet the requirements of the I-codes in establishing the wind pressure resistance of the product. It also provides for on-going quality control procedures to ensure that the product continues to meet its qualified wind pressure resistance. The ANSI standard supplements the applicable ASTM materials standards also referenced in the code change proposal. The ANSI standard was approved by the standard project committee and in process of its public comment phase at the time this proposal was due to ICC (Jan 3, 2012). The current version of the standard is available for review at www.sbcindustry.com/fs100draft. It is expected that copies of the completed ANSI standard will be available prior to the code development hearings.

As a formatting note to ICC staff, there are other proposals by the proponent dealing with separate topics for wall sheathing applications of foam sheathing and they are being proposed with the same new section number (2306.11). Presuming that this proposal passes as well as any of the others, it is the proponent's desire to have them all organized under a Section 2306.11 for wall sheathing applications of foam plastic insulation.

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

2603.11 (NEW) #1-FS-CRANDELL

Public Hearing Results

This code change was heard by the IBC Structural code development committee.

For staff analysis of the content of ANSI/FS 100-12 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2012-13cycle/Proposed-A/2012ProposedStandards.pdf.

Committee Action: **Disapproved**

Committee Reason: The committee's disapproval is based on the proposed referenced standard being an unfinished draft that is under development.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jay Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

2603.11 Wind pressure resistance. Where foam plastic insulation used in an *exterior wall covering* is not installed over a sheathing material designed and attached to independently resist 100% of the out-of-plane wind pressure in compliance with Sections 1403.3 and 1404.8, the foam plastic insulation shall be tested, qualified, monitored for quality control and labeled by an approved agency in accordance with Sections 110.4 and 1703.5 as specifically related to its intended end-use application for wind pressure resistance.

Commenter's Reason: This public comment establishes comprehensive wind pressure requirements for foam plastic insulation materials for exterior wall covering applications in a manner that is consistent with use of approved agency provisions in the IBC. This proposal is needed for the 2015 edition of the IBC as currently no specific provision exists to ensure that foam sheathing products, which are often used for energy code compliance, also comply with the building code requirement for wind pressure resistance (except the general requirements in Section 1403.3 and 1404.8). The above requirements are also consistent with an ANSI/FS 100 standard for wind pressure resistance of foam sheathing materials which was in process of resolving public ballot comments (after completing committee balloting) at the time of this writing. However, it will not be fully through the ANSI review process in time for the October final action hearing. Thus, this public comment is replacing the original proposal for adoption of ANSI/FS100 for procedural reasons and also to ensure adequate wind pressure requirements are included in the 2015 IBC. The ICC 600 committee has already taken similar preliminary action as an interim step that is far better than doing nothing.

FS192-12
Final Action: AS AM AMPC____ D

FS194 – 12

2603.11 (New), 2603.11.1 (New), Table 2603.11.1 (New), 2603.11.2 (New), Table 2603.11.2 (New)

Proposed Change as Submitted

Proponent: Jay Crandell, ARES Consulting, representing the Foam Sheathing Committee of the American Chemistry Council- Plastics Division (jcrandell@aresconsulting.biz)

THIS CODE CHANGE WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new text as follows:

2603.11 Cladding attachment over foam sheathing to steel framing. Cladding shall be specified and installed in accordance with Chapter 14 and the cladding manufacturer's installation instructions. Where used, furring and furring attachments shall be designed to resist design loads determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section 2603.11.1, 2603.11.2, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For exterior insulation and finish systems, refer to Section 1408.
3. For anchored masonry or stone veneer installed over foam sheathing; refer to Section 1405.

2603.11.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, cladding minimum fastening requirements to support the cladding weight shall be as specified in Table 2603.11.1.

TABLE 2603.11.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[1]

Cladding Fastener Through Foam Sheathing into:	Cladding Fastener -Type and Minimum Size[2]	Cladding Fastener Vertical Spacing (inches)	Maximum Thickness of Foam Sheathing[3] (inches)					
			16"oc Fastener Horizontal Spacing			24"oc Fastener Horizontal Spacing		
			Cladding Weight:			Cladding Weight:		
			3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
Steel Framing (minimum penetration of steel thickness + 3 threads)	#8 screw into 33 mil steel or thicker	6	3	3	1.5	3	2	DR
		8	3	2	0.5	3	1.5	DR
		12	3	1.5	DR	3	0.75	DR
	#10 screw into 33 mil steel	6	4	3	2	4	3	0.5
		8	4	3	1	4	2	DR
		12	4	2	DR	3	1	DR
	#10 screw into 43 mil steel or thicker	6	4	4	3	4	4	2
		8	4	4	2	4	3	1.5
		12	4	3	1.5	4	3	DR

For SI: 1 inch = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa
DR = design required
o.c. = on center

a. Steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
b. Screws shall comply with the requirements of AISI S200.
c. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C 578 or ASTM C 1289.

2603.11.2 Furred cladding attachment. Where steel or wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table 2603.11.2. Where placed horizontally, wood furring shall be preservative treated wood in accordance with Section 2303.1.8 or naturally durable wood and fasteners shall be corrosion resistant in accordance Section 2304.9.5. Steel furring shall have a minimum G60 galvanized coating.

TABLE 2603.11.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[1]

Furring Material	Framing Member	Fastener Type and Minimum Size[2]	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing[4] (inches) — 16"oc FURRING[5] Cladding Weight: 3 psf	16"oc FURRING[5] Cladding Weight: 11 psf	16"oc FURRING[5] Cladding Weight: 25 psf	24"oc FURRING[5] Cladding Weight: 3 psf	24"oc FURRING[5] Cladding Weight: 11 psf	24"oc FURRING[5] Cladding Weight: 25 psf
Minimum 33mil Steel Furring or Minimum 1x Wood Furring[3]	33 mil Steel Stud	#8 screw	Steel thickness + 3 threads	12	3	1.5	DR	3	0.5	DR
				16	3	1	DR	2	DR	DR
				24	2	DR	DR	2	DR	DR
		#10 screw	Steel thickness + 3 threads	12	4	2	DR	4	1	DR
				16	4	1.5	DR	3	DR	DR
				24	3	DR	DR	2	DR	DR
	43 mil or thicker Steel Stud	#8 Screw	Steel thickness + 3 threads	12	3	1.5	DR	3	0.5	DR
				16	3	1	DR	2	DR	DR
				24	2	DR	DR	2	DR	DR
		#10 screw	Steel thickness + 3 threads	12	4	3	1.5	4	3	DR
				16	4	3	0.5	4	2	DR
				24	4	2	DR	4	0.5	DR

For SI: 1" = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa.
DR = design required
o.c. = on center
1. Wood furring shall be Spruce-Pine-Fir or any softwood species with a specific gravity of 0.42 or greater. Steel furring shall be minimum 33 ksi steel. Steel studs shall be minimum 33 ksi steel for 33mil and 43 mil thickness and 50 ksi steel for 54 mil steel or thicker.
2. Screws shall comply with the requirements of AISI S200.
3. Where the required cladding fastener penetration into wood material exceeds ¾ inch (19.1 mm) and is not more than 1-1/2 inches (38.1 mm), a minimum 2 inch (51 mm) nominal wood furring shall be used or an approved design.
4. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C 578 or ASTM C 1289.
5. Furring shall be spaced a maximum of 24 inches (610 mm) on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8 inch (203.2 mm) and 12 inch (304.8 mm) fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches (406.4 mm) and 24 inches (610 mm) on center, respectively.

Reason: The proposed cladding connection requirements already exist in the New York State Energy Code which is based on the 2009 IECC. Similar requirements for the IECC 2012 were considered last code cycle, but it was clearly expressed that these provision are a better fit for the building code. These requirements fill an important need in the IBC provisions for exterior wall covering assemblies that include foam plastic insulation.

The proposed requirements are based on a project sponsored by the New York State Energy Research and Development Agency (NYSERDA) and the Steel Framing Alliance. The project report is available for download at http://data.memberclicks.com/site/sfa/NYSERDA_TASK_3_REPORT%20-%20FINAL_(3-22-10).pdf . The report explains the technical basis for the proposed requirements.

The purpose of the NYSERDA project was to develop prescriptive fastening requirements for cladding materials installed over foam sheathing to ensure adequate performance. The project included testing of cladding attachments through various thicknesses of foam sheathing using various fastener types on steel frame wall assemblies. Supplemental testing also was sponsored by the Foam Sheathing Coalition (lab report available at www.foamsheathing.org) to address attachments to wood framing and the resulting data is included in the data set analyzed and presented in the NYSERDA project report. The proposed cladding attachment requirements and foam sheathing thickness limits are based on rational analysis verified by the extensive test data to control cladding connection movement to no more than 0.015” slip under cladding weight or dead load. This deflection controlled approach resulted in safety factors commonly in the range of 5 to 8 relative to average shear capacity.

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

Public Hearing Results

This code change was heard by the IBC Structural code development committee.

Committee Action: Disapproved

Committee Reason: There seemed to be confusion with the proposed requirements for attaching cladding over foam sheathing to steel studs, such as test methods and whether furring included hat channels.

Assembly Action: Approved as Submitted

Individual Consideration Agenda

This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action of Approved as Submitted and a public comment was submitted.

Public Comment:

Jay Crandell, ARES Consulting, representing American Chemistry Council’s Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2603.11 Cladding attachment over foam sheathing to cold-formed steel framing. Cladding shall be specified and installed in accordance with Chapter 14 and the cladding manufacturer’s approved installation instructions, including any limitations for use over foam plastic sheathing, or an approved design. Where used, furring and furring attachments shall be designed to resist design loads determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section 2603.11.1, Section 2603.11.2, or an approved design for support of cladding weight.

(Portions of proposal not shown remain unchanged).

Commenter’s Reason: Proposal FS 194-12 as submitted received a successful assembly action at the code development hearing. The purpose of this PC is simply to make some editorial clarifications. First, it is clarified that the section applies to cold-formed steel framing. Second, the intended application of cladding manufacturer installation instructions (including any limitations for use over foam plastic sheathing) is clarified.

This PC and the proposal is based on extensive testing and analysis. It provides solutions needed to ensure building code compliant installations of cladding over foam sheathing to steel framing. The provisions in FS194 as submitted have been used successfully in the New York State energy code for nearly 2 years [1]. Technically consistent code-compliance guidance is also publicly available from the American Chemistry Council’s Foam Sheathing committee website [2].

An abbreviated version of the original research serving as the technical basis of this proposal as sponsored by the Steel Framing Alliance is also publicly available [3]. The complete NYSERDA study, including the test data and analysis supporting this proposal, also has been publicly available since 2010 [4]. In addition, several other articles, including peer-review journal papers, have addressed and confirmed solutions similar to those provided in FS 194-12. One peer-reviewed journal article which evaluated connections of cladding to steel framing using an FEA modeling and testing verification approach concluded the following [5]:

“The approach adopted in this work is in agreement with the NYSERDA report on fastening system for continuous insulation.”

In addition to the above laboratory and analytical studies, a field monitoring study quantifying the actual performance of cladding connections as well as hygrothermal and wind resistance of a continuous insulation retrofit on a multi-story building has confirmed the good performance of connections and continuous insulation within the range of conditions addressed in the FS 194 proposal [6].

Your approval of this PC will ensure that building designers have direct access to appropriate and effective solutions in the building code and that code officials have the information needed to ensure enforcement and adequate performance of energy-code compliant exterior wall covering assemblies including continuous insulation. Finally, the committee expressed confusion regarding the allowance to use “hat channels” as type of steel furring. The proposal uses the term “steel furring” purposefully to allow steel hat channels or other steel shapes as furring as long as the member is the same thickness as defined in the tables.

References:

[1] http://publicecodes.citation.com/st/ny/st/b1200v10/st_ny_st_b1200v10_4_sec002.htm
[2] http://fsc.americanchemistry.com/Building-Code/Installation-of-Cladding
[3] http://www.steelframing.org/PDF/energy/SFA_Siding_FINAL_Report_2010.pdf
[4] Fastening systems for continuous insulation, Report prepared for New York State Energy Research And Development Authority, By Newport Ventures, Inc., Final Report 10-11, April 2010.
http://www.nyserda.ny.gov/en/Publications/Research-and-Development/~/media/Files/Publications/Research/Other%20Technical%20Reports/fastening-systems-for-continuous-insulation.ashx
[5] RCI International Convention, 2011, “Three-Coat Stucco Veneer Cladding Attachment Schemes for Thick Continuous Insulation (ci) foam Based on Experimentally Validated Finite Element (fe) Modeling”
[6] Parsons, G., Hansbro, J., Buck, C., Croasdale, S. and Schwartz, J., “Structural and Hygrothermal Field Monitoring of Thick Continuously Insulated Wall Assemblies Utilized in a Multi-Story Residential Building”, Best 3 Conference, 2012.

FS194-12

Final Action: AS AM AMPC____ D

FS195-12

2603.11 (New), 2603.11.1 (New), Table 2603.11.1 (New), 2603.11.2 (New), Table 2603.11.2 (New)

Proposed Change as Submitted

Proponent: Jay Crandell, ARES Consulting, representing the Foam Sheathing Committee of the American Chemistry Council- Plastics Division (jcrandell@aresconsulting.biz)

THIS CODE CHANGE WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Add new text as follows:

2603.11 Cladding attachment over foam sheathing to wood framing. Cladding shall be specified and installed in accordance with Chapter 14 and the cladding manufacturer's installation instructions. Where used, furring and furring attachments shall be designed to resist design loads determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section 2603.11.1, 2603.11.2, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For exterior insulation and finish systems, refer to Section 1408.
3. For anchored masonry or stone veneer installed over foam sheathing, refer to Section 1405.

2603.11.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, cladding minimum fastening requirements to support the cladding weight shall be as specified in Table 2603.11.1.

TABLE 2603.11.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[1]

Cladding Fastener Through Foam Sheathing into:	Cladding Fastener -Type and Minimum Size[b]	Cladding Fastener Vertical Spacing (inches)	Maximum Thickness of Foam Sheathing[3] (inches)					
			16" o.c. Fastener Horizontal Spacing			24" o.c. Fastener Horizontal Spacing		
			Cladding Weight:			Cladding Weight:		
			3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
Wood Framing (minimum 1-1/4 inch penetration)	0.113" diameter nail	6	4	3	1	4	2	0.75
		8	4	2	0.75	4	1.5	DR
		12	4	1.5	DR	3	0.75	DR
	0.120" diameter nail	6	4	3	1.5	4	2	0.75
		8	4	2	1	4	1.5	0.5
		12	4	1.5	0.5	3	1	DR
	0.131" diameter nail	6	4	4	1.5	4	3	1
		8	4	3	1	4	2	0.75
		12	4	2	0.75	4	1	DR

For SI: 1 inch = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa
DR = design required
o.c. = on center

1. Wood framing shall be Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS.
2. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
3. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C 578 or ASTM C 1289.

2603.11.2 Furred cladding attachment. Where wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table 2603.11.2. Where placed horizontally, wood furring shall be preservative treated wood in accordance with Section 2303.1.8 or naturally durable wood and fasteners shall be corrosion resistant in accordance Section 2304.9.5.

TABLE 2603.11.2
FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[1,2]

Furring Material	Framing Member	Fastener Type and Minimum Size	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing[4] (inches)					
					16"oc FURRING[5]			24"oc FURRING[5]		
					Cladding Weight:			Cladding Weight:		
					3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
Minimum 1x Wood Furring[3]	Minimum 2x Wood Stud	0.120" diameter nail	1-1/4	8	4	4	1.5	4	2	1
				12	4	2	1	4	1.5	0.5
				16	4	2	0.5	4	1	DR
		0.131" diameter nail	1-1/4	8	4	4	2	4	3	1
				12	4	3	1	4	2	0.75
				16	4	2	0.75	4	1.5	DR
		#8 wood screw[5]	1	12	4	4	1.5	4	3	1
				16	4	3	1	4	2	0.5
				24	4	2	0.5	4	1	DR
		¼" lag screw[5]	1-1/2	12	4	4	3	4	4	1.5
				16	4	4	2	4	3	1
				24	4	3	1	4	2	0.5

For SI: 1" = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa.
DR = design required
o.c. = on center
1. Wood framing and furring shall be Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS.
2. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
3. Where the required cladding fastener penetration into wood material exceeds ¾ inch (19.1 mm) and is not more than 1-1/2 inches (38.1 mm), a minimum 2x wood furring shall be used or an approved design.
4. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C 578 or ASTM C 1289.
5. Furring shall be spaced a maximum of 24 inches (610 mm) on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8 inch (203.2 mm) and 12 inch (304.8 mm) fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches (406.4 mm) and 24 inches (610 mm) on center, respectively.

Reason: These siding connection requirements already exist in the New York State Energy Code which is based on the 2009 IECC. Similar requirements for the IECC 2012 were denied last year mainly because it was felt that they belonged in the building code, not the energy code. These requirements fill an information gap in the IBC provisions for exterior wall covering assemblies that include foam plastic insulation. This proposal is coordinated with other proposed changes to Chapter 14 and Chapter 26 to ensure related code provisions are properly linked and addressed. Separate proposals address connection to other wall framing materials.

The proposed requirements are based on a project sponsored by the New York State Energy Research and Development Agency (NYSERDA). The project report is available for download at http://data.memberclicks.com/site/sfa/NYSERDA_TASK_3_REPORT%20-%20FINAL_(3-22-10).pdf . The report explains the technical basis for the proposed requirements.

The purpose of the NYSERDA project was to develop prescriptive fastening requirements for cladding materials installed over foam sheathing to ensure adequate performance. The project included testing of cladding attachments through various thicknesses of foam sheathing using various fastener types on steel frame wall assemblies. Supplemental testing also was sponsored by the Foam Sheathing Coalition (lab report available at www.foamsheathing.org) to address attachments to wood framing and the resulting data is included in the data set analyzed and presented in the NYSERDA project report. The proposed cladding attachment requirements and foam sheathing thickness limits are based on rational analysis verified by the extensive test data to control cladding connection movement to no more than 0.015” slip under cladding weight or dead load. This deflection controlled approach resulted in safety factors commonly in the range of 5 to 8 relative to average shear capacity. Similar tests by other independent parties, such Wiss, Janey, & Elsner (unpublished data) and also Building Science Corporation for DOE’s Building America program (report pending) have shown similar results or demonstrate that this proposal has erred to the conservative.

Three separate proposals for wood , steel, and concrete/masonry wall applications have been prepared to ensure that these different applications are considered independently. If one or more these proposals are approved, the proponent will work with ICC staff to resolve duplicative formatting/numbering of the proposed new code sections.

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

2603.11 (NEW) #4-FS-CRANDELL

Public Hearing Results

This code change was heard by the IBC Structural code development committee.

Committee Action: **Disapproved**

Committee Reason: The committee felt there was not sufficient justification and question if there was peer review of the report that was referred to. The proposal could have been more compelling with testimony in support from the wood industry.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jay Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2603.11 Cladding attachment over foam sheathing to wood framing. Cladding shall be specified and installed in accordance with Chapter 14 and the cladding manufacturer’s approved installation instructions, including any limitations for use over foam plastic sheathing, or an approved design. Where used, furring and furring attachments shall be designed to resist design loads determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section 2603.11.1, Section 2603.11.2, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For exterior insulation and finish systems, refer to Section 1408.
3. For anchored masonry or stone veneer installed over foam sheathing, refer to Section 1405.

TABLE 2603.11.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[1]

Cladding Fastener Through Foam Sheathing into:	Cladding Fastener Type and Minimum Size[b]	Cladding Fastener Vertical Spacing (inches)	Maximum Thickness of Foam Sheathing[3] (inches)					
			16” o.c. Fastener Horizontal Spacing			24” o.c. Fastener Horizontal Spacing		
			Cladding Weight:			Cladding Weight:		
			3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
Wood Framing (minimum 1-1/4 inch penetration)	0.113” diameter nail	6	2 ~~4~~	2 ~~3~~	1	2 ~~4~~	2	0.75
		8	2 ~~4~~	2	0.75	2 ~~4~~	1.5	DR
		12	2 ~~4~~	1.5	DR	2 ~~3~~	0.75	DR
	0.120” diameter nail	6	3 ~~4~~	3	1.5	3 ~~4~~	2	0.75

Cladding Fastener Through Foam Sheathing into:	Cladding Fastener Type and Minimum Size[b]	Cladding Fastener Vertical Spacing (inches)	Maximum Thickness of Foam Sheathing[3] (inches)					
			16" o.c. Fastener Horizontal Spacing			24" o.c. Fastener Horizontal Spacing		
			Cladding Weight:			Cladding Weight:		
			3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
		8	3 4	2	1	3 4	1.5	0.5
		12	3 4	1.5	0.5	3	1	DR
	0.131" diameter nail	6	4	4	1.5	4	3	1
		8	4	3	1	4	2	0.75
		12	4	2	0.75	4	1	DR

For SI: 1 inch = 25.4 mm; 1 pound per square foot (psf) = 0.0479 kPa
DR = design required
o.c. = on center

TABLE 2603.11.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[1,2]

Furring Material	Framing Member	Fastener Type and Minimum Size	Minimum Penetration into Wall Framing (inches)	Fastener Spacing in Furring (inches)	Maximum Thickness of Foam Sheathing[4] (inches)					
					16"oc FURRING[5]			24"oc FURRING[5]		
					Cladding Weight:			Cladding Weight:		
					3 psf	11 psf	25 psf	3 psf	11 psf	25 psf
Minimum 1x Wood Furring[3]	Minimum 2x Wood Stud	0.120" diameter nail	1-1/4	8	2 4	2 4	1.5	2 4	2	1
				12	2 4	2	1	2 4	1.5	0.5
				16	2 4	2	0.5	2 4	1	DR
		0.131" diameter nail	1-1/4	8	4	4	2	4	3	1
				12	4	3	1	4	2	0.75
				16	4	2	0.75	4	1.5	DR
		#8 wood screw[5]	1	12	3 4	3 4	1.5	3 4	3	1
				16	3 4	3	1	3 4	2	0.5
				24	3 4	2	0.5	3 4	1	DR
		¼" lag screw[5]	1-1/2	12	4	4	3	4	4	1.5
				16	4	4	2	4	3	1
				24	4	3	1	4	2	0.5

(No change to footnotes)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This public comment requests approval as modified of FS 195 and addresses substantive comments received at the hearing and from the CDC. First, one comment was a practical concern with the available lengths of the smaller diameter fasteners. This concern is addressed in the table revision proposed with this PC. In addition, the permitted foam thicknesses for a given fastener diameter have been adjusted to not exceed the limits of the experimental data addressed below even though justified by analysis. In addition, the intended application of cladding manufacturer's installation instructions is clarified to draw attention to limitations of use over foam plastic sheathing.

Second, the CDC expressed concern with technical justification of the proposal. The research, testing, and analysis work is substantial and has been subject to review and scrutiny as explained below. The fastening requirements have also passed the test of practical use on many projects.

The research supporting FS 195 has been available for public review for a couple of years and is published by the New York State Energy Research and Development Agency, NYSERDA [1]. The testing and analysis of data followed criteria consistent with the wood industry design standard, NDS, referenced in the IBC and also used a test procedure consistent with that used by the USDA Forest Product Laboratory in development and confirmation of connection design provision in the NDS and more specifically for gapped connections with foam in the joints (as also tested by USDA Forest Products Lab) and included in the AWC/TR12 document providing technical substantiation for the NDS connection design equations. Furthermore, these same prescriptive solutions have been in successful use in the New York State energy code [2] and are included in a code-compliance guide used by building designers to fill the absence of information in the building code [3]. In addition, these cladding and continuous insulation connection provisions will facilitate energy code compliance with a new wood building system approved at the first hearing , namely the Cross Laminated Timber (CTL) wall construction technology (refer to approved proposal S250-12). Other sources, such as WJE, have conducted independent tests confirming the results of the NYSERDA work. Finally, on-going testing to expand upon this work by DOE and Building Science Corporation has confirmed these provisions or found them to be conservative [4].

Your approval of this public comment will ensure that appropriate and enforceable provisions are included in the building code to address a growing need in the IBC to coordinate with requirements in the IECC for use of continuous insulation as a means of energy code compliance.

References:

[1] Fastening systems for continuous insulation, Report prepared for New York State Energy Research And Development Authority, By Newport Ventures, Inc., Final Report 10-11, April 2010.
http://www.nyserda.ny.gov/en/Publications/Research-and-Development/~/media/Files/Publications/Research/Other%20Technical%20Reports/fastening-systems-for-continuous-insulation.ashx
[2] http://publicecodes.citation.com/st/ny/st/b1200v10/st_ny_st_b1200v10_4_sec002.htm
[3] http://fsc.americanchemistry.com/Building-Code/Installation-of-Cladding
[4] Baker, P. (2012) T02 7.2.3 External Insulation of Masonry Walls & Wood Framed Walls: Final Report, U.S. Department of Energy, Building Technologies Program, prepared by Building Science Corporation.

FS195-12

Final Action: AS AM AMPC____ D

FS199-12
202, 720.2.1, 2614 (New)

Proposed Change as Submitted

Proponent: Ken Sagan, NRG Code Advocates, representing Reflective Insulation Manufacturers Association International (KEN@NRGCODEADVOCATES.COM)

Add new definition as follows:

Radiant Barrier. A material having a low emittance surface (0.1 or less) and when installed in building assemblies, the low emittance surface shall face a ventilated or unventilated air space.

Revise as follows:

720.2.1 Facings. Where such materials are installed in concealed spaces in buildings of Type III, IV or V construction, the flame spread and smoke-developed limitations do not apply to facings, coverings, and layers of reflective foil insulation that are installed behind and in substantial contact with the unexposed surface of the ceiling, wall or floor finish.

Exceptions:

1. All layers of single and multilayer reflective plastic core insulation shall comply with Section 2613.
2. All radiant barrier with plastic core shall comply with Section 2614.

Add new text as follows:

SECTION 2614
RADIANT BARRIER with PLASTIC CORE

2614.1 General. The provisions of this section shall govern the requirements and uses of radiant barrier with plastic core in buildings and structures. Radiant barrier with plastic core shall comply with the requirements of Section 2614.2 and with Section 2614.3 or 2614.4.

2614.2 Identification. Packages and containers of radiant barrier with plastic core delivered to the job site shall show the manufacturers or supplier's name, product identification and information sufficient to determine that the end use will comply with code requirements.

2613.3 Surface-burning characteristics. Radiant barrier with plastic core shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 when tested in accordance with ASTM E84 or UL 723. The radiant barrier with plastic core shall be tested at the maximum thickness intended for use. Test specimen preparation and mounting shall be in accordance with ASTM E2599.

Exception: Does not apply to radiant barrier applied to structural sheathing.

2613.4 Room corner test heat release. Radiant barrier with plastic core shall comply with the acceptance criteria of Section 803.1.2.1 when tested in accordance with NFPA 286 or UL 1715 in the manner intended for use and at the maximum thickness intended for use.

Exception: Does not apply to radiant barrier applied to structural sheathing.

Reason: Product design innovations have resulted in a radiant barrier product configuration that requires the same treatment as *reflective plastic core insulation* as it pertains to flame/smoke safety. This proposal will require the same flame/smoke requirements for radiant barriers to be the same established by UL 723 or ASTM E84 as documented in Section 2613.3.

This proposal is intended to establish a new section on radiant barriers without the confusion as to whether the material is a radiant barrier or an insulator. The sections in chapter 26 address different types of plastic. In order to be consistent with the previous actions in this chapter, this proposal adds another plastic based product used in the construction industry that will be defined and approved for use. Product design innovations have resulted in a radiant barrier product configuration that requires the same treatment as reflective plastic core insulation as it pertains to flame/smoke safety – these products also contain plastic cores. As far back as the 1970s, sheets of metalized polyester called space blankets have been commercially available as a means to prevent hypothermia and other cold weather injuries. Because of their durability and light weight, these blankest are popular for survival and first aid applications. Swarms of people can be seen draped in reflective metalized film after a marathon, especially where the temperatures are particularly cold, like during the annual ING New York City marathon which takes place in the fall. In other words, aluminum is a good heat reflector and a bad heat radiator.

Radiant Barrier Systems (RBS) is a mature energy-saving technology having first been evaluated in the late 1950s (Joy, 1958).

Aluminum foil or metalized films, are the operative materials in many radiant barrier products. They have two physical properties of interest. First, they reflect thermal radiation very well. Second, they emit (gives off) very little heat. Most innovations now are materials related. For instance, industry has recently begun to manufacture roof plywood decking with a radiant barrier already adhered to its underside. Although reducing labor costs for new construction, it has little application to a retrofit technology. Probably the greatest potential for performance enhancement comes from proper installation. Proper installation of radiant barrier systems are covered in design notes from Florida Solar Energy Center (Fairey, 1984) and from ASTM standard C-1158.

Radiant Barriers can be incorporated into window treatments, roofs and attics, and walls. Wrapping a house with radiant barrier can result in a 10% to 20% reduction in the tonnage of air conditioning system requirement, and save both energy and construction costs.

Ingrid Melody and her publication: Radiant Barriers: A Question and Answer Primer address the proper use and applications of radiant barriers, the energy savings and case studies where radiant barriers have been evaluated.
http://www.fsec.ucf.edu/en/publications/html/fsec-en-15/

Results from a recent comprehensive field monitoring study conducted for Florida Power Corporation (FPC) by FSEC on the performance of attic radiant barrier systems in central Florida homes may be viewed by reading "FPC Residential Monitoring Project: New Technology Development - Radiant Barrier Pilot Project".
http://www.fsec.ucf.edu/en/publications/pdf/FSEC-DN-6-86.pdf
http://www.fsec.ucf.edu/en/publications/pdf/FSEC-DN-7-84.pdf
Additional Reference material by Florida Solar Energy Center:

References:

ASTM C1313/C1313M-10 Standard Specification for Sheet Radiant Barriers for Building Construction Applications
C1744-10 Practice for Installation and Use of Radiant Barrier Systems (RBS) in Commercial/Industrial Building Construction

Selected References:

Danny S. Parker , Jeffrey K. Sonne , John R. Sherwin " Flexible Roofing Facility: 2002 Summer Test Results", Prepared for: U.S. Department of Energy Building Technologies Program, July 2003

Parker, D., Sherwin, J., "Comparative Summer Attic Thermal Performance of Six Roof Contructions," The 1998 ASHRAE Annual Meeting, Toronto, Canada, June 20-24, 1998.

Parker, D., Sherwin, J., Sonne, J., Barkaszi, S., Floyd, D., Withers, C., "Measured Energy Savings of a Comprehensive Retrofit in an Existing Florida Residence," For the Florida Energy Office, December, 1997

Fairey, P., "Designing and Installing Radiant Barrier Systems," FSEC-DN-7, Florida Solar Energy Center, Cape Canaveral, FL, 1984.

Fairey, P., "Effects of Infrared Radiation Barriers on the Effective Thermal Resistance of Building Envelopes," proceedings of the ASHRAE/DOE Conference on Thermal Performance of the Exterior Envelopes of Buildings II, Las Vegas, NV, December 1982.

Fairey, P., "The Measured Side-by-Side Performance of Attic Radiant Barrier Systems in Hot-Humid Climates," proceedings of the 19th International Thermal Conductivity Conference, Cookeville, TN, October 1985.

Fairey, P., "Radiant Energy Transfer and Radiant Barrier Systems in Buildings," FSEC-DN-6, Florida Solar Energy Center, Cape Canaveral, FL, 1984.

Joy, F.A., "Improving Attic Space Insulating Values," **ASHAE Transactions,** Vol.64, 1958.

"Radiant Barriers: How They Work and How to Install Them," videotape, FSEC Producer, Cape Canaveral, FL, 1986.

Van Stratten, J.F., **Thermal Performance of Buildings,** New York: Elsevier Publishing, 1967.

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

720.1-FS-SAGAN-2614 (NEW)-FS-SAGAN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee did not understand why these requirements were necessary if there was no difference between a reflective plastic core and a radiant barrier with a plastic core. Also, if there was no difference between the two the added exceptions do not make sense and need clarification. Further, several locations of unclear or unenforceable language were identified, such as: “shall govern” in Section 2614.1 might be better as “shall comply”; “delivered to the job site” in Section 2614.2 seems necessary as the packages may be delivered someplace other than the jobsite; also, it is not clear who determines the “maximum thickness intended for use” as indicated in 2614.3, which could be an enforcement issue.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Marcelo M Hirschler, GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Section 202 - Definitions
Radiant Barrier. A material having a low emittance surface of ~~(~~0.1 or less~~)~~ ~~and when~~ installed in building assemblies~~, the low emittance surface shall face a ventilated or unventilated air space~~.

Revise as follows:

720.2.1 Facings. Where such materials are installed in concealed spaces in buildings of Type III, IV or V construction, the flame spread and smoke-developed limitations do not apply to facings, coverings, and layers of reflective foil insulation that are installed behind and in substantial contact with the unexposed surface of the ceiling, wall or floor finish.

Exceptions:

1. All layers of single and multilayer reflective plastic core insulation shall comply with Section 2613.
2. All radiant barrier with plastic core shall comply with Section 2614.

Revise as follows:

SECTION 2614
RADIANT BARRIER with PLASTIC CORE

2614.1 General. ~~The provisions of this section shall govern the requirements and uses of radiant barrier with plastic core in buildings and structures. Radiant barrier with plastic core shall comply with the requirements of Section 2614.2 and with Section 2614.3 or 2614.4.~~ Radiant barrier with plastic core shall comply with the provisions of 2614.2 through 2614.4.

2614.2 Identification. ~~Packages and containers of radiant barrier with plastic core delivered to the job site shall show the manufacturers or supplier's name, product identification and information sufficient to determine that the end use will comply with code requirements.~~ Packages and containers of radiant barrier with plastic core shall show the manufacturer's or supplier's name, product identification and manufacturer's installation instructions.

2614.3 Installation. Radiant barrier with plastic core shall be installed suspended. The radiant barrier shall not be laminated to a substrate.

~~**2614.3 Surface-burning characteristics.** Radiant barrier with plastic core shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 when tested in accordance with ASTM E84 or UL 723. The radiant barrier with plastic core shall be tested at the maximum thickness intended for use. Test specimen preparation and mounting shall be in accordance with ASTM E2599.~~

~~**Exception:** Does not apply to radiant barrier applied to structural sheathing.~~

~~**2614.4 Room corner test heat release.** Radiant barrier with plastic core shall comply with the acceptance criteria of Section 803.1.2.1 when tested in accordance with NFPA 286 or UL 1715 in the manner intended for use and at the maximum thickness intended for use.~~

~~**Exception:** Does not apply to radiant barrier applied to structural sheathing.~~

<u>**2614.4 Fire Testing.** Radiant barrier with plastic core shall comply with either of the following fire testing methods:</u>

<u>**2614.4.1 Surface burning characteristics.** Radiant barrier with plastic core shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 when tested in accordance with ASTM E84 or UL 723. The test specimen preparation and mounting requirements shall be in accordance with ASTM E2599.</u>

<u>**2614.4.2 Room corner test heat release.** Radiant barrier with plastic core shall comply with the acceptance criteria of Section 803.1.2.1 when tested in accordance with NFPA 286.</u>

Commenter's Reason: There are differences between a reflective insulation and a radiant barrier, even if there are many similarities and the fire testing is similar. For example, one difference is that a radiant barrier often does not provide thermal insulation. ASTM has issued separate specifications for radiant barriers used in buildings (ASTM C1313, Standard Specification for Sheet Radiant Barriers for Building Construction Applications) and for reflective insulations used in buildings (ASTM C1224, Standard Specification for Reflective Insulation for Building Applications). Another key issue is that radiant barriers can be laminated to a substrate. With regard to fire testing it is important to ensure that radiant barriers that are laminated to a substrate must be fire tested as a system, including the substrate. If a system consisting of a radiant barrier and a substrate are tested, ASTM E2599 is not an appropriate mounting method. There is a companion proposal, S51, dealing with radiant barriers above roofing decks, and it proposes the same definition as this one. The proposals can be handled independently and are not a function of each other.

This modification makes the following changes:

1. It clarifies that the new section 2614 applies only to installation of radiant barriers without a substrate (as shown in the installation section 2614.3).
2. It cleans up the definition by simply explaining what a radiant barrier is. Definitions need not tell users how to install products.
3. It eliminates incorrect exceptions, as the committee suggested.
4. It does what the committee asked for in that it replaces "shall govern" by "shall comply" in 2614.2.
5. It does what the committee asked for in that it eliminates the statement about the "maximum thickness intended for use" in the sections regarding testing.
6. It provides a section parallel to that on reflective insulation, but not identical to it.

Radiant barriers used in construction are specifically covered by ASTM C1313 (Standard Specification for Sheet Radiant Barriers for Building Construction Applications). The abstract of ASTM C1313 reads as follows: "This specification covers the general physical property requirements of radiant barrier materials for use in building construction. The scope is specifically limited to requirements for radiant barrier sheet materials that consist of at least one surface, such as metallic foils or metallic deposits mounted or unmounted on substrates. Sheet radiant barrier materials shall consist of low emittance surface(s) that may be in combination with any substrates and adhesives required to meet the specified physical material properties. The following test methods shall be performed: surface emittance; water vapor transmission; surface burning characteristics; corrosivity; tear resistance; and adhesive performance."

On the other hand, reflective insulation is covered by ASTM C1224 (Standard Specification for Reflective Insulation for Building Applications). The abstract of ASTM C1224 reads as follows: "This specification covers the general requirements and physical properties of reflective insulations for use in building applications. These insulation materials consist of one or more low emittance surfaces, such as metallic foil or metallic deposits, unmounted or mounted on substrates. Reflective insulation materials shall consist of low emittance surface(s) with, or without, substrates and adhesives required to meet the specified thermal performance and physical properties. The physical properties of reflective insulation are presented in details. The emittance, permeance, surface burning characteristics, humidity resistance, fungi resistance, thermal performance of reflective insulation shall be tested to meet the requirements prescribed."

Public Comment 2:

Vickie Lovell, InterCode Incorporated, representing Reflective Insulation Manufacturers Association International, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

SECTION 202
DEFINITIONS

<u>**RADIANT BARRIER.** A material having a low emittance surface of 0.1 or less installed in building assemblies.</u>

720.2.1 Facings. Where such materials are installed in concealed spaces in buildings of Type III, IV or V construction, the flame spread and smoke-developed limitations do not apply to facings, coverings, and layers of reflective foil insulation that are installed behind and in substantial contact with the unexposed surface of the ceiling, wall or floor finish.

Exceptions:

1. All layers of single and multilayer reflective plastic core insulation shall comply with Section 2613.
2. All radiant barrier with plastic core shall comply with Section 2614.

Delete and substitute as follows:

SECTION 2614
RADIANT BARRIER WITH PLASTIC CORE

2614.1 General. Radiant barrier with plastic core shall comply with the provisions of 2614.2 through 2614.4

2614.2 Installation. Radiant barrier with plastic core shall be installed suspended. The radiant barrier with plastic core shall not be laminated to a substrate.

2614.3 Identification. Packages and containers of radiant barrier with plastic core shall show the manufacturer's or supplier's name, product identification, and manufacturer's installation instructions.

2614.4 Fire Testing. Radiant barrier with plastic core shall comply with either of the following fire testing methods:

1. Surface-burning characteristics. Radiant barrier with plastic core shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 when tested in accordance with ASTM E84 or UL 723. The test specimen preparation and mounting requirements shall be in accordance with ASTM E2599.
2. Room corner test heat release. Radiant barrier with plastic core shall comply with the acceptance criteria of Section 803.1.2.1 of this code when tested in accordance with NFPA 286 or UL 1715.

Commenter's Reason: As was stated in the original proposal, this code change was intended to establish a new section on radiant barrier to distinguish between radiant barrier and reflective insulation. This proposal does not address reflective plastic core insulation. It is already addressed in IBC Section 2613.

To clarify, the difference between reflective insulation and radiant barriers is that radiant barriers are installed in attic systems with performance measured in reduction of heat flow. Reflective insulations are installed in building assemblies and have R values. Radiant barrier and reflective insulations have certain commonalities. There are differences between a reflective insulation and a radiant barrier. Due to their dissimilarities they are used in different applications, are installed differently, and are tested differently.

For example, one difference is that a radiant barrier often does not provide thermal insulation. ASTM has issued separate specifications for radiant barriers used in buildings (ASTM C1313, Standard Specification for Sheet Radiant Barriers for Building Construction Applications) and for reflective insulations used in buildings (ASTM C1224, Standard Specification for Reflective Insulation for Building Applications).

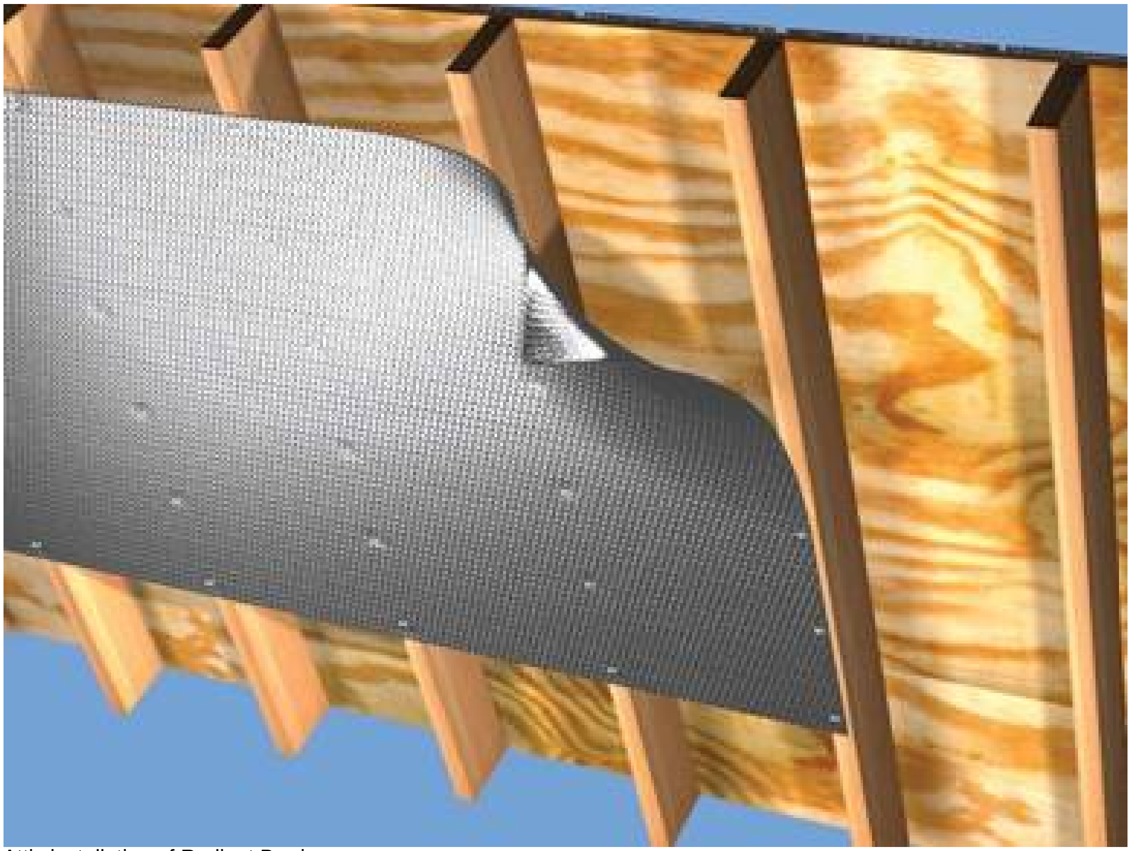
Another key issue is that radiant barriers can be laminated to a substrate. With regard to fire testing it is important to ensure that radiant barriers that are laminated to a substrate must be fire tested as a system, including the substrate. If a system consisting of a radiant barrier and a substrate are tested, ASTM E2599 is not an appropriate mounting method.

Radiant barriers used in construction are specifically covered by ASTM C1313 (Standard Specification for Sheet Radiant Barriers for Building Construction Applications). The abstract of ASTM C1313 reads as follows: "This specification covers the general physical property requirements of radiant barrier materials for use in building construction. The scope is specifically limited to requirements for radiant barrier sheet materials that consist of at least one surface, such as metallic foils or metallic deposits mounted or unmounted on substrates. Sheet radiant barrier materials shall consist of low emittance surface(s) that may be in combination with any substrates and adhesives required to meet the specified physical material properties. The following test methods shall be performed: surface emittance; water vapor transmission; surface burning characteristics; corrosivity; tear resistance; and adhesive performance."

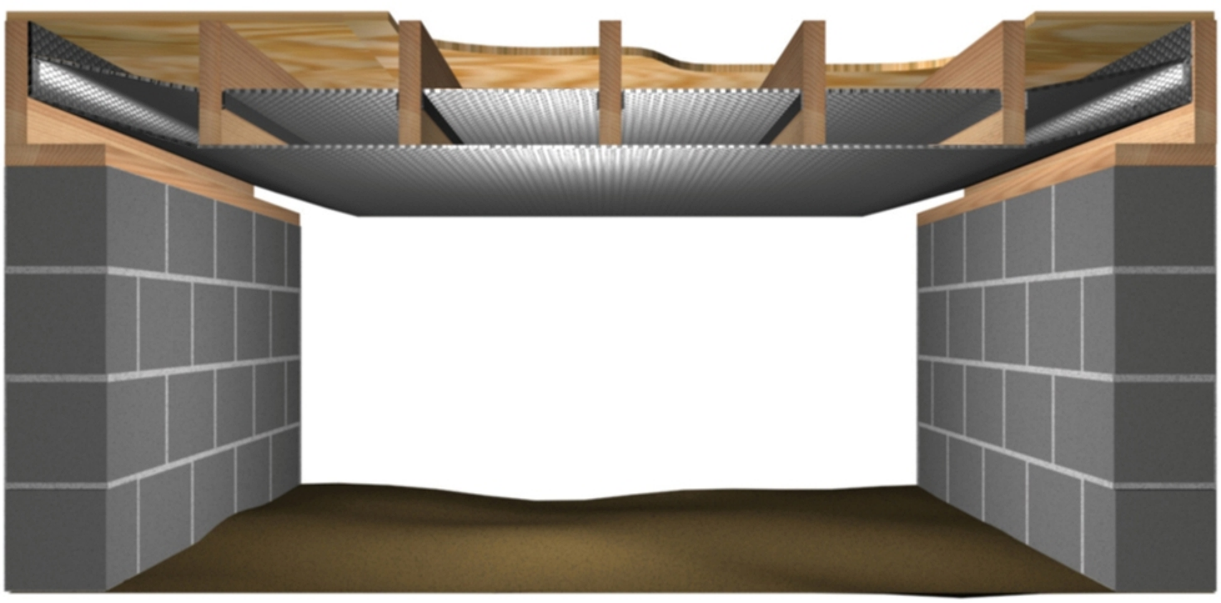
On the other hand, reflective insulation is covered by ASTM C1224 (Standard Specification for Reflective Insulation for Building Applications). The abstract of ASTM C1224 reads as follows: "This specification covers the general requirements and physical properties of reflective insulations for use in building applications. These insulation materials consist of one or more low emittance surfaces, such as metallic foil or metallic deposits, unmounted or mounted on substrates. Reflective insulation materials shall consist of low emittance surface(s) with, or without, substrates and adhesives required to meet the specified thermal performance and physical properties. The physical properties of reflective insulation are presented in details. The emittance, permeance, surface burning characteristics, humidity resistance, fungi resistance, thermal performance of reflective insulation shall be tested to meet the requirements prescribed."

This modification makes the following changes:

1. It clarifies that the new section 2614 applies only to installation of radiant barriers without a substrate (as shown in the installation section 2614.2).
2. It cleans up the definition by simply explaining what a radiant barrier is. Definitions need not tell users how to install products.
3. It eliminates incorrect exceptions, as the committee suggested.
4. It does what the committee asked for in that it replaces "shall govern" by "shall comply" in 2614.1.
5. It does what the committee asked for in that it eliminates the statement about the "maximum thickness intended for use" in the sections regarding testing.
6. It provides a section parallel to that on reflective insulation, but not identical to it.



Attic installation of Radiant Barrier
Installed on the underside of the rafters



Crawl Space with Reflective Insulation
Installed between and underside of joists - R-21

The exceptions in the original proposal related to testing to ASTM E 2599 applied to radiant barrier with plastic core, and do not apply to radiant barrier laminated to structural sheathing. However, the original proposal was not clear on that point. This public comment removes those exceptions, and clarifies how radiant barrier with plastic core shall be tested.

FS199-12

Final Action: AS AM AMPC____ D

G13-12
202

Proposed Change as Submitted

Proponent: Gene Boecker, Code Consultants, Inc., representing self

Revise as follows:

HIGH-RISE BUILDING. A building with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access. <u>In determining the lowest level of fire department vehicle access, it shall not be required to consider recessed loading docks for four vehicles or less and conditions where topography makes access from the fire department vehicle to the building impractical or impossible.</u>

Reason: Add to the definition the same exception as is found in exception #5 to Section 905.3.1. Section 905.3.1 provides two reasonable clarifications of how the lowest level of fire department vehicle access should be determined. This should also be applied in this case as part of the definition for a high-rise building. A small loading dock should not be the factor that causes a building to be considered high rise. Nor should a building be considered high rise where the structure is only four stories in height but has one side that overlooks a ravine with a road at the bottom.

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

202-E-HIGH-RISE-BOECKER (2)

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved due to concerns with the term “recessed” and questions with why the number 4 was chosen. Also there was concern that it would be hard to exclude from perimeter requirements in addressing frontage. Conflicting language of the proposed revision is confusing. There was concern with mandating that this be allowed with the terms “shall not be required.” The terms “impractical” and “impossible” were also concerning in terms of the ability to enforce in this application as compared to the standpipe requirements of Section 905.3.1 exception 5.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gene Boecker, AIA, Code Consultants, Inc. (CCI), requests Approval as Submitted.

Commenter’s Reason: The reason stated by the committee for disapproval was that there appeared to be problems with the language. As stated in the original proposal, the language is taken directly from the existing exception #5 to Section 905.3.1. Having checked with staff, there do not appear to be any problems with the interpretation of the language, nor was there any testimony in opposition to the proposal stating that there were interpretation problems with the current exception to Section 905.3.1. It uses the same factors in its language. The loading dock recess should not be a driving factor in determining whether or not a building is categorized as high-rise.

It is unclear how to respond to a question regarding what the terms “recessed,” “Impractical,” and “impossible” means when the use of the word has been in the code for the last three cycles. An example was used in the original reason statement: a four story building with a single basement sitting next to a ravine. At the bottom of the ravine is a small dirt road that is by way of travel a half mile from the parking lot in front of the building at the top of the ravine. From the dirt road level to the top occupiable floor is 76 feet. Although the dirt road is technically a level where a fire department vehicle can drive, it does not lend itself to useful fire fighting operations. Hence, it becomes a “conditions where topography makes access from the fire department vehicle to the building impractical or impossible.”

There are many other examples that can be used. However, the issue with identifying the special needs for a high-rise building, have to do with the overall aspects of the structure and the inability of fire fighters to reach the outside of the building easily with typical fire apparatus. A four story building as noted, does not meet that test. Another aspect is the ability for occupants to egress quickly.

The code official is the individual responsible for interpreting the code. A “reasonable” person will understand what the intent with a high-rise classification is; and, the code official has the authority (and responsibility) to interpret the text. However, these tools for evaluation have not been previously incorporated into the code. This text, mirroring the language used to evaluate fire department standpipe needs, provides the language. If there isn’t a problem with the standpipe language, there isn’t a problem with this proposed language.

G13-12

Final Action: AS AM AMPC____ D

G15-12
202

Proposed Change as Submitted

Proponent: William Koffel, P.E., Koffel Associates, representing Firestop Contractors International Association (wkoffel@koffel.com)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTEE.

Revise as follows:

JOINT. The opening in or between adjacent assemblies that interrupts the continuity of a fire-rated or smoke-rated assembly and either involves the intersection of dissimilar materials or assemblies, is created due to building tolerances, or is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

Reason: The test of a fire resistance rated assembly involves testing the joints within the assembly. However, the edges of the assembly are not evaluated in the same manner. Thermocouples are not placed within 12 inches of the edges of the assembly unless an element of the assembly is located only near the edge of the assembly. In addition to the current concept, that a joint is created due to building tolerances or to allow independent movement, an additional situation would also be considered a joint. If a fire resistance rated gypsum wall assembly intersects with a concrete masonry wall assembly, the intersection would now be considered a joint.

Cost Impact: Increased cost of construction where joints are currently not being properly protected

202-JOINT-G-KOFFEL

Public Hearing Results

This code change was heard by the IBC Fire Safety code development committee.

Committee Action: **Disapproved**

Committee Reason: The proposed definition relates to joints in fire resistance rated or smoke-rated assemblies. There are also joint requirements for non-fire resistance rated assemblies in the code; therefore the definition should include these. Further, the term “dissimilar materials” is subjective and could lead to enforcement problems.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

William E. Koffel, P.E., Koffel Associates, Inc., representing Firestop Contractors International Association (FCIA) requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

715.1 General. Joints that interrupt the continuity of ~~installed in or between~~ fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved fire-resistant joint system designed to resist the passage of fire for a time period not less than the required fire-resistance rating of the wall, floor or roof in or between which it is installed. Fire-resistant joint systems shall be tested in accordance with Section 715.3.

Exception: (Exceptions to remain unchanged)

Commenter's Reason: The concept of interrupting the continuity of the rated assembly was introduced in G15-12 to be included in the definition of a joint. Opposing testimony indicated that the definition of "joint" applies more broadly, and not just to joints in fire-rated assemblies. As such, the proposed text has been proposed to be included in Section 715.1.

The test of a fire resistance rated assembly involves testing the joints within the assembly. However, the edges of the assembly are not evaluated in the same manner. Thermocouples are not placed within 12 inches of the edges of the assembly unless an element of the assembly is located only near the edge of the assembly. For this reason, when the continuity of the rated assembly is not maintained, the listed joint system should be provided to maintain the fire resistance rating of the assembly.

Public Comment 2:

William E. Koffel, P.E., Koffel Associates, Inc., representing Firestop Contractors International Association (FCIA) requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

715.1 General. Joints that involve dissimilar materials in ~~installed in or between~~ fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved fire-resistant joint system designed to resist the passage of fire for a time period not less than the required fire-resistance rating of the wall, floor or roof in or between which it is installed. Fire-resistant joint systems shall be tested in accordance with Section 715.3.

Exception: (Exceptions to remain unchanged)

Commenter's Reason: The concept of dissimilar materials within a rated assembly was introduced in G15-12 to be included in the definition of a joint. Opposing testimony indicated that the definition of "joint" applies more broadly, and not just to joints in fire-rated assemblies. As such, the proposed text has been proposed to be included in Section 715.1.

The test of a fire resistance rated assembly involves testing the joints within the assembly. However, the edges of the assembly are not evaluated in the same manner. Thermocouples are not placed within 12 inches of the edges of the assembly unless an element of the assembly is located only near the edge of the assembly. For this reason, when dissimilar materials form a joint in a fire-rated assembly, the joint is not typically evaluated. For this reason, joints that involve dissimilar materials should be protected with a listed joint system.

It should be noted that this is the second of two Public Comments that are intended to incorporate the concepts included in the original proposal to modify the definition for "joint." If both Public Comments are accepted, Section 715.1 should read as follows:

715.1 General. Joints that involve dissimilar materials in or that interrupt the continuity of ~~installed in or between~~ fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved fire-resistant joint system designed to resist the passage of fire for a time period not less than the required fire-resistance rating of the wall, floor or roof in or between which it is installed. Fire-resistant joint systems shall be tested in accordance with Section 715.3.

Public Comment 3:

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

Modify the proposal as follows:

JOINT. The ~~opening~~ junction in or between adjacent assemblies that ~~interrupts the continuity of a fire-rated or smoke-rated assembly and either involves the intersection of dissimilar materials or assemblies,~~ is created due to building tolerances, or is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

Commenter's Reason: The definition is revised to clarify that a "joint" is not an opening, per se, but rather is the location of the junction of two independent surfaces intersecting, with or without contact, and with or without an opening. For example, if the space between two building elements has been filled with some material (e.g. a backer rod), then it is still a "joint", even though the opening was filled, thus literally leaving no opening. The Code already addresses numerous "openings" (e.g. 712 Vertical Openings, 716 Opening Protectives, 717 Ducts & Air Transfer Openings, 1103 Exterior Wall Openings, etc.) which are not Joints.

This item was heard by the IBC Structural Committee. The Committee reason indicated the proposed definition needed to relate to more than joints in fire resistance rated or smoke-rated assemblies. There are also joint requirements for non-fire resistance rated assemblies in the code; therefore the definition should include these. This has been addressed in this modification by deleting that proposed language.

The Committee also felt that the term "dissimilar materials" is subjective and could lead to enforcement problems. That language has been removed.

G15-12

Final Action: AS AM AMPC____ D

G16-12
202

Proposed Change as Submitted

Proponent: Joe Nebbia and Mark Nowak, Steel Framing Alliance

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Add new definition as follows:

METHODS OF TERMITE PROTECTION. Framing materials such as concrete, treated wood, or steel which remove the food source for termites, or products or services which control the access to and entry of termites into a building or structure.

Reason: Section 2304.11.6 specifies methods of termite protection but provides no guidance for the designer or building official as to what these methods are. There are many different types of approaches used to prevent termite damage in addition to treated wood. This proposal will identify other options currently being used successfully for termite protection.

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

202-METHODS OF TERMITE PROTECTION (NEW)-G-NEBBIA-NOWAK

Public Hearing Results

This code change was heard by the IBC Structural code development committee.

Committee Action: **Disapproved**

Committee Reason: The proposed definition of "methods of termite protection" is not a proper definition.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mark Nowak, Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

2304.11.6 Termite protection. In geographical areas where hazard of termite damage is known to be very heavy, wood floor framing in the locations specified in Section 2304.11.2.1 and exposed framing of exterior decks or balconies shall be of naturally durable species (termite resistant) or preservative treated in accordance with AWPA U1 for the species, product preservative and end use or provided with *approved* methods of termite protection, or substituted with materials that remove the food source for termites such as concrete or steel.

Commenter's Reason: Section 2304.11.6 specifies methods of termite protection but provides no guidance for the designer or building official as to what these methods are. There are many different types of approaches used to prevent termite damage in addition to treated wood. This proposal will identify other options currently being used successfully for termite protection for people who do not want to use pesticides or other chemical treatments.

The committee disapproved the original proposal and stated that it was not appropriate for a definition. By placing similar text into this section of the code, the additional guidance necessary to recognize alternative methods of termite resistance will be available to users of the code.

G16-12

Final Action: AS AM AMPC____ D

G20-12
202

Proposed Change as Submitted

Proponent: Michael D. Fischer, Kellen Company, representing Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

ROOF RECOVER. ~~The process of installing~~ An alteration consisting of the installation of an additional *roof covering* over a prepared existing *roof covering* without removing the existing *roof covering*.

ROOF REPLACEMENT. ~~The process of removing~~ An alteration consisting of the removal of the existing *roof covering*, repairing any damaged substrate and installing a new *roof covering*.

Reason: This proposal modifies the current definitions for roof recover to clarify that these activities are alterations. This identification is necessary to ensure that all pertinent provisions of Chapter 34 are considered.

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

202-ROOF RECOVER-G-FISCHER

Public Hearing Results

This code change was heard by the IBC Structural code development committee.

Committee Action: **Disapproved**

Committee Reason: Disapproval was requested by the proponent who also indicated a public comment will be considered.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Michael D. Fischer, Kellen Company, representing Asphalt Roofing Manufacturers Association, requests Approval as Submitted.

Commenter's Reason: This proposal was submitted as part of a package. The proponent requested disapproval of the proposal due to concerns with other technical issues. The intent of this proposal is to make it clear that roof recovering or replacement are considered "alterations" and not repairs. That distinction is important when applying the provisions of the IEBC.

G20-12
Final Action: AS AM AMPC____ D

G26-12
202

Proposed Change as Submitted

Proponent: Dennis Pitts, American Wood Council (dpits@awc.org)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

TREATED WOOD. Wood ~~and wood-based materials~~ products that ~~use vacuum-pressure impregnation processes~~ are conditioned to enhance fire retardant or preservative properties.

Fire-retardant-treated wood. ~~Pressure-treated lumber and plywood~~ Wood products that, when impregnated with chemicals by a pressure process or other means during manufacture, exhibit reduced surface-burning characteristics and resist propagation of fire.

Preservative-treated wood. ~~Pressure-treated wood~~ Wood products ~~that~~ , conditioned with chemicals by a pressure process or other means that exhibit reduced susceptibility to damage by fungi, insects or marine borers.

Reason: Pressure-treatment is not the only method permitted by the code for treated wood. Fire retardant treated wood (FRTW) can be impregnated with chemicals by pressure treatment or "other means during manufacture" (see Section 2303.2 and 2303.2.2). Preservative treated wood can be pressure treated or treated by a number of other methods indicated in the AWPA standards referenced in Section 2303.1.8. The current definition assumes pressure-treatment and therefore conflicts with the requirements in the text for both FRTW and preservative-treated wood.

Cost Impact: The code change proposal will not increase the cost of construction. No increase in cost.

202-FIRE RETARDANT TREATED WOOD-G-PITTS

Public Hearing Results

This code change was heard by the IBC Structural code development committee.

Committee Action: **Approved as Submitted**

Committee Reason: The committee believes the revisions to the definition of the term "treated wood" are improvements that simplify the definition and coordinate the wording with the related code provisions.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Marcelo M Hirschler, GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Fire-retardant-treated wood. Wood products that, when impregnated with chemicals by a pressure process or other means during manufacture, exhibit reduced surface-burning characteristics and resist propagation of fire. <u>For code requirements see Section 2303.2.</u>

(Portions of proposals not shown remain unchanged)

Commenter's Reason: This is a very simple change and it is intended to ensure that no product is offered for use as a fire-retardant-treated wood product unless it meets both the concept, correctly shown in the amended definition, and the requirements shown in section 2303.2. Section 2303.2 requires that fire-retardant-treated wood, when tested in accordance with ASTM E84 or UL 723, exhibit a *listed* flame spread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 10 1/2 feet (3200 mm) beyond the centerline of the burners at any time during the test. In the absence of the link to section 2303.2, a product that contains a minuscule amount of impregnated chemicals could be construed to meet the definition of fire-retardant-treated wood, and accepted for sale as such, without meeting the quantitative code requirements.

Public Comment 2:

Joseph Holland or Dave Bueche, Hoover Treated Wood Products, requests Approval as Modified by the Public Comment.

Modify the proposal as follows:

TREATED WOOD. Wood products that <u>use vacuum-pressure impregnation processes</u> ~~are conditioned~~ to enhance fire retardant or preservative properties.

Fire-retardant-treated wood. Wood products that, when impregnated with chemicals by a pressure process ~~or other means during manufacture~~ exhibit reduced surface-burning characteristics and resist propagation of fire.

Preservative-treated wood. Wood products that , conditioned with chemicals by a pressure process ~~or other means that~~ exhibit reduced susceptibility to damage by fungi, insects or marine borers.

Commenter's Reason: During the hearing in Dallas testimony was given that spoke to the changes in only general language. Looking at the revisions, it opens the code official up to having to approve materials not currently used as preservative treated or FRTW.

Preservative treatment: Are you, as the code official, ready to approve painted products, sprayed products, dipped products, or any other product "conditioned" to enhance the wood's ability for preservative properties for use in your buildings. If this change is approved, as submitted to the committee, that is what you will be faced with. Currently, it must be pressure impregnated. Any other method must be approved as an alternate material. This change eliminates the provisions of 104.11. Let's keep in mind this material must last for the life of the structure.

Fire-Retardant-Treated Wood: It is important to remember that FRTW is allowed in lieu of noncombustible materials. The allowance is based on significant testing of the product over the years. The testing involved much more than than the tunnel test. There is the White House test; a full scale test in a facility 20 feet wide by 100 feet long. There is testing done on material installed building for 30 years to insure the material still exhibited the required attributes. The changes recommended for approval will allow products with only the E84 test to be substituted for noncombustible materials.

The code recognizes there may be products that could be used in lieu of noncombustible materials but wants to insure it will perform as well as pressure impregnated FRTW but because it is not a part of the definition but a part of 2303.2 it needs additional scrutiny under section 104.11.

Public Comment 3:

Kristen L. Owen, Arch Wood Protection, Inc. A Lonza Company, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TREATED WOOD. Wood products that are ~~conditioned~~ processed to enhance fire retardant or preservative properties.

Fire-retardant treated wood. Wood products that, when impregnated with chemicals by a pressure process or other means during manufacture, exhibit reduced surface burning characteristics and resist propagation of fire.

Preservative-treated wood. Wood products ~~conditioned~~ impregnated with chemicals by a pressure process or other means that exhibit reduced susceptibility to damage by fungi, insects or marine borers.

Commenters Reason: The word "conditioned "in the Wood Industry is understood to mean reducing the moisture content of wood through some means of drying. Using this term with respect to the addition of chemicals to enhance the preservative or fire retardant properties is confusing. The more generally understood term of "processed" is more appropriate for the Treated Wood definition. For the Preservative-wood definition using the term "impregnated" is clear and parallels the language used to describe the same process in the Fire-retardant wood definition.

Public Comment 4:

Joseph Holland or Dave Bueche, Hoover Treated Wood Products, requests Disapproval.

Commenter's Reason: During the hearing in Dallas testimony was given that spoke to the changes in only general language. Looking at the revisions, it opens the code official up to having to approve materials not currently used as preservative treated or FRTW.

Preservative treatment: Are you, as the code official, ready to approve painted products, sprayed products, dipped products, or any other product "conditioned" to enhance the wood's ability for preservative properties for use in your buildings. If this change is approved, as submitted to the committee, that is what you will be faced with. Currently, it must be pressure impregnated. Any other method must be approved as an alternate material. This change eliminates the provisions of Section 104.11. Let's keep in mind this material must last for the life of the structure.

Fire-Retardant-Treated Wood: It is important to remember that FRTW is allowed in lieu of noncombustible materials. The allowance is based on significant testing of the product over the years. The testing involved much more than the tunnel test. There is the White House test; a full scale test in a facility 20 feet wide by 100 feet long. There is testing done on material installed building for 30 years to insure the material still exhibited the required attributes. The changes recommended for approval will allow products with only the E84 test to be substituted for noncombustible materials.

The code recognizes there may be products that could be used in lieu of noncombustible materials but wants to insure it will perform as well as pressure impregnated FRTW but because it is not a part of the definition but a part of Section 2303.2 it needs additional scrutiny under Section 104.11.

G26-12

Final Action: AS AM AMPC____ D

G28-12
304.1 (IFC [B] 202)

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering (al.godwin@aon.com**)**

Revise as follows:

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers
Ambulatory care facilities
Animal hospitals, kennels and pounds
Banks
Barber and beauty shops
Car wash
Civic administration
Clinic, outpatient
Dry cleaning and laundries: pick-up and delivery stations and self-service
Educational occupancies for students above the 12th grade
Electronic data processing
<u>Food processing establishments and commercial kitchens with an occupant load less than 25 and not associated with restaurants, cafeterias and similar dining facilities.</u>
Laboratories: testing and research
Motor vehicle showrooms
Post offices
Print shops
Professional services (architects, attorneys, dentists, physicians, engineers, etc.)
Radio and television stations
Telephone exchanges
Training and skill development not within a school or academic program

Reason: It is not uncommon to have catering services, bakeries, takeout pizza, and other food prep establishments in retail strip centers. Calling such uses an F-1 actually invokes change of use provisions that are not necessary. To avoid this, many jurisdictions will just call them "retail sales". However, they actually are more closely related to a small café and should be considered as such. Or, they should be listed under Group M.

With 200 sq. ft. per person occupant load calculation, 25 occupants equates to 5,000 sq. ft.

Cost Impact: This code change proposal will not increase the cost of construction but could reduce the cost of unnecessary change of use.

304.1-G-GODWIN

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This proposal was disapproved for several reasons. First it was considered too high of an occupant load which would basically allow a 5000 square foot kitchen. It was suggested that it might be better to simply limit the square footage instead of basing upon an occupant load. A square footage of 2500 square feet was offered as a suggestion. Additionally, the committee noted that correlation with Group F occupancies was necessary.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Al Godwin, CBO, CPM, Aon Fire Protection Engineering Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers
Ambulatory care facilities
Animal hospitals, kennels and pounds
Banks
Barber and beauty shops
Car wash
Civic administration
Clinic, outpatient
Dry cleaning and laundries: pick-up and delivery stations and self-service
Educational occupancies for students above the 12th grade
Electronic data processing
Food processing establishments and commercial kitchens ~~with an occupant load less than 25 and~~ not associated with restaurants, cafeterias and similar dining facilities <u>not more than 2500 square feet in area.</u>
Laboratories: testing and research
Motor vehicle showrooms
Post offices
Print shops
Professional services (architects, attorneys, dentists, physicians, engineers, etc.)
Radio and television stations
Telephone exchanges
Training and skill development not within a school or academic program

306.2 Moderate-hazard factory industrial, Group F-1. Factory industrial uses which are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

Aircraft (manufacturing, not to include repair)
Appliances
Athletic equipment
Automobiles and other motor vehicles
Bakeries
Beverages: over 16-percent alcohol content
Bicycles
Boats
Brooms or brushes
Business machines
Cameras and photo equipment
Canvas or similar fabric
Carpets and rugs (includes cleaning)
Clothing
Construction and agricultural machinery
Disinfectants
Dry cleaning and dyeing
Electric generation plants
Electronics
Engines (including rebuilding)
Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities <u>over 2500 square feet in area.</u>
Furniture
Hemp products
Jute products
Laundries
Leather products

Machinery
Metals
Millwork (sash and door)
Motion pictures and television filming (without spectators)
Musical instruments
Optical goods
Paper mills or products
Photographic film
Plastic products
Printing or publishing
Recreational vehicles
Refuse incineration
Shoes
Soaps and detergents
Textiles
Tobacco
Trailers
Upholstering
Wood; distillation
Woodworking (cabinet)

Commenter Reason: In its review, the Committee felt that the amendment was appropriate but too large. Also, a correlation amendment should be proposed for F-1 occupancies. Therefore, these amendments would seem to be within the recommendations of the committee.

Although worded differently, these uses will receive a form of recognition under P35-12 which passed committee as follows:

P35 – 12
403.3 (IBC [P] 2902.3)

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing Little Caesar Enterprises (JBEngineer@aol.com)

Revise as follows:

403.3 (IBC [P] 2902.3) Required public toilet facilities. Customers, patrons and visitors shall be provided with *public* toilet facilities in structures and tenant spaces intended for public utilization. The number of plumbing fixtures located within the required toilet facilities shall be provided in accordance with Section 403 for all users. Employees shall be provided with toilet facilities in all *occupancies*. Employee toilet facilities shall be either separate or combined employee and *public* toilet facilities.

Exceptions: Public toilet facilities shall not be required in<u>:</u>

<u>1.</u> Open or enclosed parking garages. Toilet facilities shall not be required in parking garages where there are no parking attendants.
<u>2. Structures and tenant spaces intended for quick transactions, including take out, pick up and drop off, having a public access area less than or equal to 300 square feet.</u>

Tenant spaces that are only intended for quick transactions do not need to provide public facilities for customers, patrons, and visitors. The public does not rely on such spaces to provide public toilet rooms. Patrons spend a short period of time completing a transaction, then they depart.

Examples of these types of spaces include: takeout food locations, such as Chinese food take outs; pizza take outs; and carry out ribs. Similar quick transaction facilities include: dry cleaners, atm facilities, florists, shoe repair shops, and newspaper stands.

It is recognized that the text of the second exception could be shortened to read: <u>Structures and tenant spaces having a public access area less than or equal to 300 square feet.</u> The added text is provided for clarity.

The purpose of this section has always been to provide comfort facilities for anyone spending a period of time in the public space. Quick transaction spaces are unique, in that people are not in the space for any length of time. Furthermore, the space open to the public is limited to 300 square feet.

It would be a safety and/or health hazard to have the public travel to the working areas of the tenant space to use toilet facilities. Hence, if a public toilet room is added, the space for the toilet room would have to be located in the front space where the small public area is located. This creates a security concern where the public toilet room would block openings in the front tenant space.

The 300 square foot dimension is based on the standard large spaces used by these types of facilities. Most tenant spaces of this type have an area less than 300 square feet for the public.

P35-12 Committee Action: **Approved as Submitted**

Committee Reason: Small spaces intended for momentary occupancy by the public do not require toilet facilities.

Assembly Action: **None**

G28-12
Final Action: AS AM AMPC____ D

G29-12
304.1 (IFC [B] 202)

Proposed Change as Submitted

Proponent: Lee J. Kranz, City of Bellevue, WA, representing Washington Association of Building Officials Technical Code Development (lkranz@bellevuewa.gov)

Revise as follows:

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers
Ambulatory health care facilities
Animal hospitals, kennels and pounds
Banks
Barber and beauty shops
Car wash
Civic administration
Clinic-outpatient
Dry cleaning and laundries: pick-up and delivery stations and self-service
Educational occupancies for students above the 12th grade
Electronic data processing
Laboratories: testing and research
Motor vehicle showrooms
Post offices
Print shops
Professional services (architect, attorneys, dentists, physicians, engineers, etc)
Radio and television stations
Telephone exchanges
Training<u>, educational tutoring</u> and skill development not within a school ~~or academic program~~.

Reason: This code change is intended to clarify that educational tutoring centers, such as those typically found in strip malls or office buildings, are considered to be classified as Group "B" occupancies. The term "educational tutoring" is descriptive of the type of use associated with training and skill development outside of a full time K-12 school and are used by students after normal mid-day school hours. It also more specifically and accurately describes the type of moderate occupant load commercial space used to provide focused learning opportunities for individual students.

"Academic program" has been deleted because it broadly describes many different learning situations or teaching methods which would otherwise be considered part of a conventional school environment and has caused many building officials to erroneously classify these uses as Group "E" occupancies.

Many building officials are classifying businesses like Sylvan, Huntington and Kumon Learning Centers as Group "E" occupancies which places the building in a higher risk occupancy category than is necessary to protect the occupants. The student-to-teacher ratio in educational tutoring centers is typically very low and the overall occupant load is moderately low which creates a safer environment similar to a group "B" occupancy.

Cost impact: The code change proposal will increase the cost of construction.

304.1-G-KRANZ

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved with concern that this description would allow the inclusion of classroom type situations for preparation for SAT's and similar tests versus the smaller tutor/ student ratio intended. The current description, "training and skill development," was felt to be sufficient. Code change G30-12 was preferred.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Lee J. Kranz, City of Bellevue Washington, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers
Ambulatory health care facilities
Animal hospitals, kennels and pounds
Banks
Barber and beauty shops
Car wash
Civic administration
Clinic-outpatient
Dry cleaning and laundries: pick-up and delivery stations and self-service
Educational occupancies for students above the 12^{th} grade
Electronic data processing
Laboratories: testing and research
Motor vehicle showrooms
Post offices
Print shops
Professional services (architect, attorneys, dentists, physicians, engineers, etc)
Radio and television stations
Telephone exchanges
Training, educational tutoring and skill development <u>uses with an occupant load less than 50 and</u> not within a school.

Commenter's Reason: Many building officials are classifying businesses like Sylvan, Huntington and Kumon Learning Centers as Group "E" occupancies placing the building in a higher risk occupancy category than is necessary to protect the occupants. The student-to-teacher ratio in educational tutoring centers is typically very low and the overall occupant load is moderately low which creates a safer environment similar to that typically found in a Group "B" occupancy.

Means of Egress Committee members preferred the language in G-30 over G-29 because it included the condition "where not classified as a Group A occupancy". This text is not sufficient as there are cases where the proposed use will not be considered to be "used for assembly purposes…" as indicated in IBC Section 303.1.1 which would allow higher occupant loads to remain in the Group B occupancy category. We believe this is contrary to the Committee's intent. The text proposed in this public comment is better because it insures that low to moderate occupant loads will be maintained and higher density spaces will be classified as Group E or Group A occupancies. WABO TCD will request that our public comment for G-30 be heard before G-29 and if approved we will withdraw G-29.

G29-12
Final Action: AS AM AMPC____ D

G30-12
304.1 (IFC [B] 202)

<u>Proposed Change as Submitted</u>

Proponent: Adria Paesani, Fountain Valley Fire Department (adria.paesani@fountainvalley.org); Robert Marshall, Contra Costa Fire Department representing CalChiefs

Revise as follows:

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers
Ambulatory health care facilities serving five or fewer patients (see Section 308.3.2 for facilities serving more than five patients)
Animal hospitals, kennels and pounds
Banks
Barber and beauty shops
Car wash
Civic administration
Clinic – outpatient
Dry cleaning and laundries: pick-up and delivery stations and self-service
Educational occupancies for students above the 12th grade
Electronic data processing
Laboratories: testing, research
Motor vehicle showrooms
Post offices
Print shops
Professional services (architects, attorneys, dentists, physicians, engineers, etc.)
Radio and television stations
Telephone exchanges
Training and skill development not within a school or academic program <u>(this shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics, and similar uses regardless of the ages served, and where not classified as a Group A occupancy)</u>

Reason: The 2012 International Building Code defines a Group E occupancy as *the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade*. There are a variety of local interpretations on whether a tutoring center falls into a Group B or Group E classification. This code proposal is intended to classify tutoring centers and similar transient occupancies that cater to children as Group B occupancies per section 304.1. Enforcing Group E regulations greatly increases the cost to tutoring centers , in particular, as other similar uses clearly do not fall into the academic provisions of the Group E occupancies, i.e. martial arts, gymnastics, etc. The majority of tutoring centers are placed in multi-unit, Type V structures. Placing a Group E occupancy in a Type V building requires either a one-hour or two-hour wall between adjoining occupancies depending on fire sprinkler coverage. In addition, a manual fire alarm system is required in all Group E occupancies having an occupant load of more than 30, unless provided with fire sprinklers.

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

304.1-G-PAESANI

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was preferred over G29-12 as it better described the smaller scale intention of the application. More specifically the statement "not classified as Group A Occupancies" clarifies that it is not intended to apply to larger classroom settings as discussed in G29-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

David S. Collins, FAIA, The Preview Group, Inc.; Carroll Pruitt, AIA, Pruitt Consulting, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers
Ambulatory care facilities
Animal hospitals, kennels and pounds
Banks
Barber and beauty shops
Car wash
Civic administration
Clinic, outpatient
Dry cleaning and laundries: pick-up and delivery stations and self-service
Educational occupancies for students above the 12th grade
Electronic data processing
Laboratories: testing and research
Motor vehicle showrooms
Post offices
Print shops
Professional services (architects, attorneys, dentists, physicians, engineers, etc.)
Radio and television stations
Telephone exchanges
Training and skill development not within a school or academic program (~~this shall include, but not be limited to,~~ tutoring centers, martial arts studios, gymnastics, <u>etc.</u> ~~and similar uses regardless of the ages served, and where not classified as Group A occupancy~~)

Commenter's Reason: The implication in the code change is that training areas somehow become assembly occupancies. Section 303.1 states that an assembly occupancy is "for purposes such as civic, social or religious functions; recreation, food or drink consumption or awaiting transportation." None of these activities are of such a nature that they would be classified as assembly. Many occupancies can have more than 50 occupants in them and are not classified as assembly, these training areas are a primary example and was the reason for initially including these areas in the laundry list under the B occupancy.

Office buildings and even retail centers often include such functions in their buildings and they closely parallel to that business or retail function where a person purchases an instrument or a skill in a training session similar to that function. Data entry and computer skills training are not assembly occupancies. It may be that the original proponent is seeing large assembly type spaces being used for some of these activities such as gymnastics or martial arts in a gymnasium where other activities warrant classification as a Group A classification simply because of its size. It isn't the training or skill development that would be the reason for the classification, it would be the size of the space and whether it was used for recreational purposes.

Public Comment 2:

Lee J. Kranz, City of Bellevue Washington, representing Washington Association of Building Officials Technical Code Development Committee requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers
Ambulatory health care facilities
Animal hospitals, kennels and pounds
Banks
Barber and beauty shops
Car wash
Civic administration
Clinic-outpatient
Dry cleaning and laundries: pick-up and delivery stations and self-service
Educational occupancies for students above the 12th grade
Electronic data processing
Laboratories: testing and research
Motor vehicle showrooms
Post offices
Print shops
Professional services (architect, attorneys, dentists, physicians, engineers, etc)
Radio and television stations
Telephone exchanges
Training and skill development not within a school or academic program ~~(this~~ <u>This </u>shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics, and similar uses regardless of the ages served, ~~and where not classified as a Group A occupancy~~<u> with an occupant load less than 50</u>).

Commenter's Reason: Many building officials are classifying businesses like Sylvan, Huntington and Kumon Learning Centers as Group "E" occupancies placing the building in a higher risk occupancy category than is necessary to protect the occupants. The student-to-teacher ratio in educational tutoring centers is typically very low and the overall occupant load is moderately low which creates a safer environment similar to that typically found in a Group "B" occupancy.

G-29 is similar to G-30 but Means of Egress Committee members preferred the language in G-30 over G-29 because it included the condition "where not classified as a Group A occupancy". This text is not sufficient as there are cases where the proposed use will not be considered to be "used for assembly purposes…" as indicated in IBC Section 303.1.1. This would allow higher occupant loads to remain in the Group B occupancy category. We believe this is contrary to the Committee's intent and creates a higher risk due to greater occupant loads.

The text proposed in this public comment is better because it insures that low to moderate occupant loads will be maintained and higher density spaces with occupant loads of 50 or more will be classified as Group E or Group A occupancies. WABO TCD will request that our public comment for G-30 be heard before G-29 and if approved we will withdraw G-29.

G30-12
Final Action: AS AM AMPC____ D

G33-12

202, 308.1.1 (NEW) (IFC [B] 202), 408.1, 425 (NEW), Chapter 35

Proposed Change as Submitted

Proponent: Dave Frable, U.S General Services Administration, Public Buildings Service, representing U.S. General Services Administration, Public Buildings Service (dave.frable@gsa.gov)

Revise as follows:

SECTION 202
DEFINITIONS

Lock-Up. An area located in an occupancy, other than an I-3 occupancy, where occupants are detained by the use of security measures not under such occupants' control.

Revise as follows:

SECTION 308
INSTITITUIONAL GROUP I

308.1 Institutional Group I. Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which care or supervision is provided to persons who are or are not capable of self-preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

308.1.1 Lockups. Lockups located in occupancies, other than Group I-3 occupancies, shall comply with the requirements of the main occupancy of the building in which the lockup is located and with the requirements of Section 425.

Revise as follows:

SECTION 408
GROUP I-3

408.1 General. Occupancies in Group I-3 shall comply with the provisions of Sections 408.1 through 408.11 and other applicable provisions of this code (see Section 308.5). Lockups located in occupancies, other than I-3 occupancies, shall comply with the requirements of Section 425.

SECTION 425
LOCKUPS.

425.1 General. Lockups in occupancies, other than Group I-3 occupancies, where the holding area has capacity for more than 50 detainees or where any individual is detained for more than 24 hours, shall be classified as Group I-3 occupancies and shall comply with the requirements of Section 408. Lockups in occupancies, other than Group I-3 occupancies, where the holding area has capacity for not more than 50 detainees, and where no individual is detained for more than 24 hours, shall comply with Section 425.2 or Section 425.3.

425.2 Lockup Option 1. The lockup shall comply with the requirements for the main occupancy of the building in which the lockup is located, and all of the following criteria:

1. Doors and other physical restraints to free egress by detainees can be readily released by staff within 2 minutes of the onset of a fire or similar emergency.
2. Staff is in sufficient proximity to the lockup so as to be able to cause the 2-minute release required by Item 1 of Section 425.2 whenever detainees occupy the lockup.
3. Staff is authorized to cause the release required by Item 1 of Section 425.2.
4. Staff is trained and practiced in effecting the release required by Item 1 of Section 425.2.
5. Where the release required by Item 1 of Section 425.2 is caused by means of remote release, detainees are not to be restrained from evacuating without the assistance of others.

425.2.1 Fire department notification. The fire department with responsibility for responding to a building that contains a lockup shall be notified of the presence of the lockup.

425.3 Lockup Option 2. Where the lockup does not comply with all the provisions of Section 425.2 the requirements of this Section shall be met.

425.3.1 Main occupancy. The requirements applicable to the main occupancy of the building in which the lockup is located shall be met.

425.3.2 Means of egress. Where security operations necessitate the locking of required means of egress, the following shall apply:

1. Detention-grade hardware meeting the requirements of ASTM F 1577 shall be provided on swinging doors within the required means of egress.
2. Sliding doors within the required means of egress shall be designed and engineered for detention and correctional use, and lock cylinders shall meet the cylinder test requirements of ASTM F 1577.

425.3.3 Smoke detection. The lockup shall be provided with a smoke detection system in accordance with Section 907.4.3.

425.3.4 Fire alarm system. Where the requirements applicable to the main occupancy of the building do not mandate a fire alarm system, the lockup shall be provided with a fire alarm system meeting all of the following criteria:

1. The fire alarm system shall be installed in accordance with Section 907.6.
2. Initiation of the fire alarm system shall be accomplished by all of the following:
   - 2.1. Manual fire alarm boxes in accordance with Section 907.4.2
   - 2.2. Smoke detection system in accordance with Section 425.3.3
   - 2.3. Automatic sprinkler system required by the provisions applicable to the main occupancy of the building.
3. Staff and occupant notification shall be provided automatically in accordance with Section 907.5.
4. Emergency force notification shall be provided in accordance with Section 907.6.5.

425.3.5 Fire department notification. The fire department with responsibility for responding to a building that contains a lockup shall be notified of the presence of the lockup.

Add new Standard to Chapter 35 as follows:

ASTM – F 1577-05 Standard Test Methods for Detention Locks for Swinging Doors

Reason: The intent of this code change proposal is to address the subject matter of 'lockups". A lockup is basically a holding area in which persons are detained with some degree of security imposed on them that are commonly located in different types of occupancies. For example, lockups are typically located in immigration and naturalization facilities at border crossings, customs facilities at international airports, prisoner holding facilities at courthouses, local police department holding areas, security offices at sports stadia, security offices at shopping mall complexes, etc. Currently, the requirements within the IBC require "lockups" to meet the rigorous defend in place requirements applicable for Group I-3 occupancies. This code change proposal provides requirements specifically for lockups located in other than Group I-3 occupancies and provide a reasonable set of safe guards applicable to the main occupancy of the building in which the lockup is located. The subject provisions for lockups are meant to apply to holding areas of limited capacity in which no individual is detained for 24 or more hours.

New Section 425.1 establishes that if the holding area has the capacity for more than 50 detainees, it is classified as Group I-3 occupancy. Similarly, new Section 425.2 requires that, if an individual is detained for 24 or more hours, the holding area must be classified as Group I-3 occupancy.

Lockups subject to the provisions in Sections 425.3 are offered two options of compliance. Option #1 in Section 425.2 requires a system of safeguards, so that doors and physical restraints to free egress by detainees can be readily released by trained staff with the authority to cause such release, within 2 minutes of the onset of a fire or similar emergency. Option #1 will apply to holding areas that either (1) are staffed at all times when detainees are present or (2) have staff in close proximity and the detection and notification technology needed to summon such trained staff immediately upon the onset of an emergency. Option #2 provides alternate provisions for when all the criteria of the 2-minute release option in compliance Option #1 cannot be satisfied. This alternate set of provisions relies heavily on the presence of complete smoke detection within the lockup and its use to summon trained staff and emergency forces via the fire alarm system, which is required even if otherwise exempted for the main occupancy of the building. In addition, if the Code provisions applicable to the main occupancy of the building require sprinkler protection, the water flow in the sprinkler system must initiate the required alarm system. This option also imposes requirements for detention-grade doors hardware to address any reliability concerns by referencing ASTM F 1577-05, Standard Test Methods for Detention Locks for Swinging Doors. The subject standard's test methods will help ensure that detention locks perform at acceptable levels to control passage to unauthorized or secure areas, to confine detainees, and to delay escape attempts.

Please note that the subject code change proposal is based on the requirements for lockups in the National Fire Protection Association, Life Safety Code (2012 edition).

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

Analysis: A review of the standard proposed for inclusion in the code, ASTM F 1577-05 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

202-LOCK UP (NEW)-G-FRABLE.doc

Public Hearing Results

For staff analysis of the content of ASTM F1577-05 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: Disapproved

Committee Reason: This proposal was disapproved based upon concern that such units would cause confusion with psychiatric, neonatal and dementia wards. Also the occupant load of 50 seems too high and inconsistent with other IBC criteria and further coordination with I-3 occupant loads should be made. Some type of built in systems were preferred over contacting the fire department as proposed in Section 425.3.5. There was some concern with the use of the terms "trained and practiced" in Section 425.2. It was noted that such requirements are needed within the IBC but the concerns noted above need to be addressed. Coordination with G37-12 was encouraged.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Dave Frable, U.S. General Services Administration, Public Buildings Service, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 425
LOCKUPS

425.1 General. Lockups in occupancies, ~~other than Group I-3 occupancies,~~ where the holding area has capacity for more than ~~50~~ 5 detainees ~~or where any individual is detained for more than 24 hours~~, shall be classified as Group I-3 occupancies and shall comply with the requirements of Section 408. Lockups in occupancies, ~~other than Group I-3 occupancies,~~ where the holding area has capacity for not more than ~~50~~ 5 detainees, and where no individual is detained for more than 24 hours, shall comply with Section 425.2 or Section 425.3.

425.2 Lockup Option 1. The lockup shall comply with the requirements for the main occupancy of the building in which the lockup is located, and all of the following criteria:

1. Doors and other physical restraints to free egress by detainees can be readily released by staff within 2 minutes of the onset of a fire or similar emergency.
2. Staff is in sufficient proximity to the lockup so as to be able to cause the 2-minute release required by Item 1 of Section 425.2 whenever detainees occupy the lockup.
3. Staff is authorized to cause the release required by Item 1 of Section 425.2.
4. Staff is trained ~~and practiced~~ in effecting the release required by Item 1 of Section 425.2.
5. Where the release required by Item 1 of Section 425.2 is caused by means of remote release, detainees are not to be restrained from evacuating without the assistance of others.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The intent of this code change is to address the subject matter of 'lockups". A lockup is basically a holding area in which persons are detained with some degree of security imposed on them that are commonly located in different types of occupancies. For example, lockups are typically located in immigration and naturalization facilities at border crossings, customs facilities at international airports, prisoner holding facilities at courthouses, local police department holding areas, security offices at sports stadia, security offices at shopping mall complexes, etc.

Currently the requirements in the IBC are silent regarding what requirements should be used when detaining 5 or less individuals who are under restraint in a "lockup" area within a building. However, when a building has more than 5 persons under restraint or security, the "lockup" area must meet the rigorous defend in place requirements applicable for Group I-3 occupancies.

This code change provides requirements specifically for lockups located in other than Group I-3 occupancies and provides a reasonable set of safe guards applicable to the main occupancy of the building in which the lockup is located. The subject provisions for lockups are meant to apply to holding areas of limited capacity in which no individual is detained for 24 or more hours.

New Section 425.1 establishes that if the holding area has the capacity for more than 5 detainees, it is classified as Group I-3 occupancy. In addition, it requires that, if an individual is detained for 24 or more hours, the holding area must be classified as Group I-3 occupancy. Also, lockups subject to the provisions in Sections 425.1 are also offered two options of compliance.

Option #1 in Section 425.2 requires a system of safeguards, so that doors and physical restraints to free egress by detainees can be readily released by trained staff with the authority to cause such release, within 2 minutes of the onset of a fire or similar emergency. Option #1 will apply to holding areas that either (1) are staffed at all times when detainees are present or (2) have staff in close proximity and the detection and notification technology needed to summon such trained staff immediately upon the onset of an emergency.

Option #2 provides alternate provisions for when all the criteria of the 2-minute release option in compliance Option #1 cannot be satisfied. This alternate set of provisions relies heavily on the presence of complete smoke detection within the lockup and its use to summon trained staff and emergency forces via the fire alarm system, which is required even if otherwise exempted for the main occupancy of the building. In addition, if the Code provisions applicable to the main occupancy of the building require sprinkler protection, the water flow in the sprinkler system must initiate the required alarm system. This option also imposes requirements for detention-grade doors hardware to address any reliability concerns by referencing ASTM F 1577-05, Standard Test Methods for Detention Locks for Swinging Doors. The subject standard's test methods will help ensure that detention locks perform at acceptable levels to control passage to unauthorized or secure areas, to confine detainees, and to delay escape attempts.

Please note that the subject code change proposal is based on the requirements for lockups in the National Fire Protection Association, Life Safety Code (2012 edition).

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

G33-12

Final Action: AS AM AMPC____ D

G36-12
308.3.1, 308.4.1, 310.5.1(IFC [B] 202)

Proposed Change as Submitted

Proponent: Betsy Lease, representing Brown County Partnership

Revise as follows:

SECTION 308
INSTITUTIONAL GROUP I

308.3.1 Five or fewer persons receiving care. A facility such as the above with five or fewer persons receiving such care shall be classified as Group R-3 or shall comply with the *International Residential Code*. ~~provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or with Section P2904 of the *International Residential Code*.~~

308.4.1 Five or fewer persons receiving care. A facility such as the above with five or fewer persons receiving such care shall be classified as Group R-3 or shall comply with the *International Residential Code*. ~~provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or with Section P2904 of the *International Residential Code*.~~

SECTION 310
RESIDENTIAL GROUP R

310.5.1 Care facilities within a dwelling. Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the *International Residential Code*. ~~provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or with Section P2904 of the *International Residential Code*.~~

Reason: The purpose of this proposal is to let the IRC determine if a sprinkler system is required in what it typically a single family home. The sprinkler system should not be 'hidden' within the IBC for homes constructed under the IRC. It is discriminatory to require only these homes to have sprinkler systems if the state has decided to not require sprinklers under IRC.

I am Chairman of a community-wide accessibility committee that works with and supports organizations that helps people with disabilities, often with limited mobility live in home in their community. These individuals may be temporarily physically disabled, or permanently disabled, or even in hospice. We advocate for them get custodial care and medical care on a regular basis – anywhere from a visit per day to a live-in helper. When it is a long term situation, we assist people to make modifications to their home to accommodate the care needs, or the client may choose to build a new home with what is commonly called a 'mother-in-law's suite' or nursery. Some of the officials I have talked to say this requirement is only for where home care is a business, but the text is not written that way. Therefore, this could be applicable to any home where one person needs custodial care or medical care. Was the intent was to apply this to foster care, or if someone I am taking care of in my home is not related? It is discriminatory under Fair Housing Act to define 'family' by blood or marriage. In addition, I am not aware of a state that licenses facilities with 5 or fewer residents.

Cost Impact: The proposed changes will not increase the cost of construction.

308.3.1-G-LEASE

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it was felt that sprinklers are necessary in such facilities. Additionally it was felt that removing this will take away clarity from the building official regarding the need to enforce sprinkler requirements when not required by the IRC when states have eliminated the residential sprinkler requirements. This may also change the type of sprinkler system allowed to be installed when constructed in accordance with the IBC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Stephen Thomas, Colorado Code Consulting, LLC, representing International Association of Building Officials (IABO), requests Approval as Submitted.

Commenter's Reason: The original reason for this proposal stated that the requirement may be discriminatory. Since the change was submitted, it has been brought to our attention that civil rights lawsuits have been threatened against several local jurisdictions that have enforced the provisions of these sections. The cases that we have reviewed have settled with the civil rights commissions and have not been tested in the courts. The lawsuits state that the additional requirement of fire sprinklers in these facilities is in violation of the Federal Fair Housing Act. By requiring sprinklers in a home serving disabled persons versus a home serving unrelated persons places a larger burden on the disabled persons. An example of this situation can be found in The State of Arizona Ex Rel. Thomas C. Horne, The Attorney General; And The Civil Rights Division Of The Arizona Department Of Law vs. City Of Avondale, AZ.

The building code should not set people up for being sued by their State or Federal Civil Rights Commission. It should be consistent with federal accessibility laws.

G36-12
Final Action: AS AM AMPC____ D

G37-12
202, 308.5, 308.5.6 (NEW) (IFC [B] 202)

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee

Revise as follows:

308.5 Institutional Group I-3. This occupancy shall include buildings and structures that are inhabited by more than five persons who are under restraint or security. An I-3 facility is occupied by persons who are generally *incapable of selfpreservation* due to security measures not under the occupants' control. This group shall include, but not be limited to, the following:

Correctional centers
Detention centers
Jails
<u>Lockup facility</u>
Prerelease centers
Prisons
Reformatories

Buildings of Group I-3 shall be classified as one of the occupancy conditions indicated in Sections 308.5.1 through 308.5.5 (see Section 408.1).

<u>**308.5.6 Lockup facilities.** A *lockup facility* for five or less persons shall be classified as a Group B occupancy or as part of the primary occupancy provided they comply with the following provisions**:**</u>

1. <u>The area containing a lockup facility shall be separated from other rooms, spaces or areas by approved smoke barrier complying with Section 709.</u>
2. <u>The area containing a lockup facility shall be protected with an automatic fire sprinkler system complying with Section 903.</u>
3. <u>The area containing a lockup facility shall be provided with an automatic smoke detection system installed in accordance with Section 907.</u>

Ad new definition as follows:

SECTION 202
DEFINITIONS

<u>**LOCKUP FACILITY.** Buildings containing holding cells, rooms or areas where occupants are restrained or detained.</u>

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Part 1 of this code proposal is the revision of Section 308.5 and the addition of Section 308.5.6. The revision removes more than five persons, and adds buildings and structures containing a room, holding cell or cellblock used to place persons under restraint or security. The new section adds lockup facilities and also clarifies that an approved smoke barrier complying with Section 709 be provided, and also fire sprinkler and smoke detectors be installed.

Part 2 of this code proposal adds a definition for lockup facilities that is needed in the Code that clarifies the use occupancies for buildings/spaces that contain five or less occupants under restraint or detained.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Cost Impact: This proposal will increase the cost of construction of rooms or spaces used to restrain or detain occupants.

308.2-G-BAJNAI-BCAC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: There were several concerns with the concept of lock-up facilities. There were no limitations on how many of these facilities could be located within a building. This could be used in some cases to replace Group I-3 occupancies. It was also felt that smoke barriers may make observation difficult. Another concern was that sprinklers are not required throughout the building only within the lockup facility smoke compartment. Finally it was felt a time limit needs to be placed upon the use of such facilities along with the need for specific monitoring requirements.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Chuck Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

308.5.6 Lockup facilities. A *lockup facility* for five or less persons shall be classified ~~as a Group B occupancy or~~ as part of the primary occupancy ~~provided they~~ and shall comply with all of the following provisions**:**

1. The area containing a lockup facility shall be separated from other rooms, spaces or areas by approved smoke barrier complying with Section 709.
2. The ~~area~~ building containing a lockup facility shall be protected with an automatic fire sprinkler system complying with Section 903.
3. The area containing a lockup facility shall be provided with an automatic smoke detection system installed in accordance with Section 907.
4. There shall be not more than one lock-up facility within a building.
5. The restraint of individuals within the lock-up facility shall be for less than 24 hours.

(Portions of the proposal not shown to remain unchanged)

Commenter's Reason: This public comment is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 5 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

This public comment addresses the Code Development Committee Reason as follows:

1. "*There were several concerns with the concept of lock-up facilities. There were no limitations on how many of these facilities could be located within a building."*

We have proposed to add an item 4 to Section 308.5.6 to clarify only one such lockup facility is permitted within a building.

2. "This could be used in some cases to replace Group I-3 occupancies."

We disagree. This proposal clearly plugs a hole in the current code: what do you do with smaller lock up facilities that have less than 6 people under restraint? This proposal tells you that when you have five or fewer people under restraint, the lock-up facility shall be classified the same as rest of the building. In other words, if the lock up facility is in a mall it would be Group B; if it is in a baseball stadium, it would be a Group A; if it is in a school, it would be a Group E.

3. *"It was also felt that smoke barriers may make observation difficult."*

Since it is permitted to have approved openings in smoke barriers including those constructed of glazing, we cannot understand where this concern emanates from.

4. “Another concern was that sprinklers are not required throughout the building, only within the lockup facility.”

We acknowledge this concern and have changed Item 2 under proposed Section 308.5.6 to apply to the building.

5. “Finally it was felt a time limit needs to be placed upon the use of such facilities along with the need for specific monitoring requirements.”

We reluctantly have addressed this concern by adding Item 5 under proposed Section 308.5.6 to clarify that the restraint of individuals is for less than 24 hours. This last constraint could be problematic in that the code has no control as to how the operator of the facility will ensure compliance to this requirement.

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

G37-12

Final Action: AS AM AMPC____ D

G40-12
202, 310.5, 310.5.2 (NEW) (IFC [B] 202), IPC Table 403.1 (IBC [P] Table 2902.1)

Proposed Change as Submitted

Proponent: Tim Nogler, Washington State Building Code Council, representing Washington Association of Building Officials Technical Code Development Committee (tim.nogler@des.wa.gov)

Revise as follows:

310.5 Residential Group R-3. Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two *dwelling units*
Boarding houses (nontransient) with 16 or fewer occupants
Boarding houses (*transient*) with 10 or fewer occupants
Care facilities that provide accommodations for five or fewer persons receiving care
Congregate living facilities (nontransient) with 16 or fewer occupants
Congregate living facilities (*transient*) with 10 or fewer occupants
Lodging houses with five of fewer *guest rooms*

310.5.2 Lodging houses. Owner occupied *lodging houses* with five or fewer *guest rooms* shall be permitted to be constructed in accordance with the *International Residential Code.*

Add new definitions as follows:

SECTION 202
DEFINITIONS

GUEST ROOM. A room used or intended to be used by one or more guests for living or sleeping purposes.

LODGING HOUSE. A one family dwelling where one or more occupants are primarily permanent in nature, and rent is paid for guestrooms.

Revise as follows:

IPC TABLE 403.1 (IBC [P] TABLE 2902.1)
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a]
(See IPC Sections 403.2 and 403.3)
(See IBC Sections 2902.2 and 2902.3)

No.	Classification	Occupancy	Description	WATER CLOSETS (Urinals see section 419.2 of the IPC)		LAVATORIES		BATHTUBS/SHOWERS	Drinking Fountains[e,f] (See Section 410.1 of the IPC)	OTHER
				MALE	FEMALE	MALE	FEMALE			
7	**Residential**	R-3	One-and two-family dwellings <u>and lodging houses with 5 or fewer guest rooms</u>	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	--	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit

(Portions of table not shown remain unchanged)

Reason: The purpose of this code change is to allow a small bed and breakfast or similar lodging to be classified as single family. The proposed definitions are from the 2012 IRC. This proposal makes the IBC consistent with the IRC in regulating “lodging houses”. The 2012 IRC scope covers lodging house occupancies with five or fewer guestrooms, when equipped with a fire sprinkler system. In the previous cycle, the IBC General committee had concerns that adding the IRC definitions to the IBC would create conflict with chapter 29 required plumbing fixtures. The committee had concerns that a new Group R-3 occupancy would create confusion with how to determine minimum number of plumbing fixtures per chapter 29. To address that concern, this proposal adds “lodging house” to IPC Table 403.1 (IBC Table 2902.1) to be consistent with one-family dwellings.

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

310.5-NOGLER

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The concept addressed is similar to G41-12 but based upon number of rooms versus occupants. This does not work with the IBC construct of occupant load but is consistent with the IRC approach. A possible solution is using total number of occupants similar to G41-12. It was encouraged to coordinate with G41-12 and evaluate how this proposal works with the accessibility requirements.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Clare Ray Allshouse AIA, CBO, City of Shoreline, WA, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Submitted.

Commenter’s Reason: The Committee disapproved the original proposal in part due to a failure to work within the IBC construct of occupant load (number of occupants versus rooms) even though it was acknowledged that it is consistent with the IRC approach. The terms used in this proposal are identical to the terms currently used in the IRC. Since the expressed purpose of this proposal is to coordinate the IBC with the IRC, it would seem most appropriate to define it in IRC terms to reduce the potential for confusion in its proper application. Furthermore, by making this scope clarification in the IBC that these occupancies are subject to the provisions of the IRC, the accessibility question raised by the Committee is resolved by definition.

G40-12

Final Action: AS AM AMPC____ D

G41-12
310.5, 310.5.2(NEW) (IFC [B] 202)

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee

Revise as follows:

310.5 Residential Group R-3. Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two *dwelling units*
Boarding houses (nontransient) with 16 or fewer occupants
Boarding houses (*transient*) with 10 or fewer occupants
Care facilities that provide accommodations for five or fewer persons receiving care
Congregate living facilities (nontransient) with 16 or fewer occupants
Congregate living facilities (*transient*) with 10 or fewer occupants
Owner-occupied lodging houses (transient) with 16 or fewer occupants

310.5.1 Care facilities within a dwelling. Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or with Section P2904 of the *International Residential Code*.

310.5.2 Owner occupied lodging houses. Owner-occupied lodging houses with ten or fewer occupants shall be permitted to be constructed in accordance with the *International Residential Code* where equipped throughout with an automatic sprinkler system in accordance with Section P2904 of the *International Residential Code*.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The purpose of this code change is to provide correlation between the International Residential Code and the International Building Code. During the previous code cycle provisions allowing the construction under the IRC for owner-occupied lodging houses for five or fewer guestrooms were approved. This proposal adds owner-occupied lodging houses to the list of R-3 Occupancy and provides a pointer to the IRC when the number of occupants falls to ten or fewer.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Cost Impact: This proposal will decrease the cost of construction by clarifying the relationship between the IRC and the IBC.

310.5-G-BAJNAI-BCAC

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This proposal was disapproved based upon the disconnect between the method of determining occupant load in 310.5, the method used in the IRC for lodging houses and also how the number 10 is used to allow construction in accordance with the IRC. A suggestion of both number of rooms and occupant load was suggested. Related to this concern it was unclear how this would work with the accessibility requirements in the IBC.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Chuck Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

310.5 Residential Group R-3. Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two *dwelling units*
Boarding houses (nontransient) with 16 or fewer occupants
Boarding houses (*transient*) with 10 or fewer occupants
Care facilities that provide accommodations for five or fewer persons receiving care
Congregate living facilities (nontransient) with 16 or fewer occupants
Congregate living facilities (*transient*) with 10 or fewer occupants
Owner-occupied lodging houses (transient) with 5 or fewer guestrooms ~~16 or fewer occupants~~

310.5.2 Owner occupied lodging houses. Owner-occupied lodging houses with 5 or fewer guestrooms ~~ten or fewer occupants~~ shall be permitted to be constructed in accordance with the *International Residential Code* where equipped throughout with an automatic sprinkler system in accordance with Section P2904 of the *International Residential Code*.

Commenter's Reason: This public comment is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 5 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The primary purpose of this code change has always been to have consistent thresholds for owner-occupied lodging houses in the IBC and IRC, thus allowing users of the I-Codes to be able to access the provisions of the IRC and be in compliance with the IBC. The code development committee's comment was that "16 or fewer occupants" in G41 was inconsistent with the IRC Section R101.2 exception #2 of "5 or fewer guestrooms", and also that this could have issues with compatibility with accessibility issues in the IBC. Therefore, this modification is offered, that uses the language of the IRC. This resolves issues that the code development committee raised related to the accessibility requirements in Chapter 11.

Public Comment 2:

Dominic Marinelli, United Spinal Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

310.3 Residential Group R-1. Residential occupancies containing *sleeping units* where the occupants are primarily *transient* in nature, including:

Boarding houses (*transient*) with more than 10 occupants
Congregate living facilities (*transient)* with more than 10 occupants

Hotels (*transient*)
Motels (*transient*)
<u>Owner-occupied lodging houses (transient) with more than 5 sleeping units</u>

310.5 Residential Group R-3. Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two *dwelling units*
Boarding houses (nontransient) with 16 or fewer occupants
Boarding houses (*transient*) with 10 or fewer occupants
Care facilities that provide accommodations for five or fewer persons receiving care
Congregate living facilities (nontransient) with 16 or fewer occupants
Congregate living facilities (*transient*) with 10 or fewer occupants
Owner-occupied lodging houses (transient) with <u>5 or fewer sleeping units for rent or hire</u> ~~16 or fewer occupants~~

310.5.2 Owner occupied lodging houses. Owner-occupied lodging houses with <u>5 or fewer sleeping units</u> ~~ten or fewer occupants~~ shall be permitted to be constructed in accordance with the *International Residential Code* where equipped throughout with an automatic sprinkler system in accordance with Section P2904 of the *International Residential Code*.

1103.2.11 ~~Residential Group R-1~~ <u>Owner occupied lodging houses</u>. ~~Buildings of Group R-1~~ <u>Lodging houses</u> containing ~~not more than~~ five <u>or fewer</u> *sleeping unit*s for rent or hire that are also occupied as the residence of the ~~proprietor~~ <u>owner</u> are not required to be *accessible*.

Commenter's Reason: The primary purpose of the G40 and G41 code changes are to have a consistent threshold for owner-occupied lodging houses in the IBC and IRC, thus allowing users of the I-Codes to be able to access the provisions of the IRC for small bed-and-breakfast type facilities and be in compliance with the IBC. While we agree with the intent, the original proposal did not coordinate with IBC Sections 310.3 and 1103.2.11.

In addition, the IBC removed the term 'guestroom' as part of the coordination effort with the Fair Housing Act during the 2001 code change cycle. The term 'sleeping unit' is used throughout the IBC and the rest of the family of codes. The term 'sleeping unit' is the same in the IRC as it is in the IBC, and is used in Section R320 for the reference back to IBC for accessibility.

SLEEPING UNIT. A room or space in which people sleep, which can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a *dwelling unit* are not sleeping units.

It is my intent to submit a code change to the IRC for the 2013 cycle to return it to consistent language compatible with the Fair Housing Act.

SECTION R320
ACCESSIBILITY

R320.1 Scope. Where there are four or more *dwelling* units or sleeping units in a single structure, the provisions of Chapter 11 of the *International Building Code* for Group R-3 shall apply.

United Spinal will be putting in a correlative code change for the IRC as follows. The definitions for 'guestroom' and 'lodging house' are not used anywhere else in the IRC, therefore, there is no reason for them to remain in the IRC. While the IRC is technically separate, it is one of the family of codes and should use consistent terms as much as possible.

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

Exceptions:

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

~~**GUESTROOM.** Any room or rooms used or intended to be used by one or more guests for living or sleeping purposes.~~

~~**LODGING HOUSE**. A one-family dwelling where one or more occupants are primarily permanent in nature, and rent is paid for guestrooms.~~

G41-12
Final Action: AS AM AMPC____ D

G42-12
311.1.2 (New) (IFC [B] 202)

Proposed Change as Submitted

Proponent: Tod Connors, Arlington County (VA) Department of Community Planning, Housing, and Development/Division of Inspection Services, representing self

Revise as follows:

311.1.2 Accessory storage spaces. A room or space used for storage purposes that is less than 100 square feet (9.3 m^2) in area and accessory to another occupancy will be classified as part of that occupancy. The aggregate area of such rooms or spaces shall not exceed the allowable area limits of Section 508.2.

Reason: Storage rooms were removed from Incidental Uses, Table 509. Storage is now treated as a mixed use condition and must meet either the requirements of 508.2 Accessory occupancies, 508.3 Nonseparated occupancies, or 508.4 Separated occupancies. When applying these mixed use sections in B occupancy buildings of IIB or IIA construction, an S-I storage room cannot be placed on the highest floor allowed by Table 503 Allowable Building Heights and Areas and Section 504 Building Height. The 100 square foot lower limit would allow small storage rooms on upper floors. This area is the same lower limit used in the Incidental Use Table when storage rooms were last included. The statement limiting area to the limits under current Accessory occupancy requirements is to preclude a large number of small storage rooms in excess of what other code sections limit.

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

311.1.2 (NEW)-G-CONNORS

Public Hearing Results

Editorial revision

Modify proposal as follow:

311.1.2 Accessory storage spaces. A room or space used for storage purposes that is less than 100 square feet (9.3 m^2) in area and accessory to another occupancy ~~will~~ shall be classified as part of that occupancy. The aggregate area of such rooms or spaces shall not exceed the allowable area limits of Section 508.2.

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved based upon the proponent's reason. This is another way of gaining small storage areas on upper floors although G126-12 is the preferred approach. Editorial revision makes consistent with current code language.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., City of San Diego, representing, City of San Diego Development Services Department, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

311.1.2 Accessory storage spaces. A room or space used for storage purposes that is less than 100 square feet (9.3 m^2) in area and accessory to another occupancy shall be classified as part of that occupancy. The aggregate area of such rooms or spaces on each story shall not exceed the allowable area limits of Section 508.2.

Commenter's Reason: The General Committee approved a code change submitted by Arlington County to address an issue we tried to also resolve in code change G124 that was not approved. We request the membership's support of our public comment for approval as modified.

We like the code change however it does not address the fact that there may be multiple accessory storage spaces on multiple upper levels above the second floor in buildings allowed to have non-rated construction. We suggest that code change be approved with the following modification. We request that the membership approve the proposed modification to the committee's action.

G42-12

Final Action: AS AM AMPC____ D

G48-12
403.1

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering, (al.godwin@aon.com)

Revise as follows:

403.1 Applicability. *High-rise buildings* shall comply with Sections 403.2 through 403.6.

Exception: The provisions of Sections 403.2 through 403.6 shall not apply to the following buildings and structures:

1. Airport traffic control towers in accordance with Section 412.3.
2. *Open parking garages* in accordance with Section 406.5.
3. ~~Buildings with~~ The portion of a building containing a Group A-5 occupancy in accordance with Section 303.6. This exemption shall not apply to other uses that if on their own would have been considered as a high-rise building.
4. Special industrial occupancies in accordance with Section 503.1.1.
5. Buildings with a Group H-1, H-2 or H-3 occupancy in accordance with Section 415.

Reason: As written, the wording exempts any building as long as part of the building is a Group A-5. If built as one building, it could be read to exempt high-rise office and/or condo's that are connected to or part of a sports stadium.

The commentary states:

"Places of outdoor assembly (Group A-5) and stand alone open parking garages are exempted because of the free ventilation to the outside that exists in such structures,"

Many stadiums today, including at the college level, are built with uses such as sky boxes and restaurants that themselves qualify as a high rise. While exempting the open air stadium seems appropriate since its occupants can see everything, other uses should be protected as a high rise if any of those uses on their own exceed the high rise limitation.

Individuals in sky boxes do not have a clear vision of neighboring skyboxes. Exiting a sky box is not as simple as walking out into the open air seating and moving away from the hazard.

Cost Impact: This code change will increase the cost of construction if such other uses have been allowed to be exempt from high-rise provisions and are now required to comply.

403#1-G-GODWIN

Public Hearing Results

Committee Action: **Approved as Submitted**

Editorial revision

Modify proposal as follows:

403.1 Applicability. *High-rise buildings* shall comply with Sections 403.2 through 403.6.

Exception: The provisions of Sections 403.2 through 403.6 shall not apply to the following buildings and structures:

1. Airport traffic control towers in accordance with Section 412.3.
2. *Open parking garages* in accordance with Section 406.5.
3. The portion of a building containing a Group A-5 occupancy in accordance with Section 303.6. This exemption shall not apply to other ~~uses~~ occupancies that if on their own would have been considered as a high-rise building.
4. Special industrial occupancies in accordance with Section 503.1.1.
5. Buildings with a Group H-1, H-2 or H-3 occupancy in accordance with Section 415.

Committee Reason: This proposal was a good clean up and clarification that simply because a building contains a Group A-5 occupancy the entire building containing other occupancies should not be exempt from the high-rise requirements of Section 403. Note editorial correction to change the term "uses" to "occupancies" in the proposed language.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler, City of Seattle, representing Department of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

403.1 Applicability. *High-rise buildings* shall comply with Sections 403.2 through 403.6.

Exception: The provisions of Sections 403.2 through 403.6 shall not apply to the following buildings and structures:

1. Airport traffic control towers in accordance with Section 412.3.
2. *Open parking garages* in accordance with Section 406.5.
3. The portion of a building containing a Group A-5 occupancy in accordance with Section 303.6. ~~This exemption shall not apply to other occupancies that if on their own would have been considered as a high-rise building.~~
4. Special industrial occupancies in accordance with Section 503.1.1.
5. Buildings with a Group H-1, H-2 or H-3 occupancy in accordance with Section 415.

Commenter's Reason: This modification is proposed to relieve some potentially unreasonable requirements imposed on small occupancies. Using the example from the proponent's reason statement, a restaurant or sky box in a large stadium would be considered a high-rise, which would require emergency power, and a fire command center, among other things, no matter how small the restaurant. By deleting the last sentence, the smallest uses could be considered accessory, and would be spared some onerous requirements. The language that remains in exception 3 addresses the proponent's concern about offices and residences connected to a stadium. While the occupant load of A-5 stadiums is high, the stadiums are occupied relatively infrequently for short periods, and the height of the high-rise portions of the building are at the lower end of the range for high-rise buildings. Stadiums have large exits, usually exceeding the required capacity, and most stadium designs include redundancies in the egress system.

G48-12
Final Action: AS AM AMPC____ D

G49-12
403.1

Proposed Change as Submitted

THIS PROPOSAL IS ON THE AGENDA OF THE IBC GENERAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC GENERAL CODE DEVELOPMENT COMMITTEE.

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering, (al.godwin@aon.com)

Revise as follows:

403.1 Applicability. *High-rise buildings* shall comply with Sections 403.2 through 403.6.

> **Exception:** The provisions of Sections 403.2 through 403.6 shall not apply to the following buildings and structures:
>
> 1. Airport traffic control towers in accordance with Section 412.3.
> 2. *Open parking garages* in accordance with Section 406.5.
> 3. Buildings with a Group A-5 occupancy in accordance with Section 303.6.
> 4. Special industrial occupancies in accordance with Section 503.1.1.
> 5. Buildings with:
>   5.1. A Group H-1 occupancy;~~,~~
>   5.2. A Group H-2 occupancy in accordance with Sections 415.7.1, 415.8.1, 415.8.3 and 415.8.4; or~~,~~
>   5.3. A Group H-3 occupancy in accordance with Section 415.7.1

Reason: The commentary states:

"Finally, buildings with occupancies in groups H-1, H-2 and H-3 are excluded from the provisions of this section because the fire hazard characteristics of such occupancies in a high-rise have not yet been considered."

However, the code does not prohibit these H occupancies from being in high-rise buildings. If that is the intent, then there are many sections of the code that need amending.

Are Group H occupancies allowed in high-rise buildings?

If not, this code change needs to go a different direction.

It is not uncommon to have Group H-2, flammable liquids, in a high rise building. And, high-rise labs often have H-2 flammable gases and H-3 oxidizing gases as well.

In accordance with Section 508.2.4, 508.3.3 and 415.8.2.1, specific H occupancies are required to be separated as separated mixed uses in accordance with Section 508.4. These Group H occupancies are not to be considered Accessory uses or non-separated mixed uses. They must always be separated mixed uses.

To exempt the entire building from high-rise provisions for complying with Section 415 does not seem reasonable since the provisions of that section do not compensate for the high rise provisions.

As listed, any high rise lab building that has a flammable gas H-2 room would be exempt from all of the high-rise provisions, including the fire service access elevator.

For example:

Section 415.8.2 provides provisions for the storage, handling, processing and transporting of flammable and combustible liquids in Groups H-2 and H-3 occupancies. There is a short list of requirements. However, compliance with that short list does not seem to compensate for the high-rise provisions of Section 403.

It does seem appropriate to exempt the occupancies only for the new sections listed. As proposed in this code change, only the following buildings would be exempt from the high rise provisions.

H-1 – required to be in a separate building and only allowed one story, Section 415.6.
H-2 and H-3 – when required to be in a separate building and only allowed one story, Section 415.7.
H-2 – special buildings:
Combustible dusts, grain processing and storage, Section 415.8.1
Liquefied petroleum gas facilities, Section 415.8.3.
Dry cleaning plants, Section 415.8.4.

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

403#2-G-GODWIN

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved as submitted as it was a necessary clarification that H occupancies can be located within a high-rise building. The committee based this decision primarily on the proponent's reason. One concern was raised related to whether group H occupancies would be allowed the construction type reductions in Section 403.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., City of San Diego, representing City of San Diego Development Services Department, requests Disapproval.

Commenter's Reason: The General Committee approved a code change submitted by AON fire protection to exempt buildings with H occupancies located in hi-rise buildings from compliance with the hi-rise requirements in Section 403.1. We request the memberships support for our public comment for disapproval of the code change.

We see no basis for this code change. An emergency generator room for required emergency or standby power or optional standby power may contain hazardous materials in excess of the amounts in Chapter 3 of the IBC. Group H occupancies located in hi-rise buildings should comply with both the hi-rise building requirements and the occupancy specific requirements. There are situations where laboratory spaces the include hazardous materials in excess of tabular limits are located in hi-rise buildings.

We urge the membership's disapproval of this code change. It does not appear that the code change as approved requires that H occupancies located in hi-rise buildings are also required to comply with the additional requirements in Section 403.

G49-12

Final Action: AS AM AMPC____ D

G53-12
403.6.1

Proposed Change as Submitted

Proponent: Brian Black, BDBlack Codes, Inc., representing National Elevator Industry Inc. (bdblack@neii.org)

Revise as follows:

403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, no fewer than two fire service access elevators, or all elevators, whichever is less, shall be provided in accordance with Section 3007. Each fire service access elevator shall have a capacity of not less than 3500 pounds (1588 kg) <u>and shall comply with Section 3002.4</u>.

Reason: When Section 3002.4 was amended to require elevator cars that can accommodate an 84 inch (2134 mm) stretcher it increased the size of the elevator car to a 3500 pound minimum capacity. As Section 403.6.1 now requires all Fire Service Access elevators in a building to be this size, it makes sense to coordinate this requirement with the stretcher size requirement.

As firefighters use Fire Service Access elevators to stage to fight a fire, these elevators will often be occupied carrying equipment and personnel to the staging floor. If only one of these 3500 pound elevators can also accommodate a stretcher, there is no guarantee that it will be the one that is available to evacuate injured persons. Having all Fire Service Access elevators usable and available to serve both the staging and the evacuation functions is an efficient way of taking advantage of what may be the largest elevator cars in the building.

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

403.6.1-G-BLACK

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: It was felt that requiring the stretcher requirements to link with the fire service access elevator is not an undue burden. This proposal will make sure that the fire service access elevator is also large enough to accommodate a stretcher.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dave Frable, U.S. General Services Administration, Public Buildings Service and Matt Archer, Douglas County, Colorado, representing Colorado Chapter, ICC, requests Disapproval.

Commenter's Reason: The intent of this comment is to reverse the action taken by the General Code Committee. The subject code change proposal was approved as submitted by the General Code Committee and will now require that ALL fire service access elevators accommodate a 24 inch by 84 inch ambulance stretcher. The proponent in the reason statement stated that ALL 3500 pound capacity fire service access elevators can accommodate this dimension ambulance stretcher. Technically, the proponent is correct. However, to our knowledge a 3500 pound elevator car can only accommodate a 24 inch by 84 inch ambulance stretcher when the door opening is from the side of the elevator car and not when the door opening is from the center of the elevator car. Please note that high-rise commercial office buildings typically to do not install elevator cars with side door openings. Only 4000 pound or more capacity elevator cars with an opening center door can accommodate a 24 inch by 84 inch ambulance stretcher. Therefore, to meet this new requirement, all fire service access elevator cars will now have to be 4000 pound or greater capacity elevator cars. In addition, the proponent also stated the subject code change will not increase costs. This is an incorrect statement since the costs associated with a 4000 pound elevator car will be more than a 3500 pound elevator car. Depending on the project, this change may increase the cost of construction to the point where it may become economically unrealistic for many high-rise projects to proceed.

In addition, please also note that the original intent of installing fire service access elevators in high-rise buildings was to improve fire fighter safety and the ability to move suppression equipment and personnel to the fire location expediently, not mandate all fire service access elevators large enough to accommodate ambulance stretchers. We also believe that a majority of designs to meet the current provisions in the 2009 code would chose to also make at least one fire service access elevator large enough to meet the required ambulance stretcher elevator requirements without a specific mandate, since access to each floor of the building must be provided by each type.

G53-12

Final Action: AS AM AMPC____ D

G54-12
404.5, 712.1.8

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare and Carl Baldassarra, P.E., FSFPE Chair, ICC Code Technology Committee (CTC)

Revise as follows:

404.5 Smoke control. ~~A~~ <u>In other than Group I-2.</u> smoke control system shall be installed in accordance with Section 909.

Exception: Smoke control is not required for *atriums* that connect only two *stories*.

712.1.8 Two-story openings. In other than ~~Groups I-2 and~~ <u>Group</u> I-3, a floor opening that is not used as one of the applications listed in this section shall be permitted if it complies with all of the items below.

1. Does not connect more than two stories.
2. Does not contain a stairway or ramp required by Chapter 10.
3. Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments.
4. Is not concealed within the construction of a wall or a floor/ceiling assembly.
5. Is not open to a corridor in Group I and R occupancies.
6. Is not open to a corridor on nonsprinklered floors.
7. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

Reason: This proposal is submitted by the ICC Ad Hoc Committee for Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx This proposal is being co-sponsored by the ICC Code Technology Committee.

This proposal is intended to correct a misapplication of the intent of the code and coordinate with federal requirements. Currently the language in Section 404.5 and 404.6 would allow a two story atrium to be open to the floors without providing a smoke control system or any passive separation. While this may be appropriate for many occupancy groups, exposing patients who are incapable of self preservation to a large vertical opening is an unacceptable risk. Practically, this would never occur because federal requirements that fund and regulate these types of facilities would not allow an opening without either smoke control or passive separation.

Two story vertical openings are design features that hospitals typically employ to create a more calming and welcoming environment for the patients and their families. The intent of the code appears to allow multiple methods for dealing vertical openings. The AHC believed that a reasonable solution was to restrict the unprotected atrium language and concurrently add language to allow the use of two story openings in 712.1.8. This trade off would protect the corridor from the large opening between floors. It would also provide facilities and designers two options for dealing with these openings.

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

404.5-G-Williams-AdHocHealthcare

Public Hearing Results

Committee Action: Approved as Modified

Modify the proposal as follows:

404.5 Smoke control. <u>A</u> ~~In other than Group I-2,~~ smoke control system shall be installed in accordance with Section 909.

> **Exception:** <u>In other than Group I-2</u> smoke control is not required for *atriums* that connect only two *stories*.

712.1.8 Two-story openings. In other than <u>Groups I-2 and</u> ~~Group~~ I-3, a floor opening that is not used as one of the applications listed in this section shall be permitted if it complies with all of the items below.

1. Does not connect more than two stories.
2. Does not contain a stairway or ramp required by Chapter 10.
3. Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments.
4. Is not concealed within the construction of a wall or a floor/ceiling assembly.
5. Is not open to a corridor in Group I and R occupancies.
6. Is not open to a corridor on nonsprinklered floors.
7. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

Committee Reason: This proposal closes a loophole for a higher risk occupancy that would now be required smoke control for two story atriums. The spaces included in atriums in hospitals often become very large. The modification emphasizes what the original intent of the proposal was to be more restrictive for Group I-2 occupancies.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee – Care facilities study group, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

404.5 Smoke control. A smoke control system shall be installed in accordance with Section 909.

> **Exception:** In other than Group I-2 <u>Condition 2</u> smoke control is not required for *atriums* that connect only two *stories*.

712.1.8 Two-story openings. In other than Groups I-2 <u>Condition 2</u> and I-3, a floor opening that is not used as one of the applications listed in this section shall be permitted if it complies with all of the items below.

1. Does not connect more than two stories.
2. Does not contain a stairway or ramp required by Chapter 10.
3. Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments.
4. Is not concealed within the construction of a wall or a floor/ceiling assembly.
5. Is not open to a corridor in Group I and R occupancies.
6. Is not open to a corridor on nonsprinklered floors.
7. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

Commenter's Reason: The original proposal limits requires two story atriums in all Group I-2 to have smoke control. The justification provided was only for hospitals. Therefore, the intent of this proposal is to allow nursing homes to follow the standard atrium provisions. Hospitals would be limited in accordance with the proposal.

The term "Condition 2' is utilized in place of 'hospital' in order to be consistent with G257-12. See G257-12 for the proposal regarding Condition 1 and Condition 2. During the hearings a floor modification passed the has Group I-2, Condition 1 as nursing homes and Group I-2, Condition 2 as hospitals. Use of this new term would not change the technical issues of this proposal.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called “Care Facilities”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/CareFacilities.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

Staff analysis: Code change G257 was Approved as Modified at the Code Development Hearings and a public comment has not been submitted. Accordingly it has been placed on the consent agenda.

G54-12

Final Action: AS AM AMPC____ D

G55-12
404.5

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE Chair, ICC Code Technology Committee (CTC)

Revise as follows:

404.5 Smoke control. ~~A~~ <u>In other than Group I-2 and Group I-1. Condition 2,</u> smoke control system shall be installed in accordance with Section 909.

Exception: Smoke control is not required for *atriums* that connect only two *stories*.

Reason: The Adhoc Healthcare committee has a proposal to require smoke control for 2 story atriums in Group I-2 due to concerns about smoke compartmentation. The CTC care committee would like to include the new Group I-1, Condition 2 based on the same theory of protection.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: The proposed changes will not increase the cost of construction.

404.5-G-BALDASSARRA-CTC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

404.5 Smoke control. <u>A</u> ~~In other than Group I-2 and Group I-1. Condition 2,~~ smoke control system shall be installed in accordance with Section 909.

Exception: <u>In other than Group I-2 and Group I-1. Condition 2</u> smoke control is not required for *atriums* that connect only two *stories*.

Committee Reason: This proposal enhances the safety in both hospitals and assisted living facilities with more occupants needing a higher level of care. This closes a loophole created with the exception for two story atriums that often get very large. The modification is similar to that made in G54-12 which is emphasizing the original intent of the proposal which was to be more restrictive.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee – Care facilities study group, requests Disapproval

Commenter's Reason: This public comment is basically a parliamentary issue regarding coordination between G54 and G55. G54 originally asked that two story atriums require smoke control in all Group I-2, nursing homes and hospitals. G55 was a correlative change – basically asking for two story atriums to require smoke control for Group I-1, Condition 2 (i.e., assisted living facilities with smoke compartments).

There is a public comment in for G54 asking that only hospitals (Group I-2 Condition 2 - see code change G257 for change in terminology) be required to have smoke control in two story atriums. If G54 is successful and G55 was to remain as modified in the Report of Hearings, there were be a conflict between nursing home requirements (Group I-2 Condition 1) and assisted living facilities (Group I-1 Condition 2). A two story atrium would require smoke control in an assisted living, but not a nursing home. The intent of the CTC is that if the public comment to G54 is successful, we will be withdrawing this change totally. If the public comment to G54 is not accepted, we would like G55 to move forward into the 2015 IBC as currently modified.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Care Facilities". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/CareFacilities.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

G55-12
Final Action: AS AM AMPC____ D

G56-12
404.5

Proposed Change as Submitted

Proponent: Sarah A. Rice, C.B.O., The Preview Group (srice@preview-group.com)

Revise as follows:

404.5 Smoke control. A smoke control system shall be installed in accordance with Section 909.

Exceptions:

1. A smoke control system is not required for *atriums* that connect only two *stories*.
2. A smoke control system is not required for atriums connecting more than two stories when all of the following are met:
   - 2.1. Only the 2 lowest stories shall be permitted to be open to the atrium. Unprotected openings shall be permitted.
   - 2.2. All stories above the lowest 2 stories must be separated from the atrium in accordance with Section 404.6.
   - 2.3 No operable openings shall be allowed in the walls of the atrium above the lowest 2 stories.

Reason: As stated in Section 909, the purpose of a smoke control systems is to provide a tenable environment for the evacuation or relocation of occupants. A smoke control system is NOT intended for the preservation of contents, the timely restoration of operations or for assistance in fire suppression or overhaul activities. Smoke control systems that are required and regulated by the IBC serve a different purpose than the smoke- and heat-venting provisions found in Section 910 and they are not considered exhaust systems under Chapter 5 of the International Mechanical Code.

In an atrium that connects more than 2 stories, the smoke control systems is intended to maintained the height of the lowest horizontal surface of the smoke layer interface to at least 6 feet above any walking surface that forms a portion of a required egress system within the smoke zone for a period of not less than either 20 minutes or 1.5 times the calculated egress time, whichever is less.

But what if the only walking surfaces in the atrium are on the 2 lowest stories of the atrium? What if all the walls above the 2 lowest stories are solid without operable openings? What purpose does the smoke control system then serve? We contend none. And if the smoke control system has no real value, then why install it?

This proposed change seeks to make exempt atriums that may connect more than 2 stories but which do not have any walking surfaces above the 2 lowest stories of the atrium when the walls of the atrium above the 2 lowest stories do not have any operable openings.

Cost Impact: The proposed changes will not increase the cost of construction. The cost of construction would be reduced by this proposal.

404.5-G-RICEE

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it was felt that 909 would already allow the design that depended upon smoke filling via passive means versus requiring a mechanical system.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Sarah A. Rice, C.B.O., The Preview Group, requests Approval as Submitted.

Commenter's Reason: This proposal seeks to recognize that there are atrium configurations which though "literally" connect more than 2 stories, in reality do not pose any greater hazard to the building occupants than an atrium which only connects 2 stories…

As the IBC is currently written, an atria that connect 2 stories is not required to have smoke control but once it "connects" more than 3 stories a smoke control system is required – regardless of the configuration of the atria, level of separation from adjacent spaces or the location of walking surfaces within the atria.

With the recognition that natural light creates a healthier environment, the use of light wells is becoming increasing common in building. We are seeing light wells extending through an entire 6-8 story building, and many of these light wells are provided with the sole intent to provide light. The walls of these light wells have no openings into the adjacent floors onto which they provide light (i.e., solid walls with nonoperable windows or doors) and there are no walking surfaces above the lowest levels.

But because these light wells are "connecting" more than 2 stories, smoke control systems are being required. But what benefit is he smoke control providing?

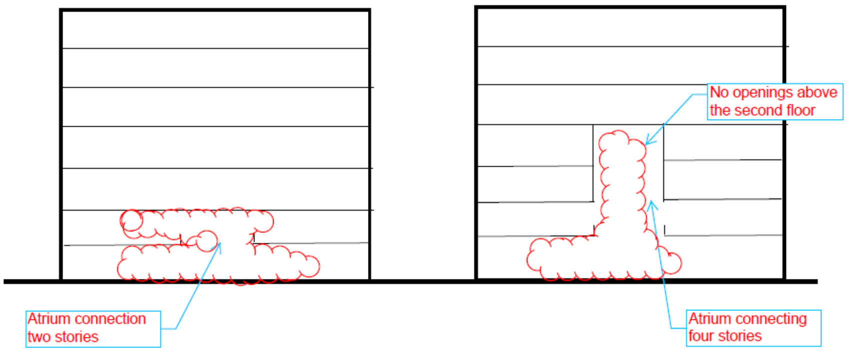
We ask you to consider this, if there are no operable openings in the walls of the atrium above the 2nd story, and there are no walking surfaces within the atria above the 2nd story, are the occupants on the 1st and 2nd story in more danger that if there were no light well, a.k.a., no atrium.

As we are so often reminded, the fundamental purpose of a smoke control system, as stated in Section 909 of the IBC, is to provide <u>a tenable environment for the evacuation or relocation of occupants</u>. And that a smoke control system is NOT intended for the preservation of contents, the timely restoration of operations nor for assistance in fire suppression or overhaul activities.

The code acknowledges that a 2-story atrium does not pose a hazard of such magnitude that a smoke control system is required. But how much more of hazard is there to the occupants if the atrium connects more than 2 stories but the only walking surfaces in the atrium are on the 2 lowest stories of the atrium and all the walls above the 2 lowest stories are solid without operable openings?

We contend that this configuration presents no more of hazard than a simple 2-story atria, if not a safer environment in some instances. In a simple 2-story atria smoke will migrate up through the atrium until it reaches the underside of the ceiling where then it will across the underside of the ceiling on the 2nd floor. By raising the "ceiling" of the atrium, a "smoke reservoir" is created where smoke will move into thus keeping the walking surfaces on the 1st, and more importantly the 2nd story, tenable for a longer period of time.

This proposed change seeks to make exempt atriums that may connect more than 2 stories but which do not have any walking surfaces above the 2 lowest stories of the atrium when the walls of the atrium above the 2 lowest stories do not have any operable openings.



G56-12

Final Action: AS AM AMPC____ D

G58-12
404.9.1 (NEW), 404.9.2 (NEW)

Proposed Change as Submitted

THIS PROPOSAL IS ON THE AGENDA OF THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE.

Proponent: Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee (BCAC)

Add new text as follows:

404.9 Travel distance. In other than the lowest level of the *atrium*, where the required *means of egress* is through the *atrium* space, the portion of *exit access* travel distance within the *atrium* space shall be not greater than 200 feet (60 960 mm). The travel distance requirements for areas of buildings open to the *atrium* and where access to the *exits* is not through the *atrium*, shall comply with the requirements of Section 1016.

404.9.1 Exit access across floor of atrium. Where the lowest level of the *atrium* is at the *level of exit discharge,* exit access travel distance shall be in accordance with Section 1016.2.

404.9.2 Interior exit stairways. A maximum of 50 percent of *interior exit stairways* are permitted to egress through the lowest level of an *atrium* where that level is the *level of exit discharge* in accordance with Section 1027.

Reason: The proposed language will clarify an otherwise vague permitted use of an atrium floor to be used as exit access to an exit from the atrium. This design is frequently encountered in healthcare and high-rise residential occupancies.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

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

404.9.1-G-BAJNAI-BCAC

Public Hearing Results

This code change was heard by the IBC Means of Egress code development committee.

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because some members of the committee felt that allowing for 50% of the egress paths to move through an atrium is a safety hazard. However, other members felt that this was a clarification of what was already permitted where the atrium floor was also the lobby at the level of exit discharge.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Chuck Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee requests Approval as Modified by this Public Comment.

Replace the proposal with the following:

~~**404.9 Travel distance.** In other than the lowest level of the *atrium*, where the required *means of egress* is through the *atrium* space, the portion of *exit access* travel distance within the *atrium* space shall be not greater than 200 feet (60 960 mm). The travel distance requirements for areas of buildings open to the *atrium* and where access to the *exits* is not through the *atrium*, shall comply with the requirements of Section 1016.~~

404.9 Exit access travel distance. Exit access travel distance for areas open to an atrium shall comply with the requirements of this section.

404.9.1 Egress not through the atrium. Where required access to the exits is not through the atrium, exit access travel distance shall comply with Section 1016.

404.9.2 Exit access travel distance at the level of exit discharge. Where the path of egress travel is through an atrium space, exit access travel distance at the level of exit discharge shall be determined in accordance with Section 1016.

404.9.3 Exit access travel distance at other than the level of exit discharge. Where the path of egress travel is not at the level of exit discharge from the atrium, that portion of the total permitted exit access travel distance that occurs within the atrium shall be not greater than 200 feet (60 960 mm).

404.10 Interior exit stairways. A maximum of 50 percent of interior exit stairways are permitted to egress through an atrium on the level of exit discharge in accordance with Section 1027.

Commenter's Reason: This public comment is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 5 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Item G58-12 was intended to address two technical points. First, the proposal spoke to how exit access travel distance is measured within an atrium. Presently, Section 404.9 only addresses the design condition where the path of egress travel is at other than the lowest level of the atrium. This public comment creates a format where the various scenarios for paths of egress travel are individually addressed. Section 404.9.1 allows for conventional exit access travel distances where access to exits is not through the atrium. Sections 404.9.2 and 404.9.3 dictate exit access travel distances where exits are accessed through the atrium. Section 404.9.2 states that where exit access travel occurs at the level of exit discharge from the atrium, Section 1016 values apply. Section 404.9.3 clarifies the current Section 404.9 requirement where exit access travel occurs at other (above or below) than the level of exit discharge from the atrium, in the correct technical context. The current reference of "lowest level of the atrium" assumes that that level is at the level of exit discharge, which may or may not be the case. Accordingly, that language has been deleted in favor of a specific reference to the level of exit discharge.

The second point of the original proposal was to clarify that interior exit stairways could egress through an atrium where such area complies with the provisions of Section 1027. This public comment agrees with that interpretation. Section 1027 does not prohibit egress through atrium spaces where all applicable conditions are met. This proposal clarifies that issue.

This reformatting and editorial clarification will assist code practitioners in correctly determining exit access travel distance requirements in buildings having atriums. Approval of this proposal as modified will increase uniformity in interpretation and application of these important provisions. This change includes the changes approved in E90 to add "exit access" to the description of travel distances.

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

G58-12

Final Action: AS AM AMPC____ D

G59-12
202, 406.3, 406.3.1, 406.3.2, 406.3.3, 406.3.4

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee (BCAC)

Add new definition as follows:

PRIVATE GARAGE. A building or portion of a building in which motor vehicles used by the tenants of the building or buildings on the premises are stored or kept, without provisions for repairing or servicing such vehicles for profit.

Revise as follows:

406.3 Private garages and carports. Private garages and carports shall comply with Sections 406.3.1 through ~~406.3.5~~ 406.3.4.

406.3.1 Classification. ~~Buildings or parts of buildings~~ Private garages and carports shall be classified as Group U occupancies. ~~because of the use or character of the occupancy~~ Each private garage shall be ~~not greater than~~ a 1,000 square feet (93 m^2) in area. ~~or one *story* in height except as provided in Section 406.3.2. Any building or portion thereof that exceeds the limitations specified in this section shall be classified in the occupancy group other than Group U that it most nearly resembles.~~ Multiple private garages are permitted in a building when each private garage is separated from the other private garages by 1-hour fire barriers in accordance with Section 707, or 1-hour horizontal assemblies in accordance with Section 711, or both.

~~**406.3.2 Area increase.** Group U occupancies used for the storage of private or pleasure-type motor vehicles where no repair work is completed or fuel is dispensed are permitted to be 3,000 square feet (279 m^2) where the following provisions are met:~~

1. ~~For a mixed occupancy building, the *exterior wall* and opening protection for the Group U portion of the building shall be as required for the major occupancy of the building. For such a mixed occupancy building, the allowable floor area of the building shall be as permitted for the major occupancy contained therein.~~
2. ~~For a building containing only a Group U occupancy, the *exterior wall* shall not be required to have a *fire-resistance rating* and the area of openings shall not be limited where the *fire separation distance* is 5 feet (1524 mm) or more.~~

~~More than one 3,000-square-foot (279 m_2) Group U occupancy shall be permitted to be in the same structure, provided each 3,000-square-foot (279 m^2) area is separated by *fire walls* complying with Section 706.~~

~~406.3.3~~ 406.3.2 Garages ~~and carports~~ floor surfaces. ~~Carports shall be open on no fewer than two sides. Carport~~ Garage floor surfaces shall be of *approved* noncombustible material. ~~Carports not open on at least two sides shall be considered a garage and shall comply with the provisions of this section for garages.~~ The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

> ~~**Exception:** Asphalt surfaces shall be permitted at ground level in carports.~~

~~The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.~~

~~406.3.4~~ **406.3.3** **Separation.** The separations~~s~~ of private garages from other occupancies shall comply with Section 508. Separation of private garages from dwelling units shall comply with ~~the following:~~ Sections 406.3.3.1 through 406.3.3.3.

~~1.~~ **406.3.3.1 Dwelling unit separation.** The private garage shall be separated from the *dwelling unit* and its *attic* area by means of gypsum board, not less than ½ inch (12.7 mm) in thickness, applied to the garage side. Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than a $^5/_8$-inch (15.9 mm) Type X gypsum board or equivalent and ½-inch (12.7 mm) gypsum board applied to structures supporting the separation from habitable rooms above the garage. Door openings between a private garage and the *dwelling unit* shall be equipped with either solid wood doors or solid or honeycomb core steel doors not less than $1^3/_8$ inches (34.9 mm) in thickness, or doors in compliance with Section 716.5.3 with a fire protection rating of not less than 20 minutes. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Doors shall be *self-closing* and self-latching.

~~2.~~ **406.3.3.2 Ducts.** Ducts in a private garage and ducts penetrating the walls or ceilings separating the *dwelling unit,* including its *attic* area*,* from the garage shall be constructed of sheet steel of not less than 0.019 inches (0.48 mm), in thickness, and shall have no openings into the garage.

406.3.4 Carports. Carports shall be open on at least two sides. Carport floor surfaces shall be of approved noncombustible material. Carports not open on at least two sides shall be considered a garage and shall comply with the requirements for private garages.

Exception: Asphalt surfaces shall be permitted at ground level in carports.

The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

(~~406.3.4, item 3~~) **406.3.4.1 Carport separation.** A separation is not required between a Group R-3 and U carport, provided the carport is entirely open on two or more sides and there are not enclosed areas above.

Reason: Consistency and coordination among the International Codes is one of the cornerstones of the ICC Code Development process. The ICC Board established the ICC Building Code Action Committee (BCAC) to act as a forum to deal with complex issues ahead of the Code Development Process, identify emerging issues and draft proposed code changes.
This proposed change is a result of the BCAC's work.

Part 1 of this code proposal adds a definition for private garage that is needed in the Code that clarifies the differences between a private garage, an open parking garage and an enclosed parking garage. This new definition for the IBC is modified from two of the legacy codes (1997 UBC Section 208 and 1999 BOCA Section 407.2. The SBC did not define a private garage.) and will serve well for the clarification of the Code that a private garage can be provided in other occupancies beside residential occupancies.

Part 2 of this code proposal is the revision of Section 406.3.1 and the deletion of Section 406.3.2 which were carry-overs from one of the legacy codes (1997 UBC Sections 312.2.1 & 312.2.2) that are really not applicable to the fire protection/life safety requirements in the IBC that address U occupancies in separated or mixed occupancies in a more defined manner than the previous legacy code from which these requirements were taken from. The retaining of a maximum size of 1000 square feet private garage (roughly a 20' x 50' floor area) is a reasonable limitation for a private garage before such a Group U occupancy would be required to be designed as a S-2 parking garage or a S-1 repair garage, as applicable. Such a maximum square footage for a private garage works out well when using IMC Section 402.2 requirement for natural ventilation in a private garage since the typical garage door is a minimum of 8' x 8' (64 sq. ft.), and the minimum natural ventilation required for ventilation is 4% of the floor area being ventilated (i.e. maximum 1000 sq. ft. x 0.04 = minimum 40 sq. ft. opening required < the minimum 64 sq. ft. overhead garage door). Such a garage door will provide an additional (24/40 =) 60% safety factor on the natural ventilation of the space under the Code.

Section 406.3.3 has been modified by breaking it into two sections and matching the language to the IRC language for clarity and correlation. (IRC Section R309 for reference).

This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Cost: This proposal will decrease the cost of construction by clarifying the requirements for private garage separation and increasing coordination of the language with the IRC.

406.3.1-G-BAJNAI-BCAC

Public Hearing Results

Committee Action: **Approved as Modified**

Modify the proposal as follows:

406.3.1 Classification. Private garages and carports shall be classified as Group U occupancies. Each private garage shall be not greater than ~~a~~ 1,000 square feet (93 m^2) in area. Multiple private garages are permitted in a building when each private garage is separated from the other private garages by 1-hour fire barriers in accordance with Section 707, or 1-hour horizontal assemblies in accordance with Section 711, or both.

(Portions of the proposal not shown remain the same)

Committee Reason: This proposal provided a good clean up of the private garage requirements. Some committee members still preferred the 3000 square feet allowed in the legacy codes. Concerns remain with the separation requirements. The modification clarifies that the 1000 square feet in Section 406.3.1 is meant as a maximum area. It should be noted that the BCAC would address concerns that Section 406.3.2(2) should be retained through reference in footnotes to Tables 602 and 705.8 during the public comment process.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee (BCAC), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE[a, e, h]

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H[f]	OCCUPANCY GROUP F-1, M, S-1[g]	OCCUPANCY GROUP A, B, E, F-2, I, R, S-2[g], U[b]
X < 5[c]	All	3	2	1
5 ≤ X < 10	IA Others	3 2	2 1	1 1
10 ≤ X < 30	IA, IB IIB, VB Others	2 1 1	1 0 1	1[d] 0 1[d]
X ≥30	All	0	0	0

For SI: 1 foot = 304.8 mm.

a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.

b. ~~For special requirements for Group U occupancies, see Section 406.3.~~ For a building containing only a Group U occupancy private garage or carport, the exterior wall shall not be required to have a fire-resistance rating where the fire separation distance is 5 feet (1524 mm) or more.

c. See Section 706.1.1 for party walls.

d. Open parking garages complying with Section 406 shall not be required to have a fire-resistance rating.

e. The fire-resistance rating of an exterior wall is determined based upon the fire separation distance of the exterior wall and the story in which the wall is located.

f. For special requirements for Group H occupancies, see Section 415.5.

g. For special requirements for Group S aircraft hangars, see Section 412.4.1.
h. Where Table 705.8 permits nonbearing exterior walls with unlimited area of unprotected openings, the required fire-resistance rating for the exterior walls is 0 hours.

TABLE 705.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON
FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]
0 to less than 3[b, c]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)[i]	Not Permitted
	Protected (P)	Not Permitted
3 to less than 5[d, e]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)[i]	15%
	Protected (P)	15%
5 to less than 10[e, f, j]	Unprotected, Nonsprinklered (UP, NS)	10%[h]
	Unprotected, Sprinklered (UP, S)[i]	25%
	Protected (P)	25%
10 to less than 15[e, f, g, j]	Unprotected, Nonsprinklered (UP, NS)	15%[h]
	Unprotected, Sprinklered (UP, S)[i]	45%
	Protected (P)	45%
15 to less than 20[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	25%
	Unprotected, Sprinklered (UP, S)[i]	75%
	Protected (P)	75%
20 to less than 25[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	45%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
25 to less than 30[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	70%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
30 or greater	Unprotected, Nonsprinklered (UP, NS)	No Limit
	Unprotected, Sprinklered (UP, S)[i]	Not Required
	Protected (P)	Not Required

For SI: 1 foot = 304.8 mm.
UP, NS = Unprotected openings in buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
UP, S = Unprotected openings in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
P = Openings protected with an opening protective assembly in accordance with Section 705.8.2.
a. Values indicated are the percentage of the area of the exterior wall, per story.
b. For the requirements for fire walls of buildings with differing heights, see Section 706.6.1.
c. For openings in a fire wall for buildings on the same lot, see Section 706.8.
d. The maximum percentage of unprotected and protected openings shall be 25 percent for Group R-3 occupancies.
e. Unprotected openings shall not be permitted for openings with a fire separation distance of less than 15 feet for Group H-2 and H-3 occupancies.

f. The area of unprotected and protected openings shall not be limited for Group R-3 occupancies, with a fire separation distance of 5 feet or greater.
g. The area of openings in an open parking structure with a fire separation distance of 10 feet or greater shall not be limited.
h. Includes buildings accessory to Group R-3.
i. Not applicable to Group H-1, H-2 and H-3 occupancies.
j. ~~For special requirements for Group U occupancies, see Section 406.3.2.~~ The area of openings in a building containing only a Group U occupancy private garage or carport with a fire separation distance of 5 feet or greater shall not be limited.

(Portions of the proposal not shown to remain unchanged)

Commenter's Reason: This public comment is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 5 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

This public comment resolves the concern noted in the Code Development Committee's reason statement. This code modification just places the requirements in the 2012 IBC Section 406.3.2(2) into the appropriate footnotes in Tables 602 & 705.8.

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

Public Comment 2:

Ali M. Fattah P.E., City of San Diego, City of San Diego Development Services Department , requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

PRIVATE GARAGE. A building or portion of a building ~~in~~ which ~~motor vehicles~~ is used for the storage of private or pleasure vehicles used by the tenants of the building or buildings on the premises ~~are stored or kept~~, without provisions for the commercial repairing or servicing such vehicles ~~for profit~~.

(Portions of the proposal not shown to remain unchanged)

Commenter's Reason: The General Committee approved this code change submitted by the ICC Building Code Action Committee with a modification to Section 406.3.1. We urge the membership in supporting our public comment for approval as modified.

We support the code change since the difference in requirements between the Group U and S-2 occupancy protection are numerous. We however believe that the code needs to make clear that for a garage to be private it needs to be connected to a unit and needs to have direct access. This will follow the philosophy the private garage user is familiar with the items stored and should not be concerned with the activities of an unrelated neighbor that may not even reside in the same building but is provided parking in a mixed occupancy building. Additionally determining whether vehicle repair is for profit is not practical since it is an operational constraint seeking to prohibit a commercial garage but to allow a homeowner to change the oil on a motor vehicle. We request that the membership approve the proposed modification to the committee's action.

G59-12
Final Action: AS AM AMPC____ D

G62-12
406.3.4

Proposed Change as Submitted

Proponent: Sarah A. Rice, C.B.O., The Preview Group (srice@preview-group.com)

Revise as follows:

406.3.4 Separation. ~~Separations shall comply with the following:~~ Private garages shall be separated from other occupancies in the same building in accordance with Section 508.

Exceptions:

1. ~~The~~ Where located adjacent to a dwelling unit, a private garage shall be separated from the *dwelling unit* and its *attic* area by means of gypsum board, not less than ½ inch (12.7 mm) in thickness, applied to the garage side. Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than a $^5/_8$-inch (15.9 mm) Type X gypsum board or equivalent and ½-inch (12.7 mm) gypsum board applied to structures supporting the separation from habitable rooms above the garage.
   1.1. Door openings between a private garage and the *dwelling unit* shall be equipped with either solid wood doors or solid or honeycomb core steel doors not less than $1^3/_8$ inches (34.9 mm) in thickness, or doors in compliance with Section 716.5.3 with a fire protection rating of not less than 20 minutes. Doors shall be *self-closing* and self-latching.
   1.2. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. ~~Doors shall be *self-closing* and self-latching.~~
   ~~2~~1.3. Ducts in a private garage and ducts penetrating the walls or ceilings separating the *dwelling unit,* including its *attic* area*,* from the garage shall be constructed of sheet steel of not less than 0.019 inches (0.48 mm), in thickness, and shall have no openings into the garage.

~~3~~2. A separation is not required between a Group R-3 and U carport, provided the carport is entirely open on two or more sides and there are not enclosed areas above.

Reason: The code in Section 406 appears to be silent with respect to the separation requirements between a private garage and something other than a dwelling unit. Private garages are not limited be being accessory to residences, but could be accessory to other uses such as a small office building. The existing provisions of Section 406.3.4 only address the separations between a dwelling unit and a private garage or carport. This change directs the code user to the mixed occupancy section of the code to address the separations either as an accessory occupancy, non-separated or separated mixed occupancy. It then takes the existing text and changes it into an exception to sending people to Section 508.

The other change is to reformat what is currently Items 1 and 2 of Section 406.3.4. The current Item 1 has various sub-requirements applying to the wall separating the private garage from a dwelling unit. The provision for self-closing and self-latching doors is simply being moved to be adjacent to the remaining door requirements. The current item 2 would appear not to be a stand alone provision nor a distinct exception for the separation of private garage and dwelling unit, but is another element of the separation described in Item 1.

Cost Impact: The proposed changes will not increase the cost of construction.

406.3.4-G-RICE

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved as it gives necessary guidance for private garages adjacent to other than Group R-3 Occupancies. It was suggested that this be correlated with G59-12 as necessary. Note that there was some concern with the term "adjacent."

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., City of San Diego, representing City of San Diego Development Services Department, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

406.3.4 Separation. Private garages shall be separated from other occupancies in the same building in accordance with Section 508.

Exceptions:

1. Where ~~located adjacent~~ attached to a dwelling unit, and where direct access is provided, a private garage shall be separated from the *dwelling unit* and its *attic* area by means of gypsum board, not less than ½ inch (12.7 mm) in thickness, applied to the garage side. Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than a 5/8 -inch (15.9 mm) Type X gypsum board or equivalent and ½-inch (12.7 mm) gypsum board applied to structures supporting the separation from habitable rooms above the garage.
    1.1. Door openings between a private garage and the *dwelling unit* shall be equipped with either solid wood doors or solid or honeycomb core steel doors not less than $1^{3}/_{8}$ inches (34.9 mm) in thickness, or doors in compliance with Section 716.5.3 with a fire protection rating of not less than 20 minutes. Doors shall be *self-closing* and self-latching.
    1.2. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted.
    1.3. Ducts in a private garage and ducts penetrating the walls or ceilings separating the *dwelling unit,* including its *attic* area, from the garage shall be constructed of sheet steel of not less than 0.019 inches (0.48 mm), in thickness, and shall have no openings into the garage.
2. A separation is not required between a Group R-3 and U carport, provided the carport is entirely open on two or more sides and there are not enclosed areas above.

Commenter's Reason: The General Committee approved this code change submitted by the Preview Group modifying the exceptions to Section 406.3.4 addressing the reduced occupancy separation between dwellings and private parking garages. We request that the membership approve the proposed modification to the committee's action.

We believe that the IBC needs to make clear that for the occupancy separation exception to allow reduced protection from a private garage and to allow protection similar protection to that for an individual dwelling and its own garage, the code needs to require that the dwelling unit be connected to garage and that it needs to have direct access to the garage. This will follow the philosophy that the private garage user is familiar with the items stored and should not be concerned with the activities of an unrelated neighbor that may not even reside in the same building but is provided parking in a mixed occupancy building.

We have seen developments where parking under two units is provided for other dwelling units and commercial tenant spaces on the same site and the project team interpreted the code to intend such a parking garage to be eligible for protection equivalent to that provided between a single family dwelling and the private garage. In fact the mixed occupancy building containing Group U and R-3 above should require a full one hour separation.

G62-12
Final Action: AS AM AMPC____ D

G63-12
406.4.3

Proposed Change as Submitted

Proponent: Donald R. Monahan, Walker Parking Consultants, representing Parking Consultants Council of the National Parking Association (don.monahan@walkerparking.com)

Revise as follows:

406.4.3 Vehicle barriers. *Vehicle barriers* not less than 2 feet 9 inches (835 mm) in height shall be placed ~~at the ends of drive lanes, and at the end of parking spaces~~ where the vertical distance to the ground or surface directly below is greater than 1 foot (305 mm). *Vehicle barriers* shall comply with the loading requirements of Section 1607.8.3.

> **Exception:** *Vehicle barriers* are not required in vehicle storage compartments

Reason: The current language implies that only those walls at the end of parking spaces or at the end of a drive aisle need to comply with the vehicle barrier requirements. Sidewalls at parking spaces are also vulnerable to vehicle impact as the vehicle maneuvers into the stall. Similarly, the side walls of vehicle-only ramps are vulnerable to collision if a vehicle is out of control due to driver heart attack, slippery or wet surfaces, or obstacles on the ramp. All walls at vertical surface displacements need to meet these vehicle barrier requirements.

Cost Impact: We believe most responsible designers already provide vehicle barriers or ramped floors at all vertical transitions in floor surfaces, such that this relatively minor clarification will not have a significant cost impact.

406.4.3-G-MONAHAN

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved as there may be other locations within a garage that should have vehicle barriers not addressed by the current specific requirements.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler, City of Seattle, representing Department of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

406.4.3 Vehicle barriers. *Vehicle barriers* not less than 2 feet 9 inches (835 mm) in height shall be placed where the vertical distance <u>from the floor of a drive lane or parking space</u> to the ground or surface directly below is greater than 1 foot (305 mm). *Vehicle barriers* shall comply with the loading requirements of Section 1607.8.3.

> **Exception:** *Vehicle barriers* are not required in vehicle storage compartments.

Commenter's Reason: The original proposal was intended to expand the requirement for vehicle barriers to apply wherever there is a "vertical surface displacement" instead of only at the ends of drive lanes and parking spaces. However, as written, the section doesn't specify where the measurement is taken from. This proposed modification clarifies that the vertical distance is measured from the floor of the drive lane or parking space.

G63-12

Final Action: AS AM AMPC____ D

G65-12
407.2.5 (New)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE Chair, ICC Code Technology Committee (CTC)

Add new text as follows:

407.2.5 Cooking facilities. In Group I-2 nursing homes, rooms or spaces that contain domestic cooking facilities shall be permitted to be open to the corridor where the number of sleeping units within the smoke compartment is limited to 30 residents and all of the following requirements are met:

1. Only one area with domestic cooking facilities is permitted within a smoke compartment.
2. The types of cooking appliances are are limited to ovens, cooktops, ranges, warmers and microwaves.
3. The corridor is a clearly identified space delineated by construction or floor pattern, material or color.
4. The space containing domestic cooking facilities shall be arranged so as not to obstruct access to the required exit.
5. A domestic cooking hood installed and constructed in accordance with Section 505 of the International Mechanical Code is provided over cooktops and ranges.
6. The domestic cooking hood provided over the cooktop or range shall be equipped with an automatic fire-extinguishing system of a type recognized for protection of domestic cooking equipment. Pre-engineered automatic extinguishing systems shall be tested in accordance with UL 300A and listed and labeled for the intended application. The system shall be installed in accordance with this code, its listing and the manufacturer's instructions.
7. A manual actuation device for the hood suppression system shall be installed in accordance with Section 904.11.1 and 904.11.2 of the International Fire Code.
8. A shutdown for the fuel and electrical power supply to the cooking equipment shall be provided and shall be accessible only to staff.
9. A portable fire extinguisher shall be installed within 30 feet (9144 mm) of domestic cooking appliances complying with Section 906.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

As nursing homes move away from institutional models, it is critical to have a functioning kitchen that can serve as the hearth of the home. Instead of a large centralized, institutional kitchen where all meals are prepared and delivered to a central dining room or the resident's room, the new "household model" nursing home uses de-centralized kitchens and small dining areas to create the feeling and focus of home. For persons with dementia, it is particularly important to have spaces that look familiar, like the kitchen in their former home ,to increase their understanding and ability to function at their highest level.

Allowing kitchens, that serve a small, defined group of residents, to be open to common spaces, and in some instances corridors, are critically important to enhancing the feeling and memories of home for older adults. This allows residents to see and smell the food being prepared, which can enhance their appetites and evoke positive memories. Some residents, based on their abilities and cognition level may even be able to participate in food preparation activities such as stirring, measuring ingredients, peeling vegetables, or folding towels. This becomes a social activity, where they can easily converse with the staff member cooking, as well as a way for the resident to maintain their functional abilities and to feel that they are still an important contributing member of society.

We know that unattended cooking equipment is the leading cause of fires. However, allowing the kitchen to be open also allows the nursing home staff to more carefully supervise the space so that if an incident were to occur, it would be spotted and dealt with faster than if the kitchen was completely behind closed doors. Health care facilities have the benefit of having awake-staff 24 hours a day. These staff members know the building layout and the residents well, and are trained to handle emergencies. The locked fuel shut-off switch will prevent cooking activities occurring without staff knowledge.

Moreover, studies have shown that a single low-flow residential sprinkler head is effective "to control both [a] cooking oil fire and [an] appliance fire, despite shielding by the cabinets, while extinguishing the fire spread to the cabinets and walls." [ref: NIST special publication 1066: Residential kitchen fire suppression research needs, Madrzykowski, Hamins & Mehta, Feb. 2007] As all nursing homes are already required to have quick-response sprinklers throughout, we believe that more than adequate safety is being provided when preparing food up to 16 residents, and by adding the automatic chemical suppression in the hood, we are also providing more than adequate safety for up to 30 residents. The volume of meals prepared in both of these cases are much more similar to a single-family home rather than a commercial restaurant setting.

The fire safety record for nursing homes is one of the lowest of any occupancy in the United States based on NFPA fire data. The number of fire deaths from multiple death fires has averaged 1.7 deaths/year for the last 20 years. The number of single fire deaths in nursing averages 3-5 deaths/ year. The population of nursing homes is 1.7 million. Compared to the number of residents 65 or over living in residential occupancies (32 million) and the number of fire deaths/year of this population, a resident over 65 in a nursing home is 12 times less likely to die in a fire than a resident over 65 living in a private residential occupancy.

All new nursing homes have been required to be sprinklered since 2003, and currently 95% of all existing nursing homes are sprinklered. All existing nursing homes are required by federal regulations to be fully sprinklered by August 13, 2013. There has never been a multiple death fire in a fully sprinklered nursing home based on 15 years of NFPA fire data. A review of nursing home fire data from 1970 (41 years) not a single multiple death nursing home fire resulted from a fire originating in a kitchen. The majority of single death fires are the result of a resident smoking while on oxygen or the ignition of their clothing or bedding from smoking material. We could find no fire data of any resident of a nursing home, single or multiple death fire, dying from a fire that originated in a kitchen.

In nursing home occupancies, the strategy is to defend in place, taking advantage of the smoke compartments to move residents away from smoke and fire. The smaller size of the household units that would contain these open kitchens, rather than the larger institutional style nursing homes many of us know, means that evacuations to an adjacent compartment or to the exterior is faster and the smaller size of any one of these units limits the number of people at risk.

An additional safety feature, in this proposal, is the inclusion of a deactivation switch that is locked and only accessible to staff. This will prevent unauthorized use of the cooking appliance without staff supervision. Staff members would need to be trained not only in basic food handling precautions but also in basic fire safety and extinguisher use. A fire extinguisher would be required in each kitchen area in addition to the suppression required in the hood and the sprinklers in the facility. These are all additional levels of safety that are being added to this application and will help to protect the residents.

The choice of thirty or fewer residents as the limiting number of residents that could be housed within a single unit with an open kitchen was based on a requirement from the Veterans Administration to serve the needs in their facilities, as well as current trends in the design of these types of facilities. These small nursing homes or nursing home “household” units generally range in size from 10 to 30 residents. The committee that drafted this proposal included providers, industry representatives, code and design professionals who are familiar with this design model and its operation. This group’s conclusion was that 30 residents allowed this open kitchen application for the overwhelming majority of facilities in the industry because staffing for thirty is widely considered an economical staffing ratio for the majority of organizations. Yet the designs for this number are still relatively small in size. These designs range from around 6,000 square feet for the smallest 10 person units to around 17,000 square feet even for units housing as many as 30. In general, at these unit sizes, the distances to exits, either to the exterior or to other compartments is much shorter than commonly seen in traditional nursing homes. This committee felt that in combining the added safety features proposed along with the improved evacuation distances and reduced number of people at risk, the limitation of 30 people maintained good safety, yet met the needs of a majority of the industry.

If this proposal is approved, there will be a reference in Table 906.1 for fire extinguishers.

Example of Kitchen open to Corridor.


Example of shutdown

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

407.2.5#1-G-BALDASSARRA-CTC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved for several reasons. First the scoping of such requirements needs to be clearer to avoid the main food preparation for such facilities using these requirements. Also the need for increased supervision was a concern. Concepts such as timers for the appliances should be considered. Generally allowing kitchens such as these open to the corridor caused some concerns. Terminology used does not seem consistent with IMC which uses "domestic cooking appliances" versus "domestic cooking facilities."

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee – Care facilities study group, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

407.2.5 Cooking facilities. In Group I-2 ~~nursing homes~~ Condition 1, rooms or spaces that contain ~~domestic~~ a cooking ~~facilities~~ facility with domestic cooking appliances shall be permitted to be open to the corridor where ~~the number of sleeping units within the smoke compartment is limited to 30 residents and~~ all of the following requirements are met:

1. The number of care recipients housed within the smoke compartment is not greater than 30.
2. The number of care recipient served by the cooking facility is not greater than 30.
3. Only one ~~area with~~ ~~domestic~~ cooking ~~facilities~~ facility area is permitted within a smoke compartment.
4. ~~2.~~ The types of domestic cooking appliances permitted are limited to ovens, cooktops, ranges, warmers and microwaves.
5. ~~3.~~ The corridor is a clearly identified space delineated by, construction or floor pattern, material or color.
6. ~~4.~~ The space containing the domestic cooking ~~facilities~~ facility shall be arranged so as not to obstruct access to the required exit.
7. ~~5.~~ A domestic cooking hood installed and constructed in accordance with Section 505 of the *International Mechanical Code* is provided over the cooktop or range.
8. ~~6.~~ The domestic cooking hood provided over the cooktop or range shall be equipped with an automatic fire-extinguishing system of a type recognized for protection of domestic cooking equipment. Pre-engineered automatic extinguishing systems shall be tested in accordance with UL 300A and listed and labeled for the intended application. The system shall

be installed in accordance with this code, its listing and the manufacturer's installation instructions.

9.~~7.~~ A manual actuation device for the hood suppression system shall be installed in accordance with Sections 904.11.1 and 904.11.2 of the *International Fire Code*.

10. An interlock device shall be provided such that upon activation of the hood suppression system, the power or fuel supply to the cooktop or range will be turned off.

~~8.~~11. A shut ~~down~~ off for the fuel and electrical power supply to the cooking equipment, shall be provided in a location that is accessible only to staff.

12. A timer shall be provided that automatically deactivates the cooking appliances within a period of not more than 120 minutes.

~~9.~~13. A portable fire extinguisher shall be installed in accordance with Section 905 of the *International Fire Code*.

Commenter's Reason: Based on the feedback from the Committee and the Opponents of the proposal, The CTC has revised some of the language to be more specific and more stringent.

The charging paragraph has been modified to more clearly define the space and the number of occupants has been moved to the requirements for greater clarity. The Condition 1 is an editorial coordination with G257-12.

- **Item #1** (new) states the maximum number of residents that may live within the same smoke compartment as the cooking facility. This limits the number of residents that could be at risk from an incident.
- **Item #2** (new) this clarifies that the cooking facility that is open to the corridor may only serve a maximum of 30 residents. This prohibits the central kitchen, serving the whole facility, from being open to the corridor. Further, this limits the number of meals that are being prepared in this facility which limits time of cooking duration, grease production and risk.
- **Item #3** The language was clarified to be clearer that only one cooking facility is permitted in a smoke compartment and for consistency with the other requirements.
- **Item #4** Added the word "domestic" to be consistent with the terminology contained within the Mechanical Code.
- **Item #6** Clarification for correlation.
- **Item #10** (new) added the requirement for an interlock that shuts off the power source/fuel supply if the hood suppression system activates.
- **Item #11** (previous #8) Terminology changed from shutdown to shutoff to correlate to the IMC and to be clear on its purpose. Also clarified that the switch is located in a location accessible only to staff.
- **Item #12** (new) Adds the requirement for a timer to deactivate the appliance in the event staff forgets to turn off the appliance. This adds a belt and suspenders level of safety which does not solely rely on human action.

In Skilled Nursing and Assisted Living care settings across the country, there are hundreds of similar kitchens, open to the corridor and common spaces, in operation today (see notes below). The ones in existence have been the result of varied negotiations with the AHJ and have resulted in a very inconsistent application/interpretation of the code. This code change is needed to create more consistency in the construction of these open kitchens and to standardize the level of safety features provided.

This proposal was originally brought forward by a group representing all of the major stakeholder groups in the Long-Term Care industry. This group worked closely with the CTC, along with Fire Marshals and other Code Officials to craft the language you see here to ensure an appropriate level of safety while providing a great benefit to the quality of life for the care recipients.

A similar proposal to what is contained here has already been approved by the Life Safety Code, and the Center for Medicare and Medicaid (CMS) endorses the use of open kitchens for small groups of residents.

Please bear in mind that all new nursing homes have been required to be fully sprinkled since 2003. All existing nursing homes have been mandated, by CMS, to be fully sprinkled by August of 2013. In the last 15 years of NFPA fire data, there has **never been a multiple death fire in a fully sprinkled nursing home.** The majority of the single death fires are the result of a resident smoking while on oxygen.

A NIST study* found that a single, low-flow residential sprinkler was able to control a cooking oil fire and extinguish any fire spread to the cabinets and walls. Because the nursing homes are sprinkled, combined with the small number of meals, hood suppression system, and automatic shut off features contained in this proposal, along with the 24/7 staffing in a nursing home create a high level of safety and will protect the residents when the kitchen is open to other spaces.

NIST Special publication 1066 "Overview of NIST/USFA Localized Residential Suppression System Project",** PG 5 & 6 Daniel Madrzykowski, Anthony Hamins, Shivani Mehta*

Open kitchen settings in operation currently (varied requirements)

- **The Green House**® project = 127 "houses" - each with an open kitchen - in operation in19 states and several more in planning or construction. States include AL, AK, AZ, AR, GA, KS, MD, MA, MS, MI, MT, NE, NJ, NY, PA, TN, TX, WA, WI
- Edgewater, West Des Moines, IA – 4 skilled nursing households, each with an open kitchen.
- Concordia Village in Springfield, IL
- Three Crowns Park in Evanston, IL – 2 households, each with an open kitchen.
- Masonic Home in Louisville, KY - 3 open kitchens
- An estimated 30 – 40 open kitchens are in operation in OR
- Landis Homes in Lititz, PA
- Garden Spot Village, in New Holland PA has 4 Nursing households, each with an open kitchen. Their sister project, Maple Farm, in Akron, PA has 2 nursing households, each with an open kitchen.
- Lutheran Home at Telford, PA
- Covenant Oaks at Oakwood Village University Woods, in Madison, WI has 4 Assisted Living households, each with an open kitchen.
- St. Mary's Center in Madison, WI – 16 households, each with an open kitchen
- St. John's Home in Milwaukee, WI – One open kitchen

- Creekview at Evergreen, OshKosh, WI – 8 skilled nursing households, each with an open kitchen

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “Areas of Study”. The Area of Study for this code change and public comment is called “Care Facilities”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/CareFacilities.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

Pictures of Nursing Homes currently in operation, with open plan kitchens

13 Resident Nursing Household
w/ open cooking facility

Staff analysis: Code change G257-12 was Approved as Modified at the Code Development Hearings and a public comment has not been submitted. Accordingly it has been placed on the consent agenda.

G65-12

Final Action: AS AM AMPC____ D

G66-12
407.2.5 (NEW)

Proposed Change as Submitted

THIS PROPOSAL IS ON THE AGENDA OF THE IBC GENERAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC GENERAL CODE DEVELOPMENT COMMITTEE.

Proponent: Carl Baldassarra, P.E., FSFPE Chair, ICC Code Technology Committee (CTC)

Add new text as follows:

407.2.5 Nursing home housing units. In Group I-2 nursing homes, within areas where nursing home residents are housed, shared living spaces, group meeting or multipurpose therapeutic spaces shall be permitted to be open to the *corridor*, where all of the following criteria are met:

1. The walls and ceilings of the space are constructed as required for *corridors*.
2. The spaces are not occupied as resident sleeping rooms, treatment rooms, incidental uses in accordance with Section 509, or hazardous uses.
3. The open space is protected by an automatic fire detection system installed in accordance with Section 907.
4. The *corridors* onto which the spaces open, in the same *smoke compartment*, are protected by an automatic fire detection system installed in accordance with Section 907, or the *smoke compartment* in which the spaces are located is equipped throughout with quick-response sprinklers in accordance with Section 903.3.2.
5. The space is arranged so as not to obstruct access to the required *exits*.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

In nursing home occupancies, residents are encouraged to spend time outside of their rooms. Wayfinding and orientation problems are common in nursing homes residents, and research has shown that direct visibility to a desired location is more effective for cuing than signage. Therefore, having a variety of shared living spaces open to the corridor encourages socialization, encourages interaction, and is important to resident well-being. Further, being able to preview activities that are occurring helps to encourage joining and allows reluctant participants to join at their own pace. Finally, a more open plan allows staff to more easily see residents throughout the course of the day.

Adhoc Health has a proposal to limit storage to containers with 10 cubic feet or greater in Table 509. This would address the issue of storage within areas open to the corridor.

Example of Living room

Example of Dining Room

Cost Impact: The proposed changes will not increase the cost of construction. There will be a reduction in cost.

407 #2-G-BALDASSARRA-CTC

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The proposal was approved as submitted as the proposal provides added value to these facilities with appropriate safety requirements. Note that this proposal will apply only to Group I-2 condition 1 occupancies based upon G257-12.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee – Care facilities study group, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

407.2.5 Nursing home housing units. In Group I-2 ~~nursing homes~~ Condition 1, within areas where nursing home residents are housed, shared living spaces, group meeting or multipurpose therapeutic spaces shall be permitted to be open to the *corridor*, where all of the following criteria are met:

1. The walls and ceilings of the space are constructed as required for *corridors*.
2. The spaces are not occupied as resident sleeping rooms, treatment rooms, incidental uses in accordance with Section 509, or hazardous uses.
3. The open space is protected by an automatic fire detection system installed in accordance with Section 907.
4. The *corridors* onto which the spaces open, in the same *smoke compartment*, are protected by an automatic fire detection system installed in accordance with Section 907, or the *smoke compartment* in which the spaces are located is equipped throughout with quick-response sprinklers in accordance with Section 903.3.2.
5. The space is arranged so as not to obstruct access to the required *exits*.

Commenter's Reason: Code change G66 is a technical change which included new text dealing with areas open to the corridors of nursing homes. The purpose of this public comment is limited to the editorial coordination of terminology with the approval of Code change G257 which revised the terminology for Group I-2 occupancies into two use conditions, similar to the way the current code addresses Group I-3. In this case, nursing homes fall under Group I-2, Condition 1. Since G257 deals only with terminology, this public comment is being submitted to G66 in order to focus the attention on the coordination of terminology issue.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Care Facilities". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/CareFacilities.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

Staff analysis: Code change G257-12 was Approved as Modified at the Code Development Hearings and a public comment has not been submitted. Accordingly it has been placed on the consent agenda.

G66-12
Final Action: AS AM AMPC____ D

G70-12
202, 407.4.2, 407.4.3.3, 407.4.3.4, 407.4.3.5, 407.4.3.5.1, 407.4.3.5.3

Proposed Change as Submitted

THIS PROPOSAL IS ON THE AGENDA OF THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE.

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care

Revise as follows:

CARE SUITE. In Group I-2 occupancies, a group of treatment rooms, care recipient sleeping rooms and ~~their associated~~ the support rooms or spaces and circulation space within the suite ~~Group I-2 occupancies~~ where staff are in attendance for supervision of all care recipients within the suite, and the suite is in compliance with the requirements of Section 407.4.3.

Revise as follows:

407.4.2 Travel distance. The travel distance between any point in a Group I-2 occupancy sleeping room, not located in a *care suite,* and an *exit access* door in that room shall be not greater than 50 feet (15 240 mm).

407.4.3 Group I-2 care suites. *Care suites* in Group I-2 shall comply with Section 407.4.3.1 through 407.4.3.4 and either Section 407.4.3.5 or 407.4.3.6.

407.4.3.1 Exit access through care suites. *Exit access* from all other portions of a building not classified as a *care suite* shall not pass through a *care suite*. In a *care suite* required to have more than one *exit*, one *exit access* is permitted to pass through an adjacent *care suite* provided all of the other requirements of Sections 407.4 and 1014.2 are satisfied.

407.4.3.2 Separation. *Care suites* shall be separated from other portions of the building by a smoke partition complying with Section 710.

~~**407.4.3.3 One intervening room.** For rooms other than sleeping rooms located within a *care suite*, *exit access* travel from the *care suite* shall be permitted through one intervening room where the travel distance to the *exit access* door from the *care suite* is not greater than 100 feet (30 480 mm).~~

407.4.3.3 Access to Corridor. Movement from habitable rooms shall not require passage through no more than 3 doors and 100 feet (30 480 mm) travel distance within the suite.

> **Exception:** The travel distance shall be permitted to be increased to 125 feet (38 100 mm) where an automatic smoke detection system is provided throughout the *care suite* and installed in accordance with NFPA 72.

~~**407.4.3.4 Two intervening rooms.** For rooms other than sleeping rooms located within a *care suite*, *exit access* travel within the *care suite* shall be permitted through two intervening rooms where the travel distance to the *exit access* door from the *care suite* is not greater than 50 feet (15 240 mm).~~

~~407.4.3.5~~ 407.4.3.4 Care suites containing sleeping room areas. Sleeping rooms shall be permitted to be grouped into *care suites* ~~with one intervening room~~ if one of the following conditions is met:

1. The ~~intervening room within~~ the *care suite* is not used as an *exit access* for more than eight care recipient beds.
2. The arrangement of the *care suite* allows for direct and constant visual supervision <u>into the sleeping rooms</u> by care providers.
3. <u>An automatic smoke detection system is provided in the sleeping rooms and installed in accordance with NFPA 72.</u>

~~407.4.3.5.1~~ <u>407.4.3.4.1</u> Area. *Care suites* containing sleeping rooms shall be not greater than ~~5,000~~ <u>7,500</u> square feet (~~465~~ <u>696</u> m^2) in area.

<u>**Exception:** *Care suites* containing sleeping rooms shall be permitted to be not greater than 10,000 sq feet (929 m^2) in area where automatic smoke detection system is provided throughout the *care suite* and installed in accordance with NFPA 72.</u>

~~407.4.3.5.2~~ <u>407.4.3.4.2</u> Exit access. Any sleeping room, or any *care suite* that contains sleeping rooms, of more than 1,000 square feet (93 m2) shall have no fewer than two *exit access* doors from the *care suite* located in accordance with Section 1015.2.

~~**407.4.3.5.3 Travel distance.** The travel distance between any point in a *care suite* containing sleeping rooms and an *exit access* door from that *care suite* shall be not greater than 100 feet (30 480 mm).~~

Reason: This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx.
In relation to the code change proposal dealing with size and configuration of care suites, the definition is being proposed with changes to address the scope of which the suites are used. Suites are recognized to be an effective tool to provide some flexibility in reaching an exit access, due to functional considerations. Use of suites is a particularly useful tool at Intensive Care Units and Emergency Departments in patient treatment areas. The ability to have full visual wall systems that have a breakaway function is extremely beneficial during any type of emergency situation, including defend-in-place, evacuation as well as day-to-day care. These systems allow for observation while providing a level of privacy for the patient. These systems are also flexible enough to handle multiple levels of acuity in the same space.

It is not the intent to broaden the definition so widely as to effectively eliminate the use of corridors as exit access. This change attempts to clarify that associated support spaces of care suites, such as pharmacies, laboratories, linen rooms and storage rooms which are not located within the care suite are not required to be classified as care suites.

The proposal relaxes several requirements due to providing additional fire protection features and clarifies code intent on requirements. The 5,000 square ft limitation for care suites was in legacy building codes before sprinkler protection was required in Group I-2 occupancies. Sprinkler protection provides additional life safety to building occupants which justifies the care suite containing sleeping rooms area increase to 7,500 square ft. Providing an automatic smoke detection system throughout a care suite containing sleeping rooms or constant staff supervision into the sleeping rooms further justifies increasing the area to 10,000 square ft.

The proposal also removes the intervening room from the travel distance requirements as an intervening room is difficult to define and conflicts with industry practice for design of certain units. For example does a pair of “cross corridor” doors within a suite constitute an intervening room? A provision was added to limit the number of doors required for a patient sleeping bed to reach the exit access corridor which addresses concerns regarding patient evacuation of the suite. Current requirements make it difficult to plan the sleeping portion of the suite in under 5,000 square feet, primarily because of the required size of the patient sleeping room. In the past, a sixteen bed area could get under the space requirement, with support spaces such as clean and soiled utilities falling outside that portion of the suite. However, the Intensive Care Unit programming data supports the need for the basic patient room / staff space elements of the program can be accommodated in under 7,500 square feet, but not less than 5,000 square feet. In order to properly staff a unit, the need for unobstructed view from a nurses station to a patient room is needed. This cannot be done with the barrier to form a suite down the middle of the unit, and therefore the staff area. The proposed change enables removal of that barrier while optimizing operational efficiency of the unit, including the fire safety watch of the unit by staff.

To achieve a 7,500 square foot suite, the program becomes very limited to the spaces that are involved in the direct care of the patient, as demonstrated on the Intensive care Suite program developed for this proposal (see the “IntensiveCareUnit-7500” tab in the noted programming file). Key spaces such as the break room and utility spaces are outside of the suite, which is workable from an operational standpoint, but not ideal. Key spaces such as staff support and utility spaces are outside of the suite. Increasing to 10,000 square feet allows inclusion of staff more staff and support spaces within the suite. Operationally, this is a key factor because the staff will not need to leave the suite on their break time, when retrieving supplies, or to access the staff toilet because it improves the response time of the staff during a medical emergency, or a fire / safety situation.

The proposal clarifies the 50 ft travel distance limitation from a patient sleeping room to an exit access door does not apply in care suites. The provision of crossing through three doors is also being introduced to help clarify what is now called out as 'intervening spaces.' Use of three doors is much clearer to a reviewer and designer, rather than defining what is an intervening space on a project-by-project basis.

The proposal also permits smoke detection to be provided in sleeping rooms of care suites where direct supervision of patients by staff is not possible. Smoke detection in the patient room provides equivalent early detection of a fire. The proposal attempts to maintain the level of life safety in care suites while providing more options to health care design professionals to facilitate excellent patient experience and treatment.

The travel distance provisions in care suites with sleeping rooms was increased to 125 ft to reach an exit access corridor based on the additional level of protection provided by direct and constant supervision into sleeping rooms by care providers or complete smoke detection throughout the suite as well as limiting the number of doors permitted for a patient sleeping bed to reach the exit access corridor.

This committee also has a correlative change to IFC with proposed language in IBC 407.8 and 907.2.6.2 coordinates with the proposed language automatic smoke detection system requirements in IBC 407.4.3.

Refer to attached "ICC_AHCHC Programming_10-10-2011.xlsx" for programming data as it relates to Intensive Care Units. This program is based on the noted version of the AIA or FGI Guidelines for Planning of Healthcare Facilities, for the support of the 7,500 square foot increases as noted above. A copy of the programming document can be found at www.iccsafe.org.

Cost Impact: The proposed changes will not increase the cost of construction.

407.4.2-G-Williams-Adhoc

Public Hearing Results

This code change was heard by the IBC Means of Egress code development committee.

The following errata were not posted to the ICC website.

Modify proposal as follows:

407.4.3.3 Access to Corridor. Movement from habitable rooms shall not require passage through ~~no~~ more than 3 doors and 100 feet (30 480 mm) travel distance within the suite.

> **Exception:** The travel distance shall be permitted to be increased to 125 feet (38 100 mm) where an automatic smoke detection system is provided throughout the *care suite* and installed in accordance with NFPA 72.

Committee Action: Approved as Submitted

Committee Reason: The erratum is editorial to remove a double negative. The use of 'doors' instead of 'intervening rooms' provides for a more uniform enforcement when determining egress from a suite. Intervening rooms are inconsistently interpreted when dealing with anti-rooms, patient bathrooms or corridors/vestibules within the suite. The proposal will provide appropriate separation requirements for suites. The increased suite size will coordinate with what is permitted by 2012 NFPA 101.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Vickie Lovell, Intercode Incorporated, representing Alliance for Fire and Smoke Containment and Control, requests Disapproval.

Reason: The Alliance for Fire and Smoke Containment and Control (AFSCC) requests disapproval of this code change, which increases the allowable area of hospital care suites containing sleeping rooms from 5,000 sq feet to 7,500 sq ft in sprinklered buildings, and up to 10,000 sq ft if a smoke detection system is provided.

The AFSCC promotes the concept of balanced fire protection, which includes the prudent integration of compartmentation, detection and suppression into fire protection designs. The request for disapproval is based the conspicuous lack of supporting documents or technically justifiable rationale by the proponent or the committee, for any of these changes to care suites. There is more justification for disapproval of this code change than for approval.

The specific size increases (7,500 and 10,000) in this proposal are random, not based on any persuasive statement other than these are the numbers used in the NFPA 101. On what basis were these numbers selected, and how were they evaluated? In reading through the NFPA 101 Annual 2011, Report on Proposals, NFPA 101, Committee member and Maryland State Fire Marshal Ken Bush stated the very same concern in his vote against the change in NFPA 101. He stated, "This proposal increases the sizes of sleeping suites in excess of the original proponent's submittal and associated substantiation with no technical justification. Nothing has been provided to indicate an equal level of protection for increased sizes in suites without supervision or smoke detection. The sizes of suites had been increased in recent past editions of the Code and should not be increased without additional technical justification."

The proposal also permits materials and products to be stored in the support areas of a care suite that may have been previously stored in areas separated from sleeping patients.

The proponent of G70 stated that, "providing an automatic smoke detection system throughout a care suite containing sleeping rooms or constant staff supervision into the sleeping rooms further justifies increasing the area to 10,000 sq ft". The intent of this proposal is inconsistent with the IBC 2012 commentary for Section 407, that states in hospitals: *the first level of protection established is the individual room (typically a patient sleeping room). Horizontal evacuation to an adjacent smoke compartment provides the second level of protection. If necessary, the third level of protection involves evacuation of the floor or entire building.* In this proposal the supposed "first level of protection" is completely undermined within a suite that has doubled in size and maintains sleeping patients with no compartmentation at all between any of the rooms or spaces that exist within the suite.

The use of care suites is explained in the IBC commentary as follows: *Traditionally, suites are used when patients require direct observation and immediate access as a component of their medical care.* If a suite is allowed to be 10,000 square feet in size (more than 4 times the area of a typical single family home), then it has grown far larger than the original reason and justification for the existence of suites, and the viability of '"direct observation and immediate care" must be called into question. It should be noted that NFPA 101 mandates "Direct visual supervision" as a precondition for increasing the size of a suite to larger than 5000 sq. ft. (2009 edition) and 7500 sq. ft. (2012 edition). This proposal aims to increase suite size to 10,000 sq. ft. without a requirement for "Direct visual supervision", which would be yet another way that the IBC is proposed to be made less safe than any edition of NFPA 101.

Additionally, the MOE committee further modified the proposal to increase travel distance to 125 feet without any justification. NFPA 101 allows only a 100 ft. maximum travel distance within a suite, so this reduction in safety could complicate or eliminate the possibility of the adoption of the IBC as an equivalently-safe alternative to NFPA 101 by CMS (Center for Medicare and Medicaid Services) for its facilities accreditation program. The proponent did not offer any research, report or investigation to quantify the impact of a fire detection system on Required Safe Egress Time (RSET) and Available Safe Egress Time (ASET), which are the usual benchmarks when doing a performance based study on the adequacy of an egress arrangement. As such, stating that we can double the size of a suite simply because of the presence of a smoke detection system is nothing more than a hunch as to what the impacts on ASET and RSET could be. Given the constant staffing within a suite, the presence of the smoke detection system may have no impact at all on the RSET or ASET, in which case tying the increased suite size to the smoke detection system is completely without merit.

Full scale fire testing indicates that smoke in a sprinklered fire can still be a formidable problem in a patient sleeping area, according to the National Research Council of Canada, report NRCC-43138, "Smoke Movement for Sprinklered Fires", by D. G. Lougheed, C., McCartney, and B.C Taber.

As part of an extended study on fires in patient rooms of health care facilities, 21 full-scale fire tests were conducted at the U.S. National Institute of Standards and Technology. These tests involved either a mattress with bedding or a clothing wardrobe. Under nonsprinklered conditions, the combustible clothing wardrobe fire resulted in room flashover in 120 seconds and rapid development of a smoke layer in the room and adjoining corridor with smoke obscuration and CO concentrations exceeding tenability levels throughout the test area (O'Neill et al. 1980).

In subsequent tests with standard 71°C pendent sprinklers arranged to provide a 6.9 (L/min)/m2 application density, the ceiling gas temperature was lowered. However, the fire could still be seen burning inside the wardrobe until smoke obscured visibility 60 seconds after the activation of the sprinkler. Also, very high concentrations of CO were measured at the 1.5 m height throughout the test area with the instantaneous hazardous threshold of 1% exceeded in the patient room, the corridor, and the remote lobby area. Clothing wardrobes may not be permitted in care suites, but the storage of other materials may now be allowed.

This proposal is also counter to the findings in the 2011 report on "The Performance of Smoke Detectors and Sprinklers in Residential and Health-Care Occupancies", by James A. Milke, Ph.D., P.E., A.J. Campanella, Cathleen T. Childers, and Brittany D. Wright of the Department of Fire Protection Engineering at the University of Maryland. This report considered the response of smoke detectors and sprinklers in fire incidents occurring from 2003-2007 in one and two, and multi-family residential dwellings, commercial residential facilities, and health-care facilities using NFIRS data. Approximately 197,000 fire incidents were included in the analysis. In all of these occupancy groups, the proportion of fires judged to be too small for the operation of the smoke detectors was appreciably fewer than those for sprinklers.

However, the report states, "The fact that fewer fires are judged to be too small for smoke detector operation than for sprinklers reflects the fact that smoke detectors are capable of responding to smaller fires than sprinklers. Those fires which are "too small" for smoke detector or sprinkler response still pose a significant hazard as indicated in casualty rates (fatal and non-fatal) in such fires."

Neither detection nor suppression eliminates the development of fire or smoke. A properly installed, carefully maintained sprinkler system can often help control a fire and a detection system can provide early notification. This proponent has offered no evidence to support the specific changes in this proposal. Fire testing and credible research confirms that fires too small to activate the sprinkler or smoke detection system can generate enough smoke and toxic gases to pose a considerable hazard. Given the condition of the occupants in care suites it is obvious that the proposal and the reason statement are deficient.

This proposal has yet to be satisfactorily justified and should be disapproved by the ICC membership.

G70-12

Final Action: AS AM AMPC____ D

G71-12, Part I
407.4.2, 407.4.3.3, 407.4.3.4, 407.4.3.5, 407.5, 408.6.1, 408.8.1, 422.3

Proposed Change as Submitted

Proponent: Philip Brazil. PE, Reid Middleton, Inc., representing Washington Association of Building Officials, Technical Code Development (pbrazil@reidmiddleton.com)

THIS IS A 3 PART PROPOSAL AND ALL THREE PARTS ARE ON THE AGENDA OF THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE.

PART I – IBC MEANS OF EGRESS

Revise as follows:

407.4.2 ~~Travel distance~~ Distance of travel. The ~~travel~~ distance of travel between any point in a Group I-2 occupancy sleeping room and an *exit access* door in that room shall be not greater than 50 feet (15 240 mm).

407.4.3.3 One intervening room. For rooms other than sleeping rooms located within a *care suite*, *exit access* travel from the *care suite* shall be permitted through one intervening room where the ~~travel~~ distance of travel to the *exit access* door from the *care suite* is not greater than 100 feet (30 480 mm).

407.4.3.4 Two intervening rooms. For rooms other than sleeping rooms located within a *care suite*, *exit access* travel within the *care suite* shall be permitted through two intervening rooms where the ~~travel~~ distance of travel to the *exit access* door from the *care suite* is not greater than 50 feet (15 240 mm).

407.4.3.5.3 ~~Travel distance~~ Distance of travel. The ~~travel~~ distance of travel between any point in a *care suite* containing sleeping rooms and an *exit access* door from that *care suite* shall be not greater than 100 feet (30 480 mm).

407.5 Smoke barriers. *Smoke barriers* shall be provided to subdivide every *story* used by persons receiving care, treatment or sleeping and to divide other *stories* with an *occupant load* of 50 or more persons, into no fewer than two *smoke compartments*. Such *stories* shall be divided into *smoke compartments* with an area of not more than 22,500 square feet (2092 m^2) and the ~~travel~~ distance of travel from any point in a *smoke compartment* to a *smoke barrier* door shall be not greater than 200 feet (60 960 mm). The *smoke barrier* shall be in accordance with Section 709.

408.6.1 Smoke compartments. The number of residents in any *smoke compartment* shall be not more than 200. The ~~travel~~ distance of travel to a door in a *smoke barrier* from any room door required as *exit access* shall be not greater than 150 feet (45 720 mm). The ~~travel~~ distance of travel to a door in a *smoke barrier* from any point in a room shall be not greater than 200 feet (60 960 mm).

408.8.1 Occupancy Conditions 3 and 4. Each sleeping area in Occupancy Conditions 3 and 4 shall be separated from the adjacent common spaces by a smoke-tight partition where the ~~travel~~ distance of travel from the sleeping area through the common space to the *corridor* exceeds 50 feet (15 240 mm).

422.3 Smoke compartments. Where the aggregate area of one or more *ambulatory care facilities* is greater than 10,000 square feet (929 m^2) on one *story*, the *story* shall be provided with a *smoke barrier* to subdivide the *story* into no fewer than two *smoke compartments*. The area of any one such *smoke compartment* shall be not greater than 22,500 square feet (2092 m^2). The ~~travel~~ distance of travel from any point in a *smoke compartment* to a *smoke barrier* door shall be not greater than 200 feet (60 960 mm). The *smoke barrier* shall be installed in accordance with Section 709 with the exception that *smoke* *barriers* shall be continuous from outside wall to an outside wall, a floor to a floor, or from a *smoke barrier* to a *smoke barrier* or a combination thereof.

Reason: The change from "travel distance" to "distance of travel" more clearly distinguishes between "exit access travel distance" as specified in Section 1016 and a travel distance that is other than an exit access travel distance for which the provisions of Section 1016 do not apply. Note that Section 1016.3 specifies the measurement of exit access travel distance as being from "the most remote point within a story along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an exit," except for open parking garages and outdoor facilities with open access components where it is measured as specified therein. The sections in this proposal, however, specify the measurement of travel distance between points within the exit access (i.e., to an exit access door in Sections 407.4.2, 407.4.3.3, 407.4.3.4 and 407.4.3.5.3; to a smoke barrier door in Sections 407.5, 408.6.1 and 422.3; to an extinguisher in Section 906.2 and Tables 906.3(1) and 906.3(2); etc.).

Changing from "travel distance" to "distance of travel" in these cases is considered to be clarifying and does not change the meaning or the intent of the language. The changes will also be consistent with "distance of travel" in 2012 IBC Sections 402.8.3, 402.8.5 and 415.10.3.3. The other change in Section 2902.5 is grammatical. Based on our analysis of the 2012 IBC, all instances of "travel distance" in the 2012 IBC where a change to "distance of travel" is warranted are included in this proposal.

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

407.4.2-G-BRAZIL

Public Hearing Results

All three parts of this code change was heard by the IBC Means of Egress code development committee.

PART I – IBC MEANS OF EGRESS
Committee Action: **Approved as Submitted**

Committee Reason: The proposal clarifies within Group I-2, Group I-3 and ambulatory care facilities where a distance is not 'exit access travel distance' as the term is used in Section 1016, but is a distance utilized for other elements.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Williams, Adhoc Health Care – MOE study group, requests Disapproval.

Commenter's Reason: Code change G70 has rewritten this Section 407 for clarity, however, the sections continue to deal with exit access travel distance to exit a room or suite, not distance to a specific object (as indicated in Part II and III of G71). The same holds true for the smoke compartments in Group I-3 and ambulatory care facilities (Sections 408 and 422). Therefore, the Adhoc Health Care committee is asking for disapproval of Part 1 only.

The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

G71-12, Part I
Final Action: AS AM AMPC____ D

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

PART II – IFC
906.2, Table 906.3(1), Table 906.3(2), 907.2.6, 907.2.10.1 (IBC [F] 906.2, Table 906.3(1), Table 906.3(2), 907.2.6, 907.2.10.1)
PART III – IPC
403.3, 403.3.4, 403.5 (IBC [P] 2902.3.2, 2902.3.3, 2902.5)

PART II – IFC

Revise as follows:

IFC 906.2 (IBC [F] 906.2) General requirements. Portable fire extinguishers shall be selected and installed in accordance with this section and NFPA 10.

Exceptions:

1. The ~~travel~~ distance <u>of travel</u> to reach an extinguisher shall not apply to the spectator seating portions of Group A-5 occupancies.
2. In Group I-3, portable fire extinguishers shall be permitted to be located at staff locations.

TABLE 906.3(1) [IBC [F] TABLE 906.3(1)]
FIRE EXTINGUISHERS FOR CLASS A FIRE HAZARDS

	LIGHT (low) HAZARD OCCUPANCY	**ORDINARY (moderate) HAZARD OCCUPANCY**	**EXTRA (high) HAZARD OCCUPANCY**
Minimum Rated Single Extinguisher	2-A [c]	2-A	4-A [a]
Maximum Floor Area per Unit of A	3,000 square feet	1,500 square feet	1,000 square feet
Maximum Floor Area for Extinguisher [b]	11,250 square feet	11,250 square feet	11,250 square feet
Maximum ~~Travel~~ Distance <u>of Travel</u> to Extinguisher	75 feet	75 feet	75 feet

(Portions to table not shown remain unchanged)

TABLE 906.3(2) [IBC [F] TABLE 906.3(2)]
FIRE EXTINGUISHERS FOR FLAMMABLE OR COMBUSTIBLE LIQUIDS
WITH DEPTHS LESS THAN OR EQUAL TO 0.25 INCH

TYPE OF HAZARD	**BASIC MINIMUM EXTINGUISHER RATING**	**MAXIMUM ~~TRAVEL~~ DISTANCE <u>OF TRAVEL</u> TO EXTINGUISHERS (feet)**
Light (Low)	5-B 10-B	30 50
Ordinary (Moderate)	10-B 20-B	30 50
Extra (High)	40-B 80-B	30 50

(Portions to table not shown remain unchanged)

907.2.6 (IBC [F] 907.2.6) Group I. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group I occupancies. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be provided in accordance with Sections 907.2.6.1, 907.2.6.2 and 907.2.6.3.3.

Exceptions:

1. Manual fire alarm boxes in sleeping units of Group I-1 and I-2 occupancies shall not be required at *exits* if located at all care providers' control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible and that ~~travel~~ <u>the</u> distances <u>of travel</u> required in Section 907.4.2.1 are not exceeded.
2. Occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 is *approved* by the fire code official.

907.2.10.1 (IBC [F] 907.2.10.1) Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-4 occupancies.

Exceptions:

1. A manual fire alarm system is not required in buildings not more than two *stories* in height where all individual *sleeping units* and contiguous *attic* and crawl spaces to those units are separated from each other and public or

common areas by at least 1-hour *fire partitions* and each individual *sleeping unit* has an *exit* directly to a *public way*, *egress court* or *yard*.

2. Manual fire alarm boxes are not required throughout the building when the following conditions are met:
   2.1. The building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2;
   2.2. The notification appliances will activate upon sprinkler waterflow; and 2.3. At least one manual fire alarm box is installed at an *approved* location.
3. Manual fire alarm boxes in resident or patient sleeping areas shall not be required at *exits* where located at all nurses' control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible and that ~~travel~~ the distances of travel required in Section 907.4.2.1 are not exceeded.

PART III – IPC

Revise as follows:

403.3 (IBC [P] 2902.3.2) Location of toilet facilities in occupancies other than malls. In occupancies other than covered and open mall buildings, the required *public* and employee toilet facilities shall be located not more than one story above or below the space required to be provided with toilet facilities, and the path of travel to such facilities shall not exceed a distance of 500 feet (152 m).

> **Exception:** The location and maximum ~~travel~~ distances of travel to required employee facilities in factory and industrial occupancies are permitted to exceed that required by this section, provided that the location and maximum ~~travel~~ distance of travel are *approved*.

403.3.4 (IBC [P] 2902.3.3) Location of toilet facilities in malls. In covered and open mall buildings, the required *public* and employee toilet facilities shall be located not more than one story above or below the space required to be provided with toilet facilities, and the path of travel to such facilities shall not exceed a distance of 300 feet (91 440 mm). In mall buildings, the required facilities shall be based on total square footage within a covered mall building or within the perimeter line of an open mall building, and facilities shall be installed in each individual store or in a central toilet area located in accordance with this section. The maximum ~~travel~~ distance of travel to central toilet facilities in mall buildings shall be measured from the main entrance of any store or tenant space. In mall buildings, where employees' toilet facilities are not provided in the individual store, the maximum ~~travel~~ distance of travel shall be measured from the employees' work area of the store or tenant space.

403.5 (IBC [P] 2902.5) Drinking fountain location. Drinking fountains shall not be required to be located in individual tenant spaces provided that public drinking fountains are located within a ~~travel~~ distance of travel of 500 feet of the most remote location in the tenant space and not more than one story above or below the tenant space. Where the tenant space is in a covered or open mall, such distance shall not exceed 300 feet. Drinking fountains shall be located on an accessible route.

Reason: The change from "travel distance" to "distance of travel" more clearly distinguishes between "exit access travel distance" as specified in Section 1016 and a travel distance that is other than an exit access travel distance for which the provisions of Section 1016 do not apply. Note that Section 1016.3 specifies the measurement of exit access travel distance as being from "the most remote point within a story along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an exit," except for open parking garages and outdoor facilities with open access components where it is measured as specified therein. The sections in this proposal, however, specify the measurement of travel distance between points within the exit access (i.e., to an exit access door in Sections 407.4.2, 407.4.3.3, 407.4.3.4 and 407.4.3.5.3; to a smoke barrier door in Sections 407.5, 408.6.1 and 422.3; to an extinguisher in Section 906.2 and Tables 906.3(1) and 906.3(2); etc.).

Changing from "travel distance" to "distance of travel" in these cases is considered to be clarifying and does not change the meaning or the intent of the language. The changes will also be consistent with "distance of travel" in 2012 IBC Sections 402.8.3, 402.8.5 and 415.10.3.3. The other change in Section 2902.5 is grammatical. Based on our analysis of the 2012 IBC, all instances of "travel distance" in the 2012 IBC where a change to "distance of travel" is warranted are included in this proposal.

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

PART II – IFC
Committee Action: **Approved as Submitted**

Committee Reason: The proposal clarifies where a distance is not 'exit access travel distance' as the term is used in Section 1016, but is a distance utilized for other types of elements. The IFC deals with distance of travel to items such as fire extinguishers and fire alarm pulls.

Assembly Action: **None**

PART III – IPC
Committee Action: **Approved as Submitted**

Committee Reason: The proposal clarifies where a distance is not 'exit access travel distance' as the term is used in Section 1016, but is a distance utilized for other types of elements. The IPC deals with distance of travel to items such as toilet rooms and drinking fountains.

Assembly Action: **None**

G73-12
407.4.3 (New), 1005.7.1.2; (IFC [B] 1005.7.1.2)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE Chair, ICC Code Technology Committee (CTC)

THIS CODE CHANGE WILL BE HEARD BY THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE.

Add new text as follows:

407.4.3 Projections in corridors. In Group I-2 nursing homes, where the *corridor* width is a minimum of 96 inches (2440 mm), projections shall be permitted for furniture where all of the following conditions are met:

1. The furniture is attached to the floor or to the wall.
2. The furniture does not reduce the clear width of the *corridor* to less than 72 inches (1830 mm) except where other encroachments are permitted in accordance with Section 1005.7.
3. The furniture is positioned on only one side of the *corridor.*
4. Each arrangement of furniture is 50 square feet (4.6 square meters) maximum in area.
5. Furniture arrangements are separated by 10 feet (3050 mm) minimum.
6. Placement of furniture is considered as part of the fire and safety plans in accordance with Section 1001.4.

Revise as follows:

1005.7.2 (IFC [B] 1005.7.2) Other projections. *Handrail* projections shall be in accordance with the provisions of Section 1012.8. Other nonstructural projections such as trim and similar decorative features shall be permitted to project into the required width a maximum of 1½ inches (38 mm) on each side.

Exception: Projections are permitted in corridors within Group I-2 nursing homes in accordance with Section 407.4.3.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Many nursing homes have long corridors that residents must traverse. Current interpretation of the IBC precludes the provision of resident seating in nursing home hallways/corridors to assure that egress is unobstructed in the event of an emergency. Residents who are physically unable to traverse the distance without being able to rest periodically have little recourse but use a wheelchair, an outcome counter to maintaining their ambulatory skills.

In addition, changes to facility operations in health care facilities no longer require staff to routinely move residents in beds, coupled with the relatively low occupant load in healthcare facilities, makes 8 ft of clear corridor width often unnecessary.

The primary substantiation to the proposal is as follows:

1. Furniture appropriately placed at defined intervals along hallways/corridors can promote a resident's ability to maintain his/her highest practical level of functioning and maintain independence. Allowing rest areas (small chairs, benches or grouped seating placed at different points) affords residents the opportunity to walk a distance, rest and then continue independently to their destination, and can enhance resident quality of life and help prevent resident falls and preventable decline in function.
2. In addition to promoting resident independence and mobility, seating placed in hallways/corridors may help to foster social opportunities and create a more homelike environment. Prohibiting such seating areas could diminish opportunities for socialization, and independence. The use of such seating areas will allow resident and staff greater flexibility in choosing safe places to rest.

3. This provision would require that furniture located within the corridor be fixed in place to eliminate the risk that the furniture could be moved into needed egress path. Furniture could be fixed to the floor or wall using a bracket, which would allow removal for maintenance and cleaning purposes.
4. For the fixed furniture, this provision maintains a minimum clear egress width of 6 feet. It also limits the frequency of such furniture groupings so that the 8 ft width is otherwise maintained.
5. This provision also requires that all of the groupings be located to one side of the corridor, so that in an emergency event, the path of travel would be clear on one side of the corridor and zig zagging the corridor would not be required.

Cost Impact: The proposed changes will not increase the cost of construction. There will be a reduction

407.4.3-G-BALDASSARRA-CTC

Public Hearing Results

This code change was heard by the IBC Means of Egress code development committee.

Committee Action: Approved as Submitted

Committee Reason: Allowance in Group I-2 nursing homes for limited furniture located along the corridor will increase the quality of life for residents without a decrease in safety. This allowance is already permitted by the certification requirements and NFPA 101. Concerns for zig-zag egress paths and non-fixed furniture have been addressed.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee – Care facilities study group, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

407.4.3 Projections in corridors. In Group I-2 ~~nursing homes~~ Condition 1, where the *corridor* width is a minimum of 96 inches (2440 mm), projections shall be permitted for furniture where all of the following conditions are met:

1. The furniture is attached to the floor or to the wall.
2. The furniture does not reduce the clear width of the *corridor* to less than 72 inches (1830 mm) except where other encroachments are permitted in accordance with Section 1005.7.
3. The furniture is positioned on only one side of the *corridor.*
4. Each arrangement of furniture is 50 square feet (4.6 square meters) maximum in area.
5. Furniture arrangements are separated by 10 feet (3050 mm) minimum.
6. Placement of furniture is considered as part of the fire and safety plans in accordance with Section 1001.4.

1005.7.2 (IFC [B] 1005.7.2) Other projections. *Handrail* projections shall be in accordance with the provisions of Section 1012.8. Other nonstructural projections such as trim and similar decorative features shall be permitted to project into the required width a maximum of 1½ inches (38 mm) on each side.

> **Exception:** Projections are permitted in corridors within Group I-2 ~~nursing homes~~ Condition 1 in accordance with Section 407.4.3.

Commenter's Reason: Code change G73 is a technical change which included new text dealing with projections into corridors of nursing homes. The purpose of this public comment is limited to the editorial coordination of terminology with the approval of Code change G257 which revised the terminology for Group I-2 occupancies into two use conditions, similar to the way the current code addresses Group I-3. In this case, nursing homes fall under Group I-2, Condition 1. Since G257 deals only with terminology, this public comment is being submitted to G73 in order to focus the attention on the coordination of terminology issue.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Care Facilities". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/CareFacilities.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings

– all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

Staff analysis: Code change G257-12 was Approved as Modified at the Code Development Hearings and a public comment has not been submitted. Accordingly it has been placed on the consent agenda.

G73-12
Final Action: AS AM AMPC____ D

G76-12
407.5

<u>Proposed Change as Submitted</u>

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare

Revise as follows:

407.5 Smoke barriers. *Smoke barriers* shall be provided to subdivide every *story* used by persons receiving care, treatment or sleeping and to divide other *stories* with an *occupant load* of 50 or more persons, into no fewer than two *smoke compartments*. Such *stories* shall be divided into *smoke compartments* with an area of not more than 22,500 square feet (2092 m^2)<u>in Group I-2 occupancies and not more than 40,000 square feet in Group I-2 hospitals</u> and the travel distance from any point in a *smoke compartment* to a *smoke barrier* door shall be not greater than 200 feet (60 960 mm). The *smoke barrier* shall be in accordance with Section 709.

Reason: This proposal is submitted by the ICC Ad Hoc Committee for Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the <u>American Society for Healthcare Engineering</u>, a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

This code change addresses outdated code material. Historically, smoke compartment size has been driven by the allowable travel distance within the smoke compartment. Past code changes have increased the travel distance without a corresponding change in smoke compartment size. Secondly, the size of the functional patient areas has increased, but the occupant load has remained the same or has been reduced. Therefore, we are asking for an increase in smoke compartment size to accommodate the operational needs of the modern hospital.

A summary of the history of smoke compartment requirements is as a requirement is as follows:

- October 1984 BCMC – Maximum length and width equals 150 feet.
- 1987 BOCA – 610.5 – Maximum length and width equals 150 feet
- 1992 BOCA Supplement – 610.4 – 22,500 uare feet, with maximum travel distance of 150 feet.
- Code Change No. B20-95 – 22,500 square feet, with maximum travel distance proposed to be increased to 200 feet.
- 1996 BOCA – 409.4 - 22,500 square feet, with maximum travel distance of 200 feet.
- 2000 IBC – 407.4 - 22,500 square feet, with maximum travel distance of 200 feet.

Originally, there was no limit to smoke compartment size, other what was imposed by travel distance. The 22,500 square foot requirement was based on the old travel distance requirement of 150 feet, and used it to extrapolate an area (150ft x150ft = 22,500 square feet). This proposal uses the same logic and applies the current 200 foot travel distance maximum (200ft x200ft), resulting in a 40,000 square foot smoke compartment. This proposal would maintain the existing requirement that each floor be divided into two smoke compartments. Practically the requirement for 200' travel distance within smoke compartments will still drive smaller smoke compartment sizes in some cases.

Over the past 20 years, there has been a steady increase in the size of patient treatment rooms in hospitals. The primary reason for the increase is the equipment and utilities necessary for the treatment of a patient, such as patient monitoring, gases, and diagnostics equipment, while maintaining space for staff access to the patient. In response, the widely adopted and enforced "*Guidelines for the Design and Construction of Health Care Facilities"* from the FGI Institute have also increased, making these operational considerations actual code requirements. In the case of the inpatient units, the adoption of a single bed in a patient room has had the largest impact on square footage, while not significantly increasing the number of occupants on the unit.

The concept of an "individual patient space" is becoming the standard design in other types throughout the hospital. Many emergency departments are opting for private patient exam spaces with hard walls, primarily for infection control and patient privacy considerations. Similarly, radiology areas are being driven by technology and clearance issues which go beyond the required minimums, and have impacts on square footages to achieve clearances. In some units, there has also been an increase in the types of required support spaces, including ratios of equipment storage per treatment room, the increased importance of computer equipment rooms, and various staff areas. However, support spaces have remained largely the same, while the main increases have been in the size of the patient treatment areas themselves. While these spaces have been increasing in size, the smoke compartment size requirements have been left unchanged in the building codes.

When studying the contemporary sizes of functions such as emergency departments, radiology operations, and bed units, the larger size allows for greater visualization from the staff to the patient, which is a crucial aspect of planning a patient area. This operational consideration could more easily be achieved before the increase in patient areas, but the same operational

considerations require an increase to the smoke zone size to match contemporary requirements, delivery of care and technologies. Attached is a study of space programs which compare the 2010 Guideline requirements with the 1996-97 Guidelines. In short, today's hospital takes more square footage to care for the same amount of patients. These programs demonstrate the need to increase to 40,000 square foot smoke compartment. See program analysis at the following link.
http://www.iccsafe.org/cs/AHC/Pages/WG-General.aspx

Cost Impact: This proposal will help to decrease the cost of construction. Increasing the compartment size will reduce the number of smoke and fire dampers and lifetime maintenance costs could proportionately decrease.

407.5-G-Williams-Adhoc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This proposal was disapproved based upon lack of technical justification. Travel distance was not felt to be a sufficient justification for the increase. Also the increase was seen as too large and perhaps can be accomplished in an incremental fashion. Also there was concern that this increase was being made without revising the occupant loads in Chapter 10. There was also concern with the size of refuge areas based upon a potential increase in occupant load.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

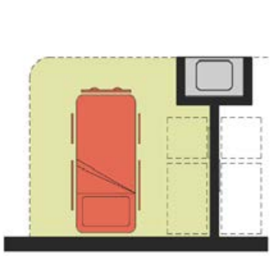
407.5 Smoke barriers. *Smoke barriers* shall be provided to subdivide every *story* used by persons receiving care, treatment or sleeping and to divide other *stories* with an *occupant load* of 50 or more persons, into no fewer than two *smoke compartments*. Such *stories* shall be divided into *smoke compartments* with an area of not more than 22,500 square feet (2092 m^2) in Group I-2 ~~occupancies~~ nursing homes and not more than 40,000 square feet in Group I-2 hospitals and the travel distance from any point in a *smoke compartment* to a *smoke barrier* door shall be not greater than 200 feet (60 960 mm). The *smoke barrier* shall be in accordance with Section 709.

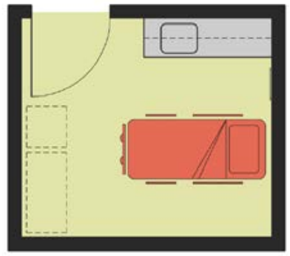
Commenter's Reason: The revised smoke compartment size was specifically intended only to apply to hospitals. This public comment is being submitted to respond to the concerns of the General Committee.

To clarify the practical application of smoke compartments in Group I-2 hospitals, they are routinely unable to consistently be maximized at the current 22,500 square feet. Due to programmatic concerns, the average compartment is between 14,000 and 18,000 square feet. When planning space, and the 22,500 square foot limit is reached, the programmatic needs of the functional area are subdivided to respond to the required limit. For example, an emergency department that has 50 bays, which may be able to exist in a 28,000 square foot area with proper staffing, would be divided into two areas of 14,000 square feet to satisfy the code requirement, sacrificing needed visual by installing the barrier down the middle.

The reason that our sample ED can exist in 28,000 square feet is because other regulatory issues cause the spaces to be larger. Exam bays have gone from 80 square feet to 100 square feet, imaging rooms have gone from 120 square feet to 180 square feet because the equipment and their servers have gotten bigger, and new medical/surgical rooms are mandated to have one bed in them, when two beds was acceptable prior to these new regulations. As these requirements have caused spaces to become larger, the smoke zone size has not followed in kind. What used to fit comfortably within the 22,500 square foot area can no longer fit, while treating the same number of patients and accommodating the same number of staff.

The same logic caused the need for larger suite sizes, which was recommended for approval in this code cycle. The supporting programming documentation was intended to describe and compare how the same spaces have grown as described above. Below are graphic representations of examples of spaces that have grown, and demonstrate that the same number of occupants are working and being treated in the space as before, which does not increase the occupant load.

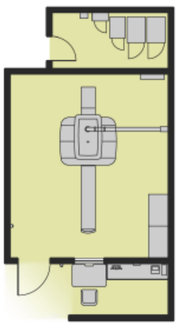




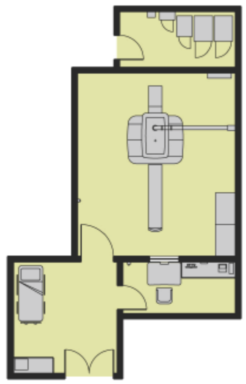
1996
80 square feet

2010
100 square feet

The sketch above describes an emergency department patient bay. What used to be able to be constructed in 80 square feet now requires 100 square feet.



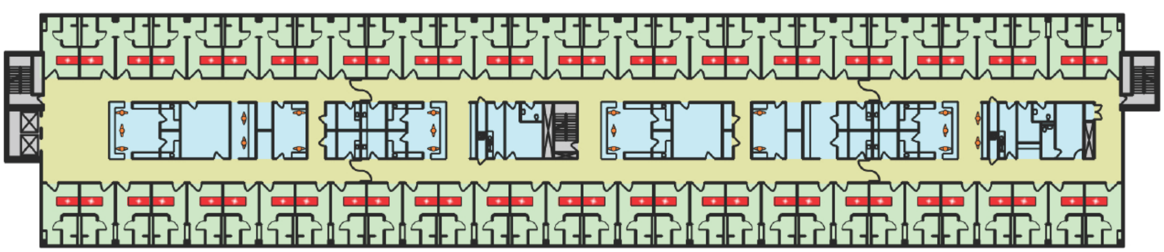
1996 Guideline



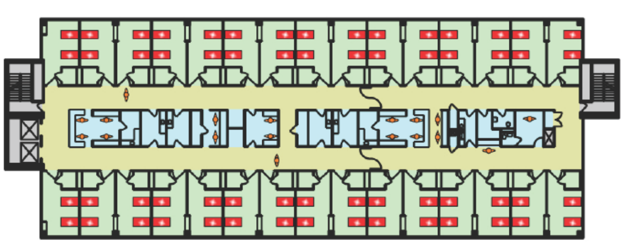
2010 Guideline

Similarly, the sketch above shows a typical MRI suite. In past years, the zoning of the equipment space was more flexible. The requirement is now based on the American College of Radiology's "Guidance Document for Safe MR Practices," 2007 version, page 3, Figure 1. The four-zone approach requires the use of more buffer spaces, increasing the square footage needed to configure the suite.

In terms of occupant load, increasing the square foot per occupant would have no effect. All aspects of egress are set via travel distance and functional need to move beds and stretchers through the facility doors and corridors. For example, corridors are required to be 96 inches, doors a minimum of 32 inches, etc. If these widths were calculated from the occupancy load, they would be drastically smaller, which serves no functional purpose and are not desired. Increasing the square foot per occupant only makes this discrepancy greater.



2010 Guideline



= patient bed

= staff member

1996 Guideline

The sketch above demonstrates the impact of occupants on the increased space needed to treat the same number of patients as well as house the same number of staff. Increased requirements for support spaces, such as computer server closets, soiled utility, increased storage per room and staff support spaces has cause the support "core" to increase. This in addition to patient rooms that are allowed to only have one bed, rather than the past allowance for two beds per patient room.

The previously submitted packages also demonstrate various functional programs within the hospital, with compliant space requirements. For example, a medical/surgical bed unit can fit into approximately 34,000 square feet, an emergency department can fit into about 30,000 square feet, and a radiology imaging area into 38,000 square feet. This demonstrates that a hospital would not go to maximize the compartment size, as is the case now, but to allow the functional and staffing considerations drive the size of the compartment, and not for the sake of the 22,500 number.

The problem of zone barriers occurs mostly on the lower floors, which is why having this increase occur in only areas that do not contain patient sleeping beds. The bed floors are subject to the requirement of a minimum of two smoke zones per floor, which is key to the defend in place concept and horizontal bed movement if needed. A floor plate of two 22,500 square foot smoke zones is still a workable in terms of planning a floor. This issue rises in emergency departments, radiology areas, observation units, which routinely occur on the lower floors of the hospital, and have much larger floor plates.

The varying size of the program square footages also make it difficult to establish an incremental smoke zone size, as suggested by the committee at the Code Action Hearings. This leads us to the logical next step of using the currently allowed 200 foot travel distance to exits as the limiting factor for the zone size. This is not the primary reason for seeking the increase in smoke size, but the figure that makes the most sense given where the original 22,500 was derived: from the 150 smoke zone distance as described in the original reason statement. For support of the concept that the travel distance set the original smoke zone size, please see IEBC, paragraph 803.3.1, allows unlimited travel distance in buildings of 150 feet by 150 feet.

Therefore, using 200 foot travel distance as the basis for the zone increase is the most logical approach to allow the needed planning flexibility to maximize visual to patients, and have staffing and care delivery set the size of the compartment in the building.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

The AHC is proposing a revision to address some of the oversights in the I-Codes of long-standing and operational requirements for hospitals and healthcare facilities that has not been specifically addressed. The requirements being proposed in this code change have been long-standing provisions of the construction and operational requirements for healthcare facilities.

Cost Impact: This proposal will help to decrease the cost of construction. Increasing the compartment size will reduce the number of smoke and fire dampers and lifetime maintenance costs could proportionately decrease.

Public Comment 2:

John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare, requests Approval as Modified by this Public Comment.

Modify the proposal as follows

407.5 Smoke barriers. *Smoke barriers* shall be provided to subdivide every *story* used by persons receiving care, treatment or sleeping and to divide other *stories* with an *occupant load* of 50 or more persons, into no fewer than two *smoke compartments*. Such *stories* shall be divided into *smoke compartments* with an area of not more than 22,500 square feet (2092 m^2) in Group I-2 ~~occupancies~~ <u>Condition 1</u> and not more than ~~40,000~~ <u>22,500</u> square feet in Group I-2 ~~hospitals~~ <u>Condition 2</u> and the travel distance from any point in a *smoke compartment* to a *smoke barrier* door shall be not greater than 200 feet (60 960 mm). The *smoke barrier* shall be in accordance with Section 709.

Commenter's Reason: Code change G76 is a technical change which proposes to revise the smoke compartment thresholds for hospitals. The purpose of this public comment is limited to the editorial coordination of terminology with the approval of Code change G257 (see below). In this case, nursing homes fall under Group I-2, Condition 1 and hospitals are Group I-2 Condition 2. Since G257 deals only with terminology, this public comment is being submitted to G76 in order to focus the attention on the coordination of terminology issue. This public comment reinstates the current smoke compartment size of 22,500 for all Group I-2 in order for the comment to focus only on the issue of coordination with G257. In addition to this public comment, the Ad Hoc committee on Healthcare has also submitted a separate public comment which addresses the technical aspects of G76.

At the Code Development Hearing, the IBC - General committee approved as modified G257-12 which created two occupancy conditions for Group I-2, similar to what is currently in the IBC for Group I-3. The end result is that where warranted based on the type of occupancy, the code would designate Group I-2 nursing homes as Group I-2 Condition 1 and Group I-2 hospitals as Group I-2 Condition 2. As indicated in the reason statement for G257, the benefit of the condition concept, when compared to creating new use groups, (i.e. Group I-5 or I-6) is that a majority of code requirements would still apply to all Group I-2 occupancies.

Following the successful action on G257, the ICC Ad Hoc Committee for Healthcare (AHC) did a word search of the IBC along with a review of code changes submitted in the 2012 Cycle which are unique to hospitals and nursing homes to determine whether or not the condition designation was necessary in order to distinguish between the two typical Group I-2 occupancies. As noted above, the majority of the code requirements do not differentiate based on these two types of Group I-2 and as such the number of instances where the Group I-2 condition designation is necessary is kept to a minimum. Code change G76 is one such application where the Group I-2 Condition 1 and 2 designation is warranted and therefore this public comment is being submitted by the AHC.

The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

Staff analysis: Code change G257 was Approved as Modified at the Code Development Hearings and a public comment has not been submitted. Accordingly it has been placed on the consent agenda.

Public Comment 3:

Wade Rudolph, CBET, CHFM, Sacred Heart Hospital, representing Wisconsin Healthcare Engineers Association Codes & Standards Committee, requests Approval as Submitted

Commenter's Reason: The proposal as submitted by John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare should be accepted as proposed. If the reasoning provided by the original comment or is reviewed again, the committee can see that there are valid reasons to accept this proposal.

The rationale of the ICC committee to reject the proposal is invalid. There are many proposals that are accepted without technical justification.

In today's hospitals with quick response fire sprinkler systems, staff training to close door to the room of origin, and low hazards, there is no reason presented that the smoke compartment size must be limited to a magical 22,500 square feet. I am not aware of any fire situation where the size of the compartment was an issue.

The second reason for rejecting the proposal stated by the committee was there was a concern with the size of the refuge area. This concern is invalid as the area of refuge size is not determined by smoke compartment size.

In I2 occupancy the smoke barriers have been demonstrated to be very effective in limiting the transfer of smoke and providing a safe area for patients to be staged while fire event is being addressed. I recently witnessed a fire event and in this event the hospital employees had completely evacuated a wing of the building in the amount of time it took me to climb four floors (less than 2 minutes). Based on my observation of this real event, I am convinced that larger smoke compartments are not a concern for the following reasons: 1. Hospitals are predominately low hazard areas which are slow to burn and support combustion. 2. The buildings constructed under the current code are fully sprinkler protected and the fire will be contained in the room of origin. 3. The employees in hospitals are trained and practice this training at least quarterly to efficiently move patients to the next smoke compartment immediately upon activation of the fire alarm system. 4. The originally defined area of 22,500 was not justified with any "technical justification" and was a very conservative number. In the fire events that I have witnessed, there was always ample time to move patients to very remote locations with no issue of harm to the patient.

The entire country is concerned about healthcare pricing. If healthcare construction costs can be reduced with no increase in potential harm to the patient, this proposal should be accepted. Every patient room is protected by smoke walls and fire sprinkler systems already. These systems have demonstrated effectiveness time and time again. The fire loss in buildings with current code construction is limited to the room of origin. There is no justifiable need for more than two smoke compartments on a given floor when buildings are constructed to the current code.

I am submitting this request on behalf of the Wisconsin Healthcare Engineers Association Codes & Standards committee representing over 700 members in the State of Wisconsin.

Thank you for your time and consideration of my comments.

G76-12

Final Action: AS AM AMPC____ D

G77-12
IBC 407.9 (New), IFC 604.2.16 (New) [IBC [F] 2702.2.17 (New)]

Proposed Change as Submitted

Proponent: Robert W. Jenkins, Chesterfield Fire & EMS, representing self (jenkinsr@chesterfield.gov)

Add new text as follows:

407.9 Emergency power. A minimum of 96-hours of emergency power shall be provided to the essential electrical systems in Group I-2 hospitals and nursing homes. Emergency power shall be connected to the life safety branch and the critical branch defined in NFPA 70, and further defined as emergency power supply systems in Chapter 4 of NFPA 110.

Add new text as follows:

IFC 604.2.16 (IBC [F] 2702.2.17) Group I-2 Occupancies. Emergency power shall be provided in Group I-2 hospitals and nursing homes in accordance with Section 407.9 of the *International Building Code*.

Reason: Group I-2 facilities are defend in place occupancies where occupants are usually not relocated. NFPA 110, Chapter 5 requires 96-hours of fuel supply for a Level 1 EPSS Class X system when located in seismic design category C, D, E or F. Time frames for emergency power supplies need to be adjusted to allow facilities adequate time to maintain fuel supplies to secondary power sources. Our jurisdiction has had a power loss for several days due primarily to hurricane remnants on the east coast, such as hurricane Isabel in 2003. Power was not restored to several areas from as little as five days to a maximum of 30-days.

Cost Impact: The code change proposal will increase the cost of construction. Cost increase will be incurred due to additional fuel storage requirements and/or type of secondary sources.

2702.2.17 (NEW)-G-JENKINS.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal brings emergency power directly into the IBC instead of depending on the requirement found within NFPA 70. There was concern that 96 hours of emergency power may be too excessive for some areas and it was encouraged that the risk based approach offered in NFPA 99 be utilized.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Williams, Adhoc Health Care – MOE study group, requests Disapproval.

Commenter's Reason: The committee requests disapproval of this proposal based on the following three reasons. In addition, the committee feels that the proposed revisions to G80 will address at least a portion of the concerns in this proposal.

First reason: G77 requires a 96 hour fuel supply. NFPA only requires this for Level 1 systems (not necessarily all nursing facilities) in a seismic risk area. This proposal would greatly increase the scope of that requirement counter to the intent of the NFPA standards. The reason statement from the committee says they would rather use a risk based approach in NFPA 99.

Secondly, G77 makes a statement that technically flawed. It says that emergency power should only be connected to the critical or life safety branches – it could be read to disallow the third branch of the traditional essential electrical system: the equipment branch. This is in direct conflict with NFPA 99.

Thirdly, the reference to NFPA 110 for emergency -power connection to branches is incorrect as well – NFPA 110 does not address the division of branches of emergency-power it addresses the performance of the system, components and switches. Chapter 4 in the 2010 version only deals with the classification of the emergency-power system.

The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

G77-12

Final Action: AS AM AMPC____ D

G80-12
407.11(New), IFC 604.2.15 (New) [IBC [F] 2702.2.16 (New)]

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care

Add new text as follows:

407.11 Electrical systems. In Group I-2 occupancies, the essential electrical power for electrical components, equipment and systems shall be designed and constructed in accordance with the provisions of Chapter 27 and NFPA 99.

Add new text as follows:

IFC 604.2.15 (IBC [F] 2702.2.16) Group I-2 Occupancies. Essential electrical power for Group I-2 occupancies shall be in accordance with Section 407.11.

Reason: Currently emergency power systems are required to comply with NFPA 99 by the Center for Medicare/Medicaid Services (CMS) in order for a facility to receive federal reimbursement funds. Providing the code language requiring compliance with NFPA 99 will ensure the required power system is provided in Group I-2 occupancies. While there is a reference to NFPA 99 in NFPA 70, there is no direct reference. This closes up a gap in the requirements. A reference to Chapter 27 will comprehensively address electrical systems including references to NFPA 70, 110 and 111.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

Cost Impact: The proposed changes will not increase the cost of construction.

407.11-G-Williams-Adhoc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was consistent with G77-12 which was Approved as Submitted. This proposal references NFPA 99 which provides a method of understanding the particular risks of a facility. This proposal adds additional clarification as to what is required for Group I-2 occupancies. G77-12 should be coordinated with G80-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Williams, Adhoc Health Care – MOE study group, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

407.11 Electrical systems. In Group I-2 occupancies, the essential electrical ~~power~~ system for electrical components, equipment and systems shall be designed and constructed in accordance with the provisions of Chapter 27 and NFPA 99.

IFC 604.2.15 (IBC [F] 2702.2.16) Group I -2 Occupancies. Essential electrical ~~power~~ systems for Group I-2 occupancies shall be in accordance with Section 407.11.

Commenter's Reason: The intent of the modification would be to revise the term "essential electrical power" to use the NFPA defined term as defined by NFPA 99-2012, as follows:

3.3.48 Essential Electrical System. A system comprised of alternate sources of power and all connected distribution systems and ancillary equipment, designed to ensure continuity of electrical power to designated areas and functions of a health care facility during disruption of normal power sources, and also to minimize disruption within the internal wiring system.

Appendix commentary: A.3.3.48 Essential Electrical System. The essential electrical system can be comprised of three branches: life safety branch, critical branch, and equipment branch.

In addition, the intent is to coordinate this proposal with G77. Chapter 27 has a reference to NFPA 110 for the review of the system. NFPA 99 allows the use of the risk based approach for analysis of the fuel and water supply needs.

The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

G80-12

Final Action: AS AM AMPC____ D

G81-12
408.3.9 (New)

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering, (al.godwin@aon.com)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE.

Add new text as follows:

<u>**408.3.9 Door penetrations.** When cell walls are also the corridor walls, cell doors are permitted to have openings necessary to observe, communicate, feed or otherwise interact with the inmate.</u>

Reason: In the case of maximum security confinement or medical security confinement, with individual cells, an access opening through the door is not uncommon. To require such opening to be protected and/or self closing is not realistic.

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

408.3.9 (NEW)-G-GODWIN

Public Hearing Results

This code change was heard by the IBC Means of Egress code development committee.

Committee Action: **Approved as Submitted**

Committee Reason: Some jail facilities may have corridors that are required to be rated, therefore, allowances for access through the door to service prisoners is appropriate to balance security concerns and fire safety concerns.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

William E. Koffel, P.E., Koffel Associates, Inc., requests Disapproval.

Commenter's Reason: Due to a schedule conflict, I was not available to testify regarding G81-12 in Dallas. However, the proposed new language is not necessary. The issue is already addressed, and better addressed in Section 408.8.

The submitter's intent seems to be corridors in Group I-3. However, Table1018.1 sends the user of the Code to Section 408.8 for reductions in corridor ratings. Section 408.8 indicates when a corridor is required to be either smoke-tight. Under no circumstances does Section 408.8 require the corridor to have a fire-resistance rating.

When the room face is required to be smoke-tight, Section 408.8.3 provides the requirements for openings in the room face. The area of openings is restricted to 120 square inches (not covered by G81 language), openings shall not be more than 36 inches above the floor (not covered by G81 language), and in Occupancy Condition 5, the openings shall be closable from within the room (not covered by G81 language).

Not only is the issue addressed by Section 408.8 but adding this new paragraph will add subjective language ("openings necessary to….") which could be interpreted to override the prescriptive requirements of Section 408.8.

G81-12
Final Action: AS AM AMPC____ D

G83-12
410.3.5

Proposed Change as Submitted

Proponent: William E. Koffel, P.E., Koffel Associates, Inc., representing Won-Door Corporation (wkoffel@koffel.com)

Revise as follows:

410.3.5 Proscenium curtain. Where a proscenium wall is required to have a fire-resistance rating , the stage opening shall be provided with a fire curtain complying with NFPA 80, a horizontal sliding doors having a fire protection rating of at least one hour, or an approved water curtain complying with Section 903.3.1.1 or, in facilities not utilizing the provisions of smoke-protected assembly seating in accordance with Section 1028.6.2, a smoke control system complying with Section 909 or natural ventilation designed to maintain the smoke level at least 6 feet (1829 mm) above the floor of the means of egress

Reason: Horizontal sliding doors can be used to protect proscenium openings without interfering with the operational considerations of the proscenium opening. A horizontal sliding door with a fire protection rating of at least one hour offers a level of protection greater than that provided by a fire curtain which is tested for a fire exposure of 30 minutes and the acceptance criteria does not include either the hose stream (included in the fire test for horizontal sliding doors or temperature rise criteria which is also not included in a fire protection rating).

Cost Impact: The proposed changes will not increase the cost of construction.

410.3.5-G-KOFFEL

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved as it is a viable design option for the protection of stages.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

William E. Koffel, P.E., Koffel Associates, Inc., representing Won-Door Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

410.3.5 Proscenium curtain. Where a proscenium wall is required to have a fire-resistance rating , the stage opening shall be provided with a fire curtain complying with NFPA 80, horizontal sliding doors complying with Section 716.5.2 and having a fire protection rating of at least one hour, or an approved water curtain complying with Section 903.3.1.1 or, in facilities not utilizing the provisions of smoke-protected assembly seating in accordance with Section 1028.6.2, a smoke control system complying with Section 909 or natural ventilation designed to maintain the smoke level at least 6 feet (1829 mm) above the floor of the means of egress.

Commenter's Reason: Although not noted in the Committee Report during the Dallas hearings it was noted that a reference to Chapter 7 should be included in the new text concerning horizontal sliding doors. As such, a reference to Section 716.5.2 has been proposed.

G83-12

Final Action: AS AM AMPC____ D

G86-12
412.3, 412.3.1, 412.3.2, Table 412.3.2, 412.3.3, 412.3.4, 412.3.5

Proposed Change as Submitted

Proponent: Eric Rosenbaum, Hughes Associates, Inc., representing Air Traffic Control Tower Fire Life Safety Task Group (erosenbaum@haifire.com)

Revise as follows:

412.3 Airport traffic control towers. The provisions of Sections 412.3.1 through 412.3.~~5~~11 shall apply to airport traffic control towers ~~not exceeding 1,500 square feet (140 m^2) per floor~~ occupied only for the following uses:

1. Airport traffic control cab.
2. Electrical and mechanical equipment rooms.
3. Airport terminal radar and electronics rooms.
4. Office spaces incidental to the tower operation.
5. Lounges for employees, including sanitary facilities.

412.3.1 Type of construction. Airport traffic control towers shall be constructed to comply with the height ~~and area~~ limitations of Table 412.3.2.

TABLE 412.3.2
HEIGHT ~~AND AREA~~ LIMITATIONS FOR AIRPORT TRAFFIC CONTROL TOWERS

TYPE OF CONSTRUCTION	HEIGHT[a] (feet)	~~MAXIMUM AREA (square feet)~~
IA	Unlimited	~~1,500~~
IB	240	~~1,500~~
IIA	100	~~1,500~~
IIB	85	~~1,500~~
~~IIIA~~	~~65~~	~~1,500~~

a. Height to be measured from grade plane to cab floor

412.3.2 Stairway Stairways in Airport traffic control towers shall conform to the requirements of Section 1009. Such *stairways* shall be a smokeproof enclosure in accordance with Section 909.20. The stair pressurization alternative in accordance with Section 909.20.5 shall be permitted to be used. *Stairways* shall not be required to extend to the roof as specified in Section 1009.11.

412.3.3 Exit access. From observation levels, airport traffic control towers shall be permitted to have a single means of exit access for a distance of travel not exceeding 100 ft (30 m). This means of egress shall be permitted to include exit access utilizing an unenclosed stair at the observation level.

~~412.3.2~~ 412.3.4 Single means of egress. Not less than one *exit stairway* shall be permitted for airport traffic controls towers of any height provided that the *occupant load* per floor is not greater than 15 and the area per floor does not exceed 1,500 square feet (140 m^2). ~~The *stairway* shall conform to the requirements of Section 1009. The *stairway* shall be separated from elevators by a minimum distance of one-half of the diagonal of the area served measured in a straight line. The *exit stairway* and elevator hoist-way are permitted to be located in the same shaft enclosure, provided they are separated from each other by a 4-hour *fire barrier* having no openings. Such *stairway* shall be pressurized to a minimum of 0.15 inch of water column (43 Pa) and a maximum of 0.35 inch of water column (101 Pa) in the shaft relative to the building with stairway doors closed. *Stairways* need not extend to the roof as specified in Section 1009.11. The provisions of Section 403 do not apply.~~

~~**Exception:** Smokeproof enclosures as set forth in Section 1022.9 are not required where required *stairways* are pressurized.~~

<u>**412.3.4.1 Arrangement of single means of egress.** Airport traffic control towers permitted a single exit and located above another building shall be provided with one of the following:</u>

<u>1. Exit enclosure separated from the other building with no door openings to or from the other building</u>
<u>2. Exit enclosure leading directly to an exit enclosure serving the other building, with walls and door separating the exit enclosures from each other, and another door allowing access to the top floor of the building that provides access to a second exit serving that floor.</u>

<u>**412.3.4.2 Interior Finish.** Airport traffic control towers permitted a single exit in accordance with Section 412.3.4 shall be restricted to interior wall and ceiling finishes of Class A or Class B.</u>

~~412.3.3~~ <u>412.3.5</u> Automatic fire detection systems. Airport traffic control towers shall be provided with an automatic fire detection system installed in accordance with Section 907.2.

<u>**412.3.6 Automatic sprinkler system.** Airport traffic control towers shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.</u>

~~412.3.4~~ <u>412.3.7</u> Standby power. A standby power system that conforms to Chapter 27 shall be provided in airport traffic control towers more than 65 feet (19 812 mm) in height. Power shall be provided to the following equipment:

1. Pressurization equipment, mechanical equipment and lighting.
2. Elevator operating equipment.
3. Fire alarm and smoke detection systems.

<u>**412.3.8 Elevator Protection.** Wires or cables that provide normal and standby power, control signals, communication with the car, lighting, heating, air conditioning, ventilation and fire-detecting systems to elevators shall be protected by construction having a minimum 1-hour *fire resistance rating* or shall be circuit integrity cable having a minimum 1-hour *fire-resistance rating*.</u>

~~412.3.5~~ <u>412.3.9</u> Accessibility. Airport traffic control towers need not be *accessible* as specified in the provisions of Chapter 11

Reason: All of the proposed changes are the recommendation of the Air Traffic Control Tower Fire Life Safety Task Group, and reflect the current approach to fire protection and life safety in airport traffic control towers (ATCT). The fire safety criteria applicable to ATCTs are originally based on an agreement between the operator of and controllers utilizing the ATCTs. Many of the changes relate to reformatting the Section with the intent of clarifying its application.

ATCTs create a unique hazard. ATCTs typically have a limited number of occupants. In addition, occupants must be awake and alert. The hazard associated with ATCTs is affected by the building's limited uses, height, and the potential delay in evacuation because of the handoff of flights .

Section 412.3-The provision of a maximum area per floor of 1,500 square feet limits the usage of the facility without providing significant Fire/Life Safety benefit in Airport Traffic Control Towers with multiple exits. The 1,500 square foot maximum area provisions are proposed to be relocated to restrict the floor size only for single exit towers. It is proposed that facilities in excess of 1,500 square feet per floor would be considered a ATCT only if the uses are limited to those listed in Section 412.3. Facilities with uses other than those listed in Section 412.3 would need to be designed as a typical building as addressed by the remainder of the IBC.

Table 412.3.1-The proposed provisions to limit construction to non-combustible types is presented because the use of combustible construction for a new ATCT allows the introduction of a potential unnecessary hazard developing within the construction without observation. We are not aware of new ATCT utilizing combustible construction.

Section 412.3.2-This change creates a new section containing criteria applicable to stairways for clarity. Most of the criteria were relocated from the existing Section 412.3.2, **Egress**. The current specified pressure differential required by Section 412 does not coordinate with Chapter 9 and the current approaches, a pressure differential of a minimum of 0.10 inches of water. In addition, instead of requiring a smoke proof enclosure by stair pressurization all options are identified as acceptable for providing a smoke proof enclosure.

Section 412.3.3-This section provides new criteria applicable to egress from observation levels. Obstruction related to enclosed stairs would eliminate the ability to provide sightlines. In addition, the reduction in area to allow two stairs to this level would affect operations. The proposed maximum exit access travel distance provision is intended to address exit access from the cab, where a single access stair is provided to allow maximum floor usage and maintain 360 degree line-of-sight requirements. A single exit access stair is typically provided from the observation level with the exit originating on the floor below the observation level. The proposed provision limits travel distance before reaching an exit/exits and is based on the common path of travel limitations established under Chapter 10.

Section 412.3.4- Many of the changes relate to relocations to or from other sections. In addition, the separation distance criteria of the stair to an elevator and fire resistance rating of the shafts is proposed to be removed. Elevators are not typically utilized as a means of egress unless specifically design such as Occupant Evacuation Elevators, Section 3008. If designed as a means of egress the criteria for separation distance of exits in Chapter 10 would potentially apply. Shaft enclosure criteria in Chapter 7 addresses fire resistance rated separation of shafts sufficiently.

Section 412.3.4.1-The proposed provision limiting single stair exit arrangement is intended to provide increased Fire/Life Safety when Airport Traffic Control Towers are built above other buildings. In this scenario, separated exit enclosures are required to protect occupants from the Airport Traffic Control Tower where delayed evacuation of the cab may be required.

Section 412.3.4.2-The proposed restriction on interior finish in a single exit stair Airport Traffic Control Tower is intended to increase Fire/Life Safety by limiting flame spread and smoke production which have a higher probability of impinging on the means of egress in single stair facilities.

Section 412.3.6-The proposed provision requiring sprinkler protection in all Airport Traffic Control Towers is intended to increase life safety and property protection. Life safety is positively affected by limiting the chance of smoke/fire spread and flashover in the facility where delayed evacuation of the cab may be required. In addition, property protection to allow sooner reuse of the structure would be provided.

Section 412.3.8-The proposed provision requiring protection of elevator wiring and cabling is to increase the probability of a functioning elevator to aid firefighters in the event of a fire and to increase the probability that the facility can be rapidly returned back to service after a minor fire incident.

Section 412.3.9 - No change from current criteria. ATCTs are exempt from accessibility criteria in Section 412.3.5.

Cost Impact: This code change will increase the cost of construction from the current code requirements; however, reflects current building practices of ATCTs.

412.3-G-ROSENBAUM

Public Hearing Results

The following errata were not posted to the ICC website.

Underline all of Section 412.3.3 as follows:

412.3.3 Exit access. From observation levels, airport traffic control towers shall be permitted to have a single means of exit access for a distance of travel not exceeding 100 feet (30 m). This means of egress shall be permitted to include exit access utilizing an unenclosed stair at the observation level.

(Portions of proposal not shown remain unchanged)

Committee Action: Disapproved

Committee Reason: The proposal was disapproved as the committee felt that it was inappropriate to remove Type IIIA construction. Also, less restrictive requirements for smaller buildings were necessary with regard to sprinklers and pressurized stairways. In Section 412.3.4.1 as proposed should not restrict all openings. Additionally, terminology with regard to stairways should be revised to be consistent with E5-09/10.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Eric Rosenbaum, Hughes Associates, Inc., representing Air Traffic Control Tower Fire Life Safety Task Group, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

412.3 Airport traffic control towers. The provisions of Sections 412.3.1 through ~~412.3.5~~ 412.3.9 shall apply to airport traffic control towers ~~not exceeding 1,500 square feet (140 m^2) per floor~~ occupied only for the following uses:

1. Airport traffic control cab.
2. Electrical and mechanical equipment rooms.
3. Airport terminal radar and electronics rooms.

4. Office spaces incidental to the tower operation.
5. Lounges for employees, including sanitary facilities.

412.3.1 Type of construction. Airport traffic control towers shall be constructed to comply with the height ~~and area~~ limitations of Table 412.3.2.

TABLE 412.3.2
HEIGHT ~~AND AREA~~ LIMITATIONS FOR AIRPORT TRAFFIC CONTROL TOWERS

TYPE OF CONSTRUCTION	HEIGHT[a] (feet)	~~MAXIMUM AREA (square feet)~~
IA	Unlimited	~~1,500~~
IB	240	~~1,500~~
IIA	100	~~1,500~~
IIB	85	~~1,500~~
IIIA	65	~~1,500~~

a. Height to be measured from grade plane to cab floor

412.3.2 Stairways. Stairways in airport traffic control towers shall be in accordance with Section 1009. Stairways shall be smokeproof enclosures complying with one of the alternatives provided in Section 909.20.

Exception: Stairways in airport traffic control towers are not required to comply with Section 1009.16.

412.3.3 Exit access. From observation levels, airport traffic control towers shall be permitted to have a single means of *exit access* for a travel distance not greater than 100 feet (30480 mm). Exit access stairways from the observation level need not be enclosed.

~~412.3.2 Egress~~ 412.3.4 Number of exits. Not less than one *exit stairway* shall be permitted for airport traffic controls towers of any height provided that the *occupant load* per floor is not greater than 15 and the area per floor does not exceed 1,500 square feet (140 m^2). ~~The *stairway* shall conform to the requirements of Section 1009. The *stairway* shall be separated from elevators by a minimum distance of one-half of the diagonal of the area served measured in a straight line. The *exit stairway* and elevator hoist-way are permitted to be located in the same shaft enclosure, provided they are separated from each other by a 4-hour *fire barrier* having no openings. Such *stairway* shall be pressurized to a minimum of 0.15 inch of water column (43 Pa) and a maximum of 0.35 inch of water column (101 Pa) in the shaft relative to the building with stairway doors closed. *Stairways* need not extend to the roof as specified in Section 1009.11. The provisions of Section 403 do not apply.~~

~~**Exception:** Smokeproof enclosures as set forth in Section 1022.9 are not required where required *stairways* are pressurized.~~

412.3.4.1 Interior finish. Where an airport traffic control tower is provided with only one exit stairway, interior wall and ceiling finishes shall be either Class A or Class B.

~~412.3.3~~ 412.3.5 Automatic fire detection systems. Airport traffic control towers shall be provided with an automatic fire detection system installed in accordance with Section 907.2.

412.3.6 Automatic sprinkler system. Where an occupied floor is located more than 35 feet (10 668 mm) above the lowest level of fire department vehicle access, airport traffic control towers shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1

~~412.3.4~~ 412.3.7 Standby power. A standby power system that conforms to Chapter 27 shall be provided in airport traffic control towers more than 65 feet (19 812 mm) in height. Power shall be provided to the following equipment:

1. Pressurization equipment, mechanical equipment and lighting.
2. Elevator operating equipment.
3. Fire alarm and smoke detection systems.

412.3.8 Elevator protection. Wires or cables that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, *ventilation* and fire-detecting systems to elevators shall be protected by construction having a *fire-resistance rating* of not less than 1 hour, or shall be circuit integrity cable having a *fire-resistance rating* of not less than 1 hour.

412.3.8.1 Elevators for occupant evacuation. Where provided in addition to an exit stairway, occupant evacuation elevators shall be in accordance with Section 3008.

~~412.3.5~~ 412.3.9 Accessibility. Airport traffic control towers need not be *accessible* as specified in the provisions of Chapter 11

909.20 Smokeproof enclosures. Where required by Section 412.3.2 or Section 1022.10, a smokeproof enclosure shall be constructed in accordance with this section. A smokeproof enclosure shall consist of an enclosed interior exit stairway that conforms to Section 1022.2 and an open exterior balcony or ventilated vestibule meeting the requirements of this section. Where access to the roof is required by the International Fire Code, such access shall be from the smokeproof enclosure where a smokeproof enclosure is required.

1009.3 Exit access stairways. Floor openings between stories created by exit access stairways shall be enclosed.

Exceptions:

(Exceptions 1 through 10 not shown remain unchanged)

11. Stairways serving observation levels of airport traffic control towers complying with Section 412 are not required to be enclosed.

Commenter's Reason: All of the proposed changes are the recommendation of the Air Traffic Control Tower Fire Life Safety Task Group, and reflect the current approach to fire protection and life safety in airport traffic control towers (ATCT). The existing IBC criteria is unclear, difficult to interpret how it applies, does not address all of the concerns associated with ATCTs and does not correlate with other sections in the IBC, The fire safety criteria identified in the proposal are originally based on an agreement between the operator of and controllers utilizing the ATCTs. Many of the changes relate to reformatting the Section with the intent of clarifying its application.

The original proposal was revised based on the committee comments as follows:

1. The Committee thought it was inappropriate to remove Type IIIA construction. Type IIIA construction has been reinserted.
2. The Committee thought less restrictive requirements for smaller buildings were necessary with regard to automatic sprinklers. For automatic sprinklers, height requirements for the installation of automatic sprinklers have been added to provide a basis for applying the more restrictive requirements, similarly to that as required by Section 903.2.11.3. The selection of 35 feet was chosen based on the heights of ground ladders typical found at smaller, rural fire departments and airports. Due to the absence of aerial ladders or means to reach higher elevations at these locations, additional levels of fire protection are required to protect the life safety of the tower occupants in towers that exceed 35 feet.
3. The Committee thought less restrictive requirements for smaller buildings were necessary with regard to pressurized stairways. The current IBC/IFC requirements of Section 412.3.2 requires all stairways to be a smoke proof enclosure. Due to the potential delayed response of occupants to allow hand-off of air traffic to controllers not in the building, a smoke proof enclosure is felt to be an appropriate level of safety for all stairways located in new ATCTs by the Air Traffic Control Tower Fire Life Safety Task Group. Providing smoke proof enclosures is common design practice in ATCTs.

Changes to the sections addressing sprinkler protection and Type IIIA construction were made based on committee feedback. The original intent was to provide a superior level of life safety for the building occupants but based on the Committee response the requirements were made too restrictive for smaller ATCTs.

Section 412.3.4.1 was removed due to concerns regarding the restrictions of openings. IBC Chapter 10 is considered to appropriately address these life safety aspects.

The Committee also commented that terminology with regards to stairways should be revised to be consistent with E5-09/10. Revisions were made to the terminology to bring it in line with other ICC terminology.

In addition, criteria for using elevators as a means of egress, including elevator lobbies, has been addressed by referencing section 3008. This addresses a comment received during the meeting to address elevator lobbies if elevators are used as a means of egress. The intent is that elevators used as a means of egress would require compliance with Section 3008, Occupant Evacuation Elevators.

Additional changes to Sections 909.20 and 1009.3 were added to coordinate with proposed changes to Sections 412.3.2 and 412.3.3.

All of the proposed changes are the recommendation of the Air Traffic Control Tower Fire Life Safety Task Group, and reflect the current approach to fire protection and life safety in airport traffic control towers (ATCT). The fire safety criteria applicable to ATCTs are originally based on an agreement between the operator of and controllers utilizing the ATCTs. Many of the changes relate to reformatting the Section with the intent of clarifying its application.

ATCTs create a unique hazard. ATCTs typically have a limited number of occupants. In addition, occupants must be awake and alert. The hazard associated with ATCTs is affected by the building's limited uses, height, and the potential delay in evacuation because of the handoff of flights.

The proposed changes address the following issues:

a. Change addresses the Section has been ignored since 2000 IBC.
b. Recommendations are based on designers and users input and agreement.
c. Reflect current design approaches.
d. Addresses issues not currently addressed by code.
e. Clarifies application.
f. Correlates IBC with other enforcement criteria.
g. Reformats for usability.
h. Take changes as a package.
i. Reflect some increase and decreases in safety.

Provides a practical, designable approach to fire safety that the current requirements do not.

G86-12

Final Action: AS AM AMPC____ D

G90-12
402.1, 402.2, 420.3, 420.6 (New)

Proposed Change as Submitted

Proponent: Jason Thompson, P.E., National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

Revise as follows:

420.1 General. Occupancies in Groups I-1, R-1, R-2 and R-3 shall comply with the provisions of Sections 420.1 through ~~420.5~~ 420.6 and other applicable provisions of this code.

420.2 Separation walls. Walls separating *dwelling units* in the same building, walls separating *sleeping units* in the same building and walls separating *dwelling* or *sleeping units* from other occupancies contiguous to them in the same building shall be constructed as *fire partitions* in accordance with Section 708. For buildings more than two stories in height or that have dwelling or sleeping units located on a floor level that is more than 25 feet above the grade plane, see Section 420.6.

420.3 Horizontal separation. Floor assemblies separating *dwelling units* in the same buildings, floor assemblies separating *sleeping units* in the same building and floor assemblies separating *dwelling* or *sleeping units* from other occupancies contiguous to them in the same building shall be constructed as *horizontal assemblies* in accordance with Section 711. For buildings more than two stories in height or that have dwelling or sleeping units located on a floor level that is more than 25 feet above the grade plane, see Section 420.6.

420.6 Special requirements for Group I-1, R-1 and R-2 occupancies. Buildings classified as a Group I-1, R-1 or R-2 occupancy that are more than two stories in height or that have dwelling or sleeping units located on a floor level that is more than 25 feet above the grade plane shall comply with all of the following requirements:

1. The separation walls specified in Section 420.2 shall be constructed of noncombustible materials to provide a fire resistance rating of not less than 2 hours and shall comply with the requirements for fire barriers in accordance with Section 707.
2. The floor assemblies specified in Section 420.3 shall be constructed of noncombustible materials to provide a fire resistance rating of not less than 2 hours and shall comply with the requirements for horizontal assemblies in accordance with Section 711.
3. Load bearing walls shall meet the requirements of Section 1604 without the use of sheathing.
4. The materials used for construction of walls shall be of a type that is not adversely affected by moisture.

Reason: Though the loss of life from fires affecting Group I-1, R-1 and R-2 occupancies is not high with the changing construction methods and the noticeable shift to light weight construction methods, and the continued national trend in reducing fire department staffing numbers, the proposed code language provides for two distinct safety provisions. The first is the increased compartmentalization of the building to reduce fire spread and damage using passive fire protection methods. The second safety provision is the ability of the structure to be constructed in such a way that it retains its structural integrity after being subject to a fire. The provisions of **Section 101.3 Intent**, state:

> *"The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations."*

Currently many of these load bearing walls are constructed in such a way that the wall sheathing is a critical part of the structural integrity of the wall. The sheathing is used for localized member stability, global stability, and in many cases the lateral load resisting system for the entire building. During an adverse event, such as a fire this sheathing can be compromised by fire damage, mechanical damage, and water damage compromising the overall structural integrity of the building. Where the current standard test used for fire resistance is the ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials, in practice this test does not account for the reduction in strength and stiffness that results from fire and water damage. It is not practical to think that every assembly would be tested at designed load levels and the resulting strength and stiffness data used in design, as a result the proposed provisions would provide for the structure to rely on the sheathing only as a fire resistive element and would allow the structure to maintain its design strength after the sheathing was compromised or removed for any reason.

The proposed story level and floor height is based on the ability for a fire department to make a rescue from the exterior of the structure using the equipment commonly found on an NFPA 1901 equipped motorized fire engine, this using the most common extension ladder size, being a 24 foot long extension ladder which can easily reach a second floor window. In addition, for structures three stories or greater in height, the level of vertical load and potential lateral load on these walls increases and as a result an additional level of safety is needed.

While we acknowledge the success in NFPA 13 & 13R sprinkler systems to manage and control fire, the provisions of this code change are designed the assist those systems in effectively doing their job and to provide structural stability and strength that is dictated under the provisions of Section 101.3.

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

420.1-G-THOMPSON

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Proper justification was not provided for this proposal. Changing 2 hour fire partitions to 2 hour fire barriers was seen as overly restrictive. The origins of the 2 story criteria seem unclear.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Jason Thompson, National Concrete Masonry Association, representing, Masonry Alliance for Codes and Standards; J. Timothy Schreffler, Bellefonte Borough, Centre County, Pennsylvania, representing Bellefonte Fire Department; requests Approval as Submitted

Commenter's Reason (Thompson): The General Code Development Committee missed one of the main fire safety reasons for proposed change G90 when they recommended disapproval. That reason is to protect the fire service during firefighting operations when Group I-1, R-1 and R-2 experience a fire event. The risk to the fire service from collapse of a structure increases significantly for buildings that are more than two stories (e.g. over 25 feet) above ground. This is especially notable when structural stability under fire conditions depends on the combination of light framing and structural sheathing for support. If the strength of the sheathing materially is reduced or eliminated due to damage from a fire or water during the event the structure becomes unstable and a risk to the responding fire service.

Section 101.3, of the IBC specifically states the intent of the code is "*to provide safety to fire fighters and emergency responders during emergency operations".* This proposal is to provide a proper degree of safety and reliability for structural stability for the fire service for I-1, R-1, and R2 occupancies that are more than 2 stories in height by requiring that the stability of the bearing walls be provided independent of the sheathing material used and that the sheathing material used be resistant to damage from moisture. This proposal provides the necessary degree of protection for the emergency responders in these types of structures.

The proposal also increases the fire safety of the building provided to the occupants by increasing the fire resistance of the separations between dwelling units from 1-hour to 2-hours. It also increases the stability of these fire separations under fire conditions by requiring the supporting walls be constructed as fire barriers instead of fire partitions. G90 is recommended for approval as submitted.

Commenter's Reason(Schreffler): In my professional opinion, the proposed code change is a critical step in addressing the structural stability of a building that may have been damaged due to a fire or water condition. With the publication of the 2006 International Building Code, the code recognized the need to maintain the structural stability and protect the firefighters and emergency responders working in the building. In light frame type construction both in wood and steel, this stability and strength can be quickly compromised if the sheathing that is typically used for bracing is removed or compromised. The result could be the loss of enough capacity to cause structural collapse while the responders are in the building. This proposed code change addresses these concerns in I-1, R-1, and R2 occupancies that are more than 2 stories in height by requiring that the stability of the bearing walls be provided independent of the sheathing material and that the sheathing is not moisture sensitive. This is an important step forward in protecting the occupants and our emergency responders in these types of structures.

G90-12
Final Action: AS AM AMPC____ D

G92-12
422.3

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare

Revise as follows:

422.3 Smoke compartments. Where the aggregate area of one or more *ambulatory care facilities* is greater than 10,000 square feet (929 m^2) on one *story*, the *story* shall be provided with a *smoke barrier* to subdivide the *story* into no fewer than two *smoke compartments*. The area of any one such *smoke compartment* shall be not greater than ~~22,500~~ 40,000 square feet (~~2092 m²~~ 3719 m^2). The travel distance from any point in a *smoke compartment* to a *smoke barrier* door shall be not greater than 200 feet (60 960 mm). The *smoke barrier* shall be installed in accordance with Section 709 with the exception that *smoke barriers* shall be continuous from outside wall to an outside wall, a floor to a floor, or from a *smoke barrier* to a *smoke barrier* or a combination thereof.

Reason: This proposal is submitted by the ICC Ad Hoc Committee for Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering, a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx.

Intent and Summary

This code change addresses outdated code material. Historically, smoke compartment size has been driven by the allowable travel distance within the smoke compartment. Past code changes have increased the travel distance without a corresponding change in smoke compartment size. Secondly, the size of the functional patient areas has increased, but the occupant load has remained the same or has been reduced. Therefore, we are asking for an increase in smoke compartment size to accomodate the operational needs of these facilities.

A summary of the history of smoke compartment requirements is as follows:

- October 1984 BCMC – No area limitations. Maximum length and width equals 150 feet.
- 1987 BOCA – 610.5 – No area limitations. Maximum length and width equals 150 feet
- 1992 BOCA Supplement – 610.4 – 22,500 square feet, with maximum travel distance of 150 feet.
- Code Change No. B20-95 – 22,500 square feet, with maximum travel distance proposed to be increased to 200 feet.
- 1996 BOCA – 409.4 - 22,500 square feet, with maximum travel distance of 200 feet.
- 2000 IBC – 407.4 - 22,500 square feet, with maximum travel distance of 200 feet.

Originally, there was no limit to smoke compartment size, other what was imposed by travel distance. The 22,500 square foot requirement was based on the old travel distance requirement of 150 feet, and used it to extrapolate an area (150ft x150ft = 22,500 square feet). This proposal uses the same logic and applies the current 200 foot travel distance maximum (200ft x200ft), resulting in a 40,000 square foot smoke compartment. This proposal would maintain the existing requirement that each floor be divided into two smoke compartments. Practically the requirement for 200' travel distance within smoke compartments will still drive smaller smoke compartment sizes in some cases.

The application of the smoke compartment size for Ambulatory Care facilities was taken from the hospital requirement in Section 407. There was no specific reason given for using 22,500 square feet as a threshold other than mirroring the hospital requirement.

When studying the contemporary sizes of functions within ambulatory surgery areas, the area provided has increased. Attached is a study of space programs which compare the 2010 Guideline requirements with the 1996-97 Guidelines. In short, today's ambulatory surgery facility takes more square footage to care for the same amount of patients. These programs demonstrate the need to increase to 40,000 square foot smoke compartment. See program analysis at the following link. **http://www.iccsafe.org/cs/AHC/Pages/WG-General.aspx**

Cost impact: This proposal will help to decrease the cost of construction. Increasing the compartment size will reduce the number of smoke and fire dampers and lifetime maintenance costs could proportionally decrease.

422.3-G-WILLIAMS-ADHOC.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based upon the previous action on G76-12. The main focus of the concern focused upon occupant load, travel distance and refuge areas.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

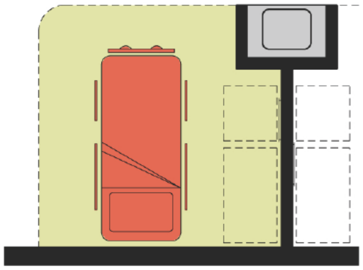
John Williams, Adhoc Health Care – MOE study group, requests Approval as Submitted.

Commenter's Reason: This public comment is being submitted to respond to the concerns of the General Committee.

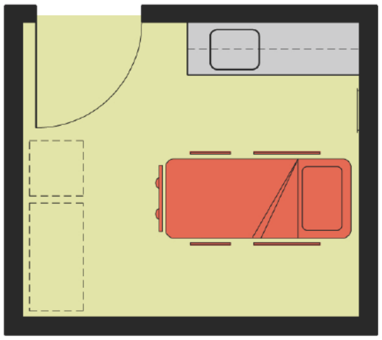
To clarify the practical application of smoke compartments in ambulatory healthcare facilities, they are routinely unable to consistently be maximized at the current 22,500 square feet. Due to programmatic concerns, the average compartment is between 14,000 and 18,000 square feet. When planning space, and the 22,500 square foot limit is reached, the programmatic needs of the functional area are subdivided to respond to the required limit. For example, an emergency department (which are increasingly appearing in an ambulatory setting) with 50 bays, which may be able to exist in a 28,000 square foot area with proper staffing, would be divided into two areas of 14,000 square feet to satisfy the code requirement, sacrificing needed visual by installing the barrier down the middle.

The reason that our sample ED can exist in 28,000 square feet is because other regulatory issues cause the spaces to be larger. Exam bays have gone from 80 square feet to 100 square feet, imaging rooms have gone from 120 square feet to 180 square feet because the equipment and their servers have gotten bigger, and new medical/surgical rooms are mandated to have one bed in them, when two beds was acceptable prior to these new regulations. As these requirements have caused spaces to become larger, the smoke zone size has not followed in kind. What used to fit comfortably within the 22,500 square foot area can no longer fit, while treating the same number of patients and accommodating the same number of staff.

The same logic caused the need for larger suite sizes, which was recommended for approval in this code cycle. The supporting programming documentation was intended to describe and compare how the same spaces have grown as described above. Below are graphic representations of examples of spaces that have grown, and demonstrate that the same number of occupants are working and being treated in the space as before, which does not increase the occupant load.

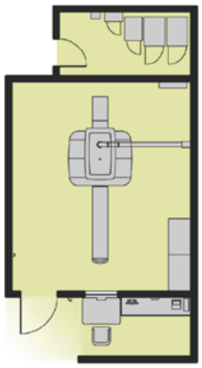


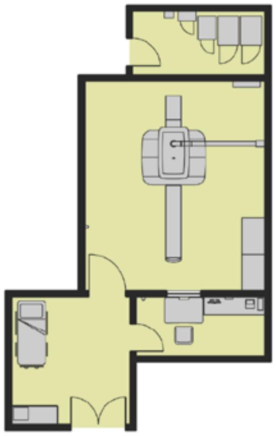
1996
80 square feet



2010
100 square feet

The sketch above describes a typical emergency room patient bay configuration. What used to be able to be constructed in 80 square feet now requires 100 square feet.





1996 Guideline 2010 Guideline

Similarly, the sketch above shows a typical MRI suite. In past years, the zoning of the equipment space was more flextible. The requirement is now based on the American College of Radiology's "Guidance Document for Safe MR Practices," 2007 version, page 3, Figure 1. The four-zone approach requires the use of more buffer spaces, increasing the square footage needed to configure the suite.

In terms of occupant load, increasing the square foot per occupant would have no effect. All aspects of egress are set via travel distance and functional need to move beds and stretchers through the facility doors and corridors. For example, corridors are required to be 96 inches, doors a minimum of 32 inches, etc. If these widths were calculated from the occupancy load, they would be drastically smaller, which serves no functional purpose and are not desired. Increasing the square foot per occupant only makes this discrepancy greater.

The previously submitted packages also demonstrate various functional programs within the ambulatory care facility, with compliant space requirements. For example, an MRI suite typically built in an outpatient setting has increased from about 800 square feet to about 1,400 square feet, due to the zoning. This demonstrates that an ambulatory facility would not go to maximize the compartment size, as is the case now, but to allow the functional and staffing considerations drive the size of the compartment, and not for the sake of the 22,500 number.

The varying size of the program square footages also make it difficult to establish an incremental smoke zone size, as suggested by the committee at the Code Action Hearings. This leads us to the logical next step of using the currently allowed 200 foot travel distance to exits as the limiting factor for the zone size. This is not the primary reason for seeking the increase in smoke size, but the figure that makes the most sense given where the original 22,500 was derived: from the 150 smoke zone distance as described in the original reason statement. For support of the concept that the travel distance set the original smoke zone size, please see IEBC, paragraph 803.3.1, allows unlimited travel distance in buildings of 150 feet by 150 feet.

Therefore, using 200 foot travel distance as the basis for the zone increase is the most logical approach to allow the needed planning flexibility to maximize visual to patients, and have staffing and care delivery set the size of the compartment in the building.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

The AHC is proposing a revision to address some of the oversights in the I-Codes of long-standing and operational requirements for hospitals and healthcare facilities that has not been specifically addressed. The requirements being proposed in this code change have been long-standing provisions of the construction and operational requirements for healthcare facilities.

Cost impact: This proposal will help to decrease the cost of construction. Increasing the compartment size will reduce the number of smoke and fire dampers and lifetime maintenance costs could proportionally decrease.

G92-12

Final Action: AS AM AMPC____ D

G99-12
425 (New), Chapter 35

Proposed Change as Submitted

Proponent: Jane Malone, National Center for Healthy Housing (jmalone@nchh.org)

Revise as follows:

SECTION 425
RADON REDUCING CONSTRUCTION FEATURES FOR EDUCATIONAL BUILDING USES

425.1 General. Occupancies classified as Group E shall comply with the provisions of this section where the building is located in an area of High (Zone 1) Radon Potential as determined by Figure AF101 of Appendix F of the *International Residential Code*.

> **Exception.** Buildings complying with the radon resistant construction techniques for new construction in accordance with Chapter 2 of EPA 625-R-92-016.

425.2 Radon Reducing Construction Features. Buildings shall be equipped with the radon reducing features in Section 425.2.1 through 425.2.12.

425.2.1 Vapor Retarder. A continuous vapor retarder meeting ASTM E1745 Class A, B or C, with any seams overlapped not less than 12 inches (305 mm) and sealed, shall be installed under the slab in basement and slab-on-grade construction and on top of the soil in crawl space construction.

425.2.2 Base Course. Floors of basements and slab-on-grade construction shall be placed over a stone base course, not less than 4 inches (102 mm) in thickness. The stone base course shall have a void ratio of not less than 35 percent, or Size Number 4, 5 or 6 shall be used and shall meet the specifications of ASTM C33.

425.2.3 Solid Vent Pipe. Solid vent pipe shall be installed as follows:

1. Basement slabs with interior foundation pipe drains installed shall have solid 6 inch (153 mm) minimum diameter vent pipe sections installed in conjunction with this drainage system. One independent vent stack pipe shall be installed for every contiguous 15,000 square feet (1392 sq. m), or portion thereof, of slab area, terminating at an approved location, as prescribed in Section 425.2.9, on the exterior of the building. Basement slabs with french drains or channel drains shall not be permitted unless interior foundation pipe drains as described in this section are installed.
2. Excluding non-habitable spaces such as garages, basement slabs that do not have an interior foundation pipe drain, and slab-on-grade construction, shall be provided with one 6 inch (153 mm) minimum diameter solid vent pipe section with a "T" pipe fitting or equivalent for every contiguous 15,000 square feet (1392 sq. m), or portion thereof, of slab area, with this vent pipe section to be installed into the sub-slab aggregate. Each of the horizontal openings of the "T" pipe fitting shall be connected to a minimum of 10 feet (3 m) of 6 inch (153 mm) diameter perforated pipe or equivalent area soil gas collection plenum and placed in the sub-slab aggregate. The vertical portion of the "T" pipe fitting shall be connected to an independent solid vent stack pipe terminating at an approved location, as prescribed in Section 425.2.9, on the exterior of the building. Where more than one vent pipe section is provided, interconnection of these sections into a single independent vent stack is permitted for coverage up to a total area of 15,000 square feet (1392 sq. m) to permit use of a single in-line vent pipe fan when activation of the system is desired.
3. Crawl spaces shall be provided with one 6 inch (153 mm) minimum diameter solid vent pipe section with a "T" pipe fitting or equivalent for every contiguous 15,000 square feet (1392 sq. m),

or portion thereof, of crawl space area. Each of the horizontal openings of the "T" pipe fitting shall be connected to a minimum of 10 feet (3 m) of 6 inch (153 mm) diameter perforated pipe or equivalent area soil gas collection plenum and installed upon the soil. The vertical portion of the "T" pipe fitting shall be connected to an independent solid vent pipe terminating at an approved location on the exterior of the building.

4. In combination basement/crawl space or slab-on-grade/crawl space buildings, a 6 inch (153 mm) minimum diameter solid vent pipe is permitted to be provided between the areas and interconnected into the independent vent stack, for coverage up to a total area of 15,000 square feet (1392 sq. m) to permit use of a single in-line vent pipe fan where activation of the system is desired. Slabs areas divided by internal footings shall be permitted to be joined with piping into a single independent vent stack for coverage up to a total area of 15,000 square feet (1392 sq. m).

425.2.4 Joint and Penetration Sealing. Except for french drains or channel drains, joints in foundation walls and floors, including, without limitation, control joints between slab sections poured separately, and between foundation wall and floor, as well as all other openings and penetrations of the foundation walls and floor including, but not limited to, utility penetrations, shall be substantially sealed by utilizing a caulk complying with ASTM C920 class 25 or greater, in order to close off the soil gas entry routes. Prior to sealing, backer rods shall be used to fill gaps greater than one inch. Any openings or penetrations of the floor over the crawl space shall be substantially sealed in order to close off the soil gas entry routes.

425.2.5 Floor drains. Floor drains shall substantially close off the soil gas entry routes with a water-seal trap or other mechanical means.

425.2.6 Sump Cover. A sump cover which substantially closes off the soil gas entry routes shall be provided for all sump installations. Sump covers shall not be used as a vent pipe location.

425.2.7 Sealing. The following measures shall be provided:

1. No ductwork for supply or return air shall be routed through a crawl space or beneath a slab. Where ductwork passes through or beneath a slab, all openings and joints shall be seamless or properly taped or sealed water-tight.
2. Sealant materials that substantially close off the soil gas entry routes shall be installed on any doors or other openings between basements and adjoining crawl spaces that are vented to the exterior.
3. The tops of foundation walls, including, without limitation, interior ledges, that are constructed of hollow masonry units shall be capped or the voids shall be completely filled.
4. The vapor retarder in a crawlspace shall turn up onto the foundation walls not less than 12 inches (153 mm) and shall be sealed to the wall with a caulk complying with ASTM C920 class 25 or higher or equivalent method.

425.2.8 Vent Stack Installation. The independent vent stack pipe provided in accordance with this section shall be an adequately supported, gas tight, 6 inch (153 mm) minimum diameter solid pipe, through any enclosed portions of the building. Excluding a basement or crawl space, the pipe shall be routed in a manner that makes it accessible for the installation of a future in-line vent pipe fan in a non-conditioned space, and installed in a configuration, and supported in a manner, that will ensure that rain water or condensate accumulation within the pipes will drain downward into the ground beneath the slab or vapor retarder.

425.2.9 Vent Stack Termination. The vent stack pipe shall meet the following termination requirements:

1. Vent pipes shall terminate at least 24 inches (610 mm) above the roof, measured from the highest point where the vent intersects the roof. When a vent pipe extension terminates on an occupiable roof the vent pipe shall extend at least 10 feet (3 m) above the roof surface.

Exception: Buildings more than three stories in height shall be allowed to extend vent pipe terminals through a wall provided that the termination is at least 20 feet (6 m) above grade and is effectively screened.

2. No vent terminal shall be located directly beneath any door, window, or other ventilating opening into the conditioned space of the building or of an adjacent building nor shall any such vent terminal be within 25 feet (7620 mm) horizontally of such an opening unless it is at least 2 feet (610 mm) above the top of such opening.
3. No vent terminal shall be closer than 25 feet (7620 mm) horizontally from any lot line.

425.2.10 Labeling. Radon vent pipes shall be identifiable and clearly labeled as a radon reduction system at intervals of at least every 10 feet (7620 mm) and at least once in every room or space. The radon reduction system label of any section of vent pipe above the roof shall caution against placement of air intake valves within 10 feet (7620 mm) of the vent pipe discharge.

425.2.11 Electrical Connection for Fan. A dedicated electrical branch circuit terminating in an electrical box shall be installed proximate to each vent stack where a future in-line vent pipe fan and system failure alarms is likely to be installed.

425.2.12 Air Passages. In order to reduce stack effect, air passages that penetrate the conditioned envelope of the building, such as openings installed in top-floor ceilings, shall be closed, gasketed or otherwise sealed with materials approved for such applications.

Add new standard to Chapter 35 as follows:

ASTM
ASTM E 1745-11 Standard Specification for Plastic Water Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

US EPA Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

EPA 625-R-92-016-1994 Radon Prevention in the Design and Construction of Schools and Other Large Buildings.

Reason: The purpose of this requirement is to protect students, faculty, and other staff from exposure to radon gas in the educational environment. This proposed change will reduce radon exposure risk for humans in educational buildings that are constructed in known areas[1] of high radon potential.

The rate of exposure for children and staff in school buildings is second only to exposure in the home. [2] In the current ICC family of codes, provision for radon control, commonly known as radon-resistant new construction, is contained only in the optional Appendix F for the International Residential Code.

Epidemiological studies confirm that radon increases the risk of lung cancer in the general population. Radon is the second leading cause of lung cancer – second only to smoking – and more significant than secondhand smoke. In the US alone, 21,000 lung cancer deaths each year are caused by radon exposure. [3] The World Health Organization estimates that between 3% and 14% of all lung cancer cases worldwide are caused by radon exposure. [4] The Surgeon General of the United States issued a Health Advisory in 2005 warning Americans about the health risk from exposure to radon in indoor air. Dr. Richard Carmona, the Nation's Chief Physician, urged Americans find out how much radon they might be breathing. Dr. Carmona also stressed the need to remedy the problem as soon as possible when the radon level is 4 pCi/L or more.

Radon is a colorless and odorless gas that is a decay product of uranium and occurs naturally in soil and rock. The main source of high-level radon pollution in buildings is surrounding uranium-containing soil such as granite, shale, phosphate and pitchblende. Radon enters a building through cracks in walls, basement floors, foundations and other openings. There is no known threshold concentration below which radon exposure presents no risk. Even low concentrations of radon can result in a small increase in the risk of lung cancer. EPA recommends that all homes and schools be tested for radon. EPA recommends mitigation if radon is above 4 pCi/L (equivalent to EPA Radon Zone 1) and consideration of mitigation if radon is 2-4 pCi/L (equivalent to Zone 2). [5] In 2009, the World Health Organization released a report indicating that 100 Bq/m^{3}or 2.7 pCi/L should be the reference level for radon.[6]

This proposal consists of the subchapter 10 “Radon Hazard Sub-code of the New Jersey Uniform Construction Code” – which applies to all residential and educational uses – combined with revisions consistent with provisions that were accepted for the IGCC 2012. These provisions improve upon the New Jersey standard by improving the cost-efficiency and effectiveness of this existing radon standard.

[1] “Zone Maps,” US EPA, http://www.epa.gov/radon/zonemap.html
[2] “Radon in Schools,” US EPA, http://www.epa.gov/radon/pubs/schoolrn.html
[3] “Health Risks,” US EPA, http://www.epa.gov/radon/healthrisks.html
[4] “Radon and Cancer,” World Health Organization, http://www.who.int/mediacentre/factsheets/fs291/en/index.html
[5] “Health Risks,” US EPA, http://www.epa.gov/radon/healthrisks.html
[6] “WHO Handbook on Radon,” http://www.who.int/entity/ionizing_radiation/env/9789241547673/en/index.html

Cost Impact: This code change will increase the cost of construction. This change will also save lives.

Analysis: A review of the standard proposed for inclusion in the code, ASTM E 1745 and EPA 625-R-92-016 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

426 (NEW)-G-MALONE.doc

Public Hearing Results

For staff analysis of the content of ASTM E1745-11 and US EPA 625-R-92-016-1994 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: Disapproved

Committee Reason: There was still concern on the need for such provisions and it was felt that perhaps an appendix would be a better location for the requirements. Also, it was noted that the map should be placed within the provisions versus simply referencing the IRC. The presentation of the requirements could be simplified.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Jane Malone, National Center for Healthy Housing requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

SECTION 425
RADON REDUCING CONSTRUCTION FEATURES FOR GROUP E OCCUPANCIES.

425.1 General. Buildings containing Group E Occupancies shall comply with the provisions of this section where the building is located in a Zone 1 radon potential area as determined by Figure 425.1 and Table 425.1.

> **Exception:** Where approved, radon zone designations or maps adopted by a state agency shall supersede Figure 425.1 and Table 425.1.

425.2 Radon reducing construction features. Buildings, including garages below occupiable space, shall be equipped with radon reducing features in accordance with Sections 425.2.1 through 425.2.6.

425.2.1 Gravel. A layer of clean aggregate that meets the specifications of Size Number 4, 5, 56, or 6 of ASTM C33 shall be installed below the foundation slab. The depth of gravel shall be not less than the diameter of the pipe provided in accordance with Section 425.2.3.

425.2.2 Vapor retarder. A continuous vapor retarder of Class A, B or C complying with ASTM E1745 shall be installed under the slab in basement, crawl space slab, and slab-on-grade construction, and over the soil in crawl space construction. Seams of the vapor retarder shall be overlapped not less than 12 inches (305 mm). Seams shall be sealed with a caulk of not less than Class 25 complying with ASTM C920, or by tape specified by the vapor retarder manufacturer’s instructions. The vapor retarder in a crawl space shall turn up onto the foundation walls not less than 12 inches (153 mm) and shall be continuously sealed to the wall with a caulk of not less than Class 25 complying with ASTM C920. Openings or penetrations in the retarder shall be sealed.

425.2.3 Vent stack pipe. A solid, rigid, gas tight, non-perforated, ABS or PVC vent stack pipe shall be installed in a continuous vertical stack, from the tee pipe fitting for each suction point in accordance with Section 425.2.3.6 within the interior of the building, to the termination point installed in accordance with Section 425.2.6. The vent stack pipe shall be without dips or sags and shall slope upward toward the vent or chimney at least 1/8 inch per foot (21 mm per 305 mm).

425.2.3.1 Pipe dimensions. Vent stack pipe shall be not less than 4 inches (102 mm) nominal inside diameter. Pipe wall thickness shall be Schedule 40.

425.2.3.2 Pipe joints. The joint surfaces for ABS or PVC pipe shall be prepared with a primer and solvent welded in accordance with the pipe manufacturer's instructions.

425.2.3.3 Pipe support. Above ground piping shall be supported by the structure of the building in accordance with the International Plumbing Code.

425.2.3.4 Coverage area. Where 4-inch (102 mm) nominal inside diameter pipe is used, not less than one independent vent stack shall be installed for vent coverage for each 5,000 square feet (464 m^2) area of slab or crawlspace. Where 6-inch (152 mm) nominal inside diameter pipe is used, not less than one independent vent stack shall be installed for each 15,000 square feet (1,392 m^2) area of slab or crawlspace.

425.2.3.5 Interconnected coverage areas. Where a 4-inch (102 mm) nominal inside diameter solid piping located above the slab interconnects the pipes from separate areas in combination basement and crawl space buildings, separate areas in combination slab-on-grade and crawl space buildings, or separate areas under slabs divided by internal footings, the coverage area shall not be greater than 5,000 square feet (464 m^2). Where a 4-inch (102 mm) nominal inside diameter perforated piping interconnects areas separated by interior footings in a pipe loop located along the perimeter of the foundation under the slab, the coverage area shall not be greater than 5,000 square feet (464 m^2). Where 6-inch (152 mm) nominal inside diameter pipe is used, the piping shall serve a total coverage area not greater than 15,000 square feet (1,392 m^2).

425.2.3.6 Suction point. A suction point consisting of a tee pipe fitting or saddle fitting shall be installed o connect horizontal piping below the structure and an independent solid vent stack in accordance with sections 425.3.6.1 through 425.3.6.3.

425.2.3.6.1 Suction points in basement slabs, crawl space slabs and slab on grade foundations. For basement slab, crawl space slab and slab on grade foundations, a tee pipe fitting or saddle fitting shall be installed in the sub-slab aggregate for each coverage area. Each of the horizontal openings of the tee pipe fitting or saddle fitting shall be connected to not less than 10 feet (?? mm) of perforated pipe having not less than 1 square inch (645 mm^2) of opening for each lineal foot of pipe. The perforated pipe shall be covered by the sub-slab aggregate. The vertical portion of the tee pipe fitting or saddle fitting shall be connected to an independent solid vent stack.

425.2.3.6.2 Suction points in crawl spaces with soil floors. Crawl spaces with soil floors shall be provided with a tee pipe fitting or saddle fitting for each coverage area. Each of the horizontal openings of the tee pipe fitting or saddle fitting shall be connected to not less than 10 feet (3048 mm) of perforated pipe having not less than 1 square inch (645 mm^2) of opening for each lineal foot of pipe. The perforated pipe shall be installed on top of the soil. The vertical portion of the tee pipe fitting or saddle fitting shall be connected to an independent solid vent stack.

425.2.3.6.3 Sump cover. A sump cover shall not be used as a suction point location**.**

425.2.3.7 Vent stack termination. The independent vent stack pipe shall discharge outside of the building and be installed in accordance with Sections 426.2.3.7.1 and 425.2.3.7.2.

425.2.3.7.1 Rooftop termination. Vent stack pipes shall terminate at least not less than 2 feet (610 mm) above the roof surface, measured from the highest point where the pipe intersects the roof surface. Where a vent stack pipe terminates on an occupiable roof, the pipe shall extend at least not less than 10 feet (3048 mm) above the roof surface.

> **Exception:** In a building more than three stories in height, the vent stack pipe shall not be required to terminate above the roof surface provided that it terminates through an exterior wall at a point at least not less than 20 feet (6096 mm) above grade and at least not less than 10 feet (3048 mm) in any direction from any operable window, door, or other gravity intake opening into the building.

425.2.3.7.2 Clearance from other buildings and lots. Vent terminals shall not be closer than 25 feet (7620 mm), measured horizontally, from any adjacent building or lot line.

425.2.4. Sealing. Openings and penetrations shall be sealed in accordance with Sections 425.2.4.1 through 452.2.4.5.

425.2.4.1 Foundation walls and floors. Joints, openings and penetrations in foundation walls and floors, that are in contact with the soil shall be sealed by a caulk of not less than Class 25 complying with ASTM C920. Prior to sealing, backer rods shall be used to fill openings greater than ½ inch (12.7 mm) in width.

425.2.4.1.1 Hollow masonry unit walls. The top course of hollow block masonry foundation walls shall be made of solid masonry units or the top course shall be fully grouted. The top course under the full width of door and window openings shall be made of solid masonry units or the hollow masonry units shall be fully grouted. Where a brick veneer or other masonry ledge is installed, the course immediately below the ledge shall be made of solid masonry units or the top course shall be fully grouted. Other penetrations through walls shall be sealed.

425.2.4.2 Floor drains. Floor drains and condensate drains shall not be open to the soil.

425.2.4.3 Sump cover. A solid sump cover, equipped with a seal or gasket, shall be provided for sump installations.

425.2.4.4 Ductwork. Where ductwork passes through a crawl space, or through or beneath a slab, all openings and joints shall be seamless or taped or sealed water-tight.

425.2.4.5. Top floor ceilings. Openings in top-floor ceilings shall be closed, gasketed or otherwise sealed with materials approved for such applications.

425.2.5 Provision for depressurization fan. A section of the vent stack pipe that is located outside of the building or in a non-conditioned space above the basement or crawl space shall be accessible for the future installation of an in-line depressurization fan. Where provided, the fan shall not be mounted in any location where pipe positively pressurized by the fan is located inside of a conditioned or occupiable space.

425.2.5.1 Accessible fan installation location. A space having a vertical height of not less than 48 inches (1220 mm) and a diameter of not less than 21 inches (530 mm) shall be provided in the area designated for a depressurization fan.

425.2.5.2 Electrical connection for fan. An outlet box for an electrical connection, supplied by a branch circuit ,shall be installed within 6 feet (1829 mm) of the area designated for a depressurization fan.

425.2.6 Labeling. Radon vent pipes shall be identifiable and labeled as a component of a radon reduction system at intervals of not less than 10 feet (3048 mm) and not less than once in every room or space. The section of vent pipe above the roof shall have a label that cautions against placement of air intake openings within 10 feet (3048 mm) of the vent pipe discharge.

Add new standard to Chapter 35 as follows:

ASTM
ASTM E 1745-11 Standard Specification for Plastic Water Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

Figure 425.1 EPA Map of Radon Zones

The United States Environmental Protection Agency and the United States Geological Survey have evaluated the radon potential in the United States and developed this map of radon zones. The map assigns each of the 3,141 counties in the United States to one of three zones based on radon potential. Zone 1 areas have a predicted average indoor radon screening level greater than 4 pCi/L (picocuries per liter). Table 425.1 lists the Zone 1 counties illustrated on the map.

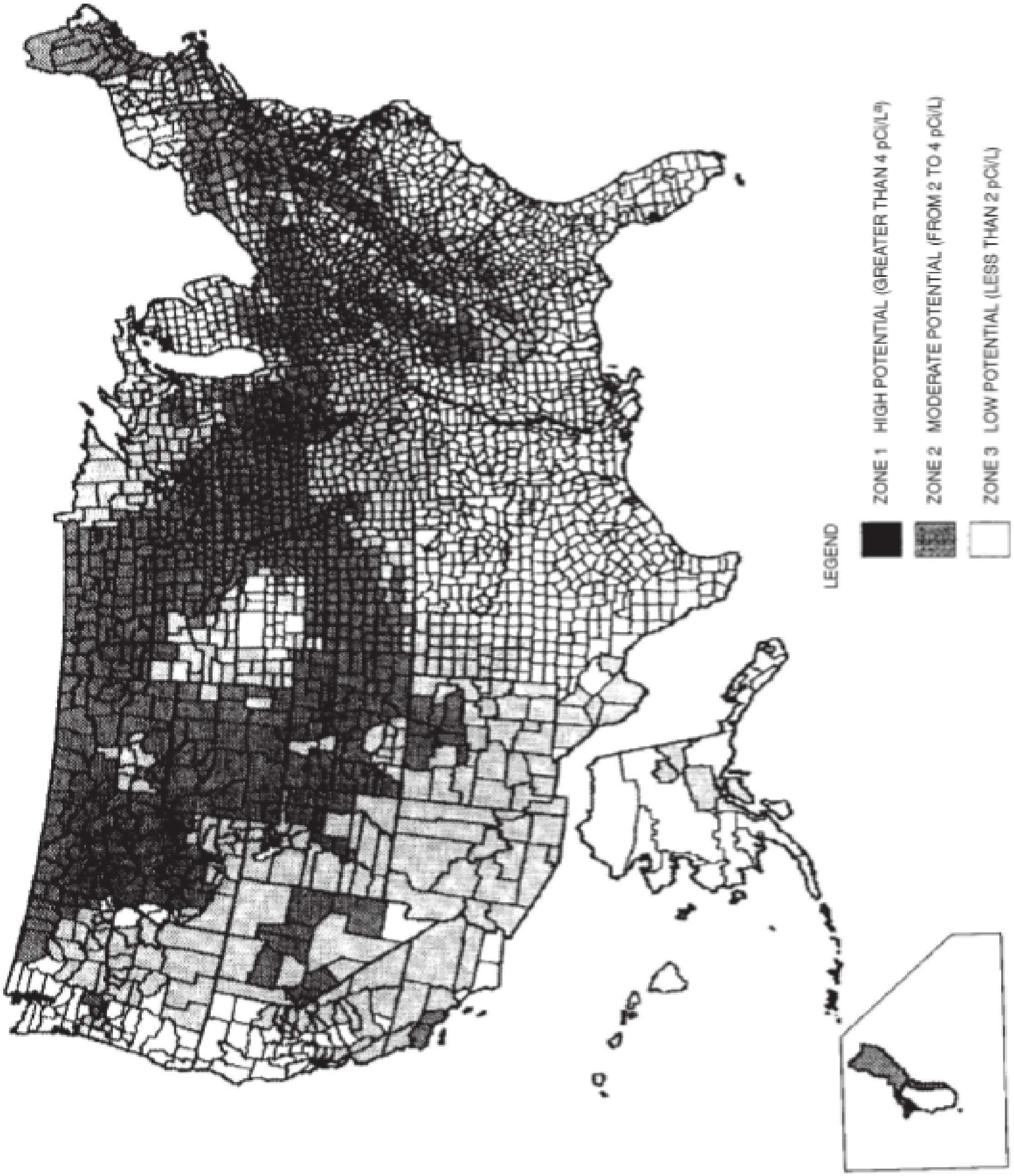


Table 425.1
List of Counties with High Radon Potential (Zone 1)

ALABAMA
Calhoun
Clay
Cleburne
Colbert
Coosa
Franklin
Jackson
Lauderdale
Lawrence
Limestone
Madison
Morgan
Talladega

CALIFORNIA
Santa Barbara
Ventura

COLORADO
Adams
Arapahoe
Baca
Bent
Boulder
Chaffee
Cheyenne
Clear Creek
Crowley
Custer
Delta
Denver
Dolores
Douglas
El Paso
Elbert
Fremont
Garfield
Gilpin
Grand
Gunnison
Huerfano
Jackson
Jefferson
Kiowa
Kit Carson
Lake
Larimer
Las Animas
Lincoln
Logan
Mesa
Moffat
Montezuma
Montrose
Morgan
Otero
Ouray
Park
Phillips
Pitkin
Prowers
Pueblo
Rio Blanco
San Miguel
Summit
Teller
Washington
Weld
Yuma

CONNECTICUT
Fairfield
Middlesex
New Haven
New London

GEORGIA
Cobb
De Kalb
Fulton
Gwinnett

IDAHO
Benewah
Blaine
Boise
Bonner
Boundary
Butte
Camas
Clark
Clearwater
Custer
Elmore
Fremont
Gooding
Idaho
Kootenai
Latah
Lemhi
Shoshone
Valley

ILLINOIS
Adams
Boone
Brown
Bueau
Calhoun
Carroll
Cass
Champaign
Coles
De Kalb
De Witt
Douglas
Edgar
Ford
Fulton
Greene
Grundy
Hancock
Henderson
Henry
Iroquois
Jerse
Jo Daviess
Kane
Kendall
Knox
La Salle
Lee
Livingston
Logan
Macon
Marshall
Mason
McDonough
McLean
Menard
Mercer
Morgan
Moultrie
Ogle
Peoria
Piatt
Pike
Putnam
Rock Island
Sangamon
Schuyler
Scott
Stark
Stephenson
Tazewell
Vermilion
Warren
Whiteside
Winnebago
Woodford

INDIANA
Adams
Allen
Bartholomew
Benton
Blackford
Boone
Carroll
Cass
Clark
Clinton
De Kalb
Decatur
Delaware
Elkhart
Fayette
Fountain
Fulton
Grant
Hamilton
Hancock
Harrison
Hendricks
Henry
Howard
Huntington
Jay
Jennings
Johnson
Kosciusko
Lagrange
Lawrence
Madison
Marion
Marshall
Miami
Monroe
Montgomery
Noble
Orange
Putnam
Randolph
Rush
Scott
Shelby
Steuben
St. Joseph
Tippecanoe
Tipton
Union
Vermillion
Wabash
Warren
Washington
Wayne
Wells
White
Whitley

IOWA
All Counties

KANSAS
Atchison
Barton
Brown
Cheyenne
Clay
Cloud
Decatur
Dickinson
Douglas
Ellis
Ellsworth
Finney
Ford
Geary
Gove
Graham
Grant
Gray
Greeley
Hamilton
Haskell
Hodgeman
Jackson
Jewell
Johnson
Keary
Kingman
Kiowa
Lane
Leavenworth
Lincoln
Logan
Marion
Marshall
McPherson
Meade
Mitchell
Nemaha
Ness
Norton
Osborne
Ottawa
Pawnee
Phillips
Pottawatomie
Pratt
Rawlins
Republic
Rice
Riley
Rooks
Rush
Russell
Saline
Scott
Sheridan
Sherman
Smith
Stanton
Thomas
Trego
Wallace
Washington
Wichita
Wyandotte

KENTUCKY
Adair
Allen
Barren
Bourbon
Boyle
Bullitt
Casey
Clark
Cumberland
Fayette
Franklin
Green
Harrison
Hart
Jefferson
Jessamine
Lincoln
Marion
Mercer
Metcalfe
Monroe
Nelson
Pendleton
Pulaski
Robertson
Russell
Scott
Taylor
Warren
Woodford

MAINE
Androscoggin
Aroostook
Cumberland
Franklin
Hancock
Kennebec
Lincoln
Oxford
Penobscot
Piscataquis
Somerset
York

MARYLAND
Baltimore
Calvert
Carroll
Frederick
Harford
Howard
Montgomery
Washington

MASS.
Essex
Middlesex
Worcester

MICHIGAN
Branch
Calhoun
Cass
Hillsdale
Jackson
Kalamazoo
Lenawee
St. Joseph
Washtenaw

MINNESOTA
Becker
Big Stone
Blue Earth
Brown
Carver
Chippewa
Clay
Cottonwood
Dakota
Dodge
Douglas
Faribault
Fillmore
Freeborn
Goodhue
Grant
Hennepin
Houston
Hubbard
Jackson
Kanabec
Kandiyohi
Kittson
Lac Qui Parle
Le Sueur
Lincoln
Lyon
Mahnomen
Marshall
Martin
McLeod
Meeker
Mower
Murray
Nicollet
Nobles
Norman
Olmsted
Otter Tail
Pennington
Pipestone
Polk
Pope
Ramsey
Red Lake
Redwood
Renville
Rice
Rock
Roseau
Scott
Sherburne
Sibley
Stearns
Steele
Stevens
Swift
Todd
Traverse
Wabasha
Wadena
Waseca
Washington
Watonwan
Wilkin
Winona
Wright
Yellow Medicine

MISSOURI
Andrew
Atchison
Buchanan
Cass
Clay
Clinton
Holt
Iron
Jackson
Nodaway
Platte

MONTANA
Beaverhead
Big Horn
Blaine
Broadwater
Carbon
Carter
Cascade
Chouteau
Custer
Daniels
Dawson
Deer Lodge
Fallon
Fergus
Flathead
Gallatin
Garfield
Glacier
Granite
Hill
Jefferson
Judith Basin
Lake
Lewis and Clark
Liberty
Lincoln
Madison
McCone
Meagher
Mineral
Missoula
Park
Phillips
Pondera
Powder River
Powell
Prairie
Ravalli
Richland
Roosevelt
Rosebud
Sanders
Sheridan
Silver Bow
Stillwater
Teton
Toole
Valley
Wibaux

Table 425.1 (continued)
List of US Counties with High Radon Potential (Zone 1)

Yellowstone National Park

NEBRASKA
Adams
Boone
Boyd
Burt
Butler
Cass
Cedar
Clay
Colfax
Cuming
Dakota
Dixon
Dodge
Douglas
Fillmore
Franklin
Frontier
Furnas
Gage
Gosper
Greeley
Hamilton
Harlan
Hayes
Hitchcock
Hurston
Jefferson
Johnson
Kearney
Knox
Lancaster
Madison
Nance
Nemaha
Nuckolls
Otoe
Pawnee
Phelps
Pierce
Platte
Polk
Red Willow
Richardson
Saline
Sarpy
Saunders
Seward
Stanton
Thayer
Washington
Wayne
Webster
York

NEVADA
Carson City
Douglas
Eureka
Lander
Lincoln
Lyon
Mineral
Pershing
White Pine

NEW HAMPSHIRE
Carroll

NEW JERSEY
Hunterdon
Mercer
Monmouth
Morris
Somerset
Sussex
Warren

NEW MEXICO
Bernalillo
Colfax
Mora
Rio Arriba
San Miguel
Santa Fe
Taos

NEW YORK
Albany
Allegany
Broome
Cattaraugus
Cayuga
Chautauqua
Chemung
Chenango
Columbia
Cortland
Delaware
Dutchess
Erie
Genesee
Greene
Livingston
Madison
Onondaga
Ontario
Orange
Otsego
Putnam
Rensselaer
Schoharie
Schuyler
Seneca
Steuben
Sullivan
Tioga
Tompkins
Ulster
Washington
Wyoming
Yates

N. CAROLINA
Alleghany
Buncombe
Cherokee
Henderson
Mitchell
Rockingham
Transylvania
Watauga

N. DAKOTA
All Counties

OHIO
Adams
Allen
Ashland
Auglaize
Belmont
Butler
Carroll
Champaign
Clark
Clinton
Columbiana
Coshocton
Crawford
Darke
Delaware
Fairfield
Fayette
Franklin
Greene
Guernsey
Hamilton
Hancock
Hardin
Harrison
Holmes
Huron
Jefferson
Knox
Licking
Logan
Madison
Marion
Mercer
Miami
Montgomery
Morrow
Muskingum
Perry
Pickaway
Pike
Preble
Richland
Ross
Seneca
Shelby
Stark
Summit
Tuscarawas
Union
Van Wert
Warren
Wayne
Wyandot

PENNSYLVANIA
Adams
Allegheny
Armstrong
Beaver
Bedford
Berks
Blair
Bradford
Bucks
Butler
Cameron
Carbon
Centre
Chester
Clarion
Clearfield
Clinton
Columbia
Cumberland
Dauphin
Delaware
Franklin
Fulton
Huntingdon
Indiana
Juniata
Lackawanna
Lancaster
Lebanon
Lehigh
Luzerne
Lycoming
Mifflin
Monroe
Montgomery
Montour
Northampton
Northumberland
Perry
Schuylkill
Snyder
Sullivan
Susquehanna
Tioga
Union
Venango
Westmoreland
Wyoming
York

RHODE ISLAND
Kent
Washington

S. CAROLINA
Greenville

S. DAKOTA
Aurora
Beadle
Bon Homme
Brookings
Brown
Brule
Buffalo
Campbell
Charles Mix
Clark
Clay
Codington
Corson
Davison
Day
Deuel
Douglas
Edmunds
Faulk
Grant
Hamlin
Hand
Hanson
Hughes
Hutchinson
Hyde
Jerauld
Kingsbury
Lake
Lincoln
Lyman
Marshall
McCook
McPherson
Miner
Minnehaha
Moody
Perkins
Potter
Roberts
Sanborn
Spink
Stanley
Sully
Turner
Union
Walworth
Yankton

TENNESSEE
Anderson
Bedford
Blount
Bradley
Claiborne
Davidson
Giles
Grainger
Greene
Hamblen
Hancock
Hawkins
Hickman
Humphreys
Jackson
Jefferson
Knox
Lawrence
Lewis
Lincoln
Loudon
Marshall
Maury
McMinn
Meigs
Monroe
Moore
Perry
Roane
Rutherford
Smith
Sullivan
Trousdale
Union
Washington
Wayne
Williamson
Wilson

UTAH
Carbon
Duchesne
Grand
Piute
Sanpete
Sevier
Uintah

VIRGINIA
Alleghany
Amelia
Appomattox
Augusta
Bath
Bland
Botetourt
Bristol
Brunswick
Buckingham
Buena Vista
Campbell
Chesterfield
Clarke
Clifton Forge
Covington
Craig
Cumberland
Danville
Dinwiddie
Fairfax
Falls Church
Fluvanna
Frederick
Fredericksburg
Giles
Goochland
Harrisonburg
Henry
Highland
Lee
Lexington
Louisa
Martinsville
Montgomery
Nottoway
Orange
Page
Patrick
Pittsylvania
Powhatan
Pulaski
Radford
Roanoke
Rockbridge
Rockingham
Russell
Salem
Scott
Shenandoah
Smyth
Spotsylvania
Stafford
Staunton
Tazewell
Warren
Washington
Waynesboro
Winchester
Wythe

WASHINGTON
Clark
Ferry
Okanogan
Pend Oreille
Skamania
Spokane
Stevens

W. VIRGINIA
Berkeley
Brooke
Grant
Greenbrier
Hampshire
Hancock
Hardy
Jefferson
Marshall
Mercer
Mineral
Monongalia
Monroe
Morgan
Ohio
Pendleton
Pocahontas
Preston
Summers
Wetzel

WISCONSIN
Buffalo
Crawford
Dane
Dodge
Door
Fond du Lac
Grant
Green
Green Lake
Iowa
Jefferson
Lafayette
Langlade
Marathon
Menominee
Pepin
Pierce
Portage
Richland
Rock
Shawano
St. Croix
Vernon
Walworth
Washington
Waukesha
Waupaca
Wood

WYOMING
Albany
Big Horn
Campbell
Carbon
Converse
Crook
Fremont
Goshen
Hot Springs
Johnson
Laramie
Lincoln
Natrona
Niobrara
Park
Sheridan
Sublette
Sweetwater
Teton
Uinta
Washakie

Commenter's Reason: This modification is presented as a substitute for this code change proposal. It is not entirely new, rather it is the original with several modifications. It is more readily understood without strikethrough. The proposed language addresses the IBC Committee's reasons for declining the proposal as follows:

(1) "There was still concern on the need for such provisions, and it was felt that perhaps an appendix would be a better location for the requirements." Response: This extremely modest approach to reduce radon exposure risk in only buildings in the highest risk localities belongs in the body of the code. Radon is a life, safety issue and is responsible for 21,000 lung cancer deaths each year. The public deserves radon protection in high risk areas.

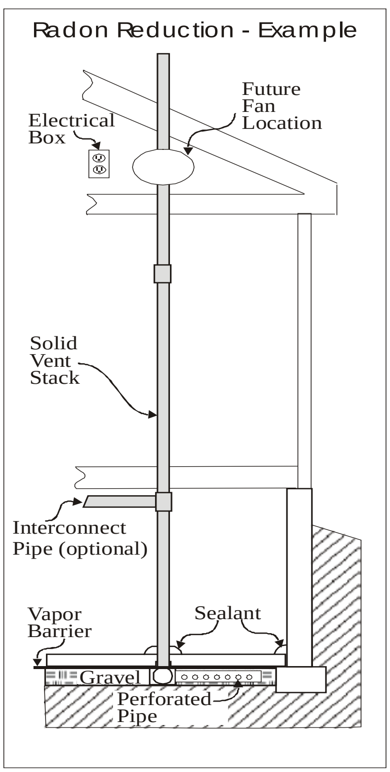
(2) "The map should be placed within the provisions versus simply referencing the IRC." Response: The EPA Radon Map and county list are included in the proposal as modified, and we have added a provision allowing the code official to approve the use of state and local data to supersede the older EPA information.

(3) "The presentation of the requirements could be simplified." Response: The requirements have gone through extensive editing and review to deliver this modified version. Text has been converted to code language and ambiguous terminology has been deleted. The section on sealing has been streamlined. The most complex section pertaining to piping has been broken down into distinct elements such as pipe dimensions, pipe support, coverage areas, interconnected coverage areas, and suction points.

During the IBC hearing, arguments were raised that are addressed briefly here:

- *Data is old:* The earth is old and progeny of radium have been finding their way into structures for a long time. The EPA maps from 1993 have withstood the test of time in the sense that they have provided a solid baseline of information for counties. New York, New Jersey, Nebraska, and other states collected additional data that have identified additional high risk counties beyond those that the EPA maps indicate. Some have compiled radon data below the county level to the zip code and municipal levels. This comment adds a provision to permit approval of the use of state and local data to supersede the EPA map and list.
- *Building tightness:* As buildings have become more tight to improve energy efficiency, the risk of radon entry into the building has grown.
- *Relation to other sections of the code:* These provisions complement but do not conflict with other segments of the building code.
- *Multiple proposals for different occupancies:* The proposals for G99 and G100, as revised by the comments, are the same. They could be combined in a single new section 425 covering both occupancies.

For reference, the figure below shows an example of how the radon-reducing features are installed.



G99-12

Final Action: AS AM AMPC____ D

G100-12
425 (New), Chapter 35

Proposed Change as Submitted

Proponent: Jane Malone, National Center for Healthy Housing (jmalone@nchh.org)

Add new text as follows:

SECTION 425
RADON REDUCING CONSTRUCTION FEATURES FOR
GROUP R-2 OCCUPANCIES.

425.1. General. Group R-2 Occupancies shall comply with the provisions of this section if the building is located in an area of High (Zone 1) Radon Potential as determined by Figure AF101 of Appendix F of the *International Residential Code*.

Exception. Buildings complying with Chapter 2 of EPA 625-R-92-016.

425.2. Radon Reducing Construction Features. Buildings shall be equipped with radon reducing features in accordance with Sections 425.2.1 through 425.2.12.

425.2.1 Vapor Barrier. A continuous vapor barrier meeting ASTM E1745 Class A, B or C, with any seams overlapped not less than 12 inches (305 mm) and sealed, shall be installed under the slab in basement and slab-on-grade construction and on the soil in crawl space construction.

425.2.2 Base Course. Floors of basements and slab on grade construction shall be placed over a stone base course, not less than 4 inches (102 mm) in thickness. The stone base course shall have a void ratio of not less than 35 percent, or Size Number 4, 5 or 6 shall be used and shall meet the specifications of ASTM C33.

425.2.3 Solid Vent Pipe. Solid vent pipe shall be installed as follows:

1. Basement slabs with interior foundation pipe drains installed shall have solid 6 inch (153 mm) minimum diameter vent pipe sections installed in conjunction with this drainage system. One independent vent stack pipe shall be installed for every contiguous 15,000 square feet (1392 sq. m), or portion thereof, of slab area, terminating at an approved location, as prescribed in 425.2.9, on the exterior of the building. Basement slabs with French drains or channel drains shall not be allowed unless interior foundation pipe drains as described in this section are installed.
2. Basement slabs which do not have an interior foundation pipe drain, and slab on grade construction (excluding non-habitable spaces such as garages), shall be provided with one 6 inch (153 mm) minimum diameter solid vent pipe section with a "T" pipe fitting or equivalent for every contiguous 15,000 square feet (1392 sq. m), or portion thereof, of slab area, with this vent pipe section to be installed into the sub-slab aggregate. Each of the horizontal openings of the "T" pipe fitting shall be connected to a minimum of 10 feet (3 m) of 6 inch (153 mm) diameter perforated pipe or equivalent area soil gas collection plenum and placed in the sub-slab aggregate. The vertical portion of the "T" pipe fitting shall be connected to an independent solid vent stack pipe terminating at an approved location, as prescribed in 425.2.9, on the exterior of the building. Where more than one vent pipe section is provided, interconnection of these sections into a single independent vent stack is permitted for coverage up to a total area of 15,000 square feet (1392 sq. m) to permit use of a single in-line vent pipe fan if activation of the system is desired.
3. Crawl spaces shall be provided with one 6 inch (153 mm) minimum diameter solid vent pipe section with a "T" pipe fitting or equivalent for every contiguous 15,000 square feet (1392 sq. m), or portion thereof, of crawl space area. Each of the horizontal openings of the "T" pipe fitting shall

be connected to a minimum of 10 feet (3 m) of 6 inch (153 mm) diameter perforated pipe or equivalent area soil gas collection plenum and installed upon the soil. The vertical portion of the "T" pipe fitting shall be connected to an independent solid vent pipe terminating at an approved location on the exterior of the building.

4. In combination basement/crawl space or slab-on-grade/crawl space buildings, a 6 inch (153 mm) minimum diameter solid vent pipe may be provided between the areas and interconnected into the independent vent stack, for coverage up to a total area of 15,000 square feet (1392 sq. m) to permit use of a single in-line vent pipe fan if activation of the system is desired. Slabs areas divided by internal footings may be joined with piping into a single independent vent stack for coverage up to a total area of 15,000 square feet (1392 sq. m).

425.2.4 Joint and Penetration Sealing. Joints in foundation walls and floors, including, without limitation, control joints between slab sections poured separately, and between foundation wall and floor (except for French drains or channel drains), as well as all other openings and penetrations of the foundation walls and floor including, but not limited to, utility penetrations, shall be substantially sealed by utilizing a caulk complying with ASTM C920 class 25 or greater, in order to close off the soil gas entry routes. Prior to sealing, backer rods shall be used to fill gaps greater than one inch. Any openings or penetrations of the floor over the crawl space shall be substantially sealed in order to close off the soil gas entry routes.

425.2.5 Floor drains. Floor drains shall substantially close off the soil gas entry routes with a water-seal trap or other mechanical means.

425.2.6 Sump Cover. A sump cover which substantially closes off the soil gas entry routes shall be provided for all sump installations. Sump covers shall not be used as a vent pipe location.

425.2.7 Sealing. The following measures shall be provided:

1. No ductwork for supply or return air shall be routed through a crawl space or beneath a slab. Where ductwork passes through or beneath a slab, all openings and joints shall be seamless or properly taped or sealed water-tight.
2. Sealant materials that substantially close off the soil gas entry routes shall be installed on any doors or other openings between basements and adjoining crawl spaces that are vented to the exterior.
3. The tops of foundation walls, including, without limitation, interior ledges, that are constructed of hollow masonry units shall be capped or the voids shall be completely filled.
4. The vapor barrier in a crawlspace shall turn up onto the foundation walls not less than 12 inches (153 mm) and shall be sealed to the wall with a caulk complying with ASTM C920 class 25 or higher or equivalent method.

425.2.8 Vent Stack Installation. The independent vent stack pipe provided in accordance with this section shall be an adequately supported, gas tight, 6 inch (153 mm) minimum diameter solid pipe, through any enclosed portions of the building. The pipe shall be routed in a manner that makes it accessible for the installation of a future in-line vent pipe fan in a non-conditioned (not heated or cooled) space excluding a basement or crawl space, and installed in a configuration, and supported in a manner, that will ensure that rain water or condensate accumulation within the pipes will drain downward into the ground beneath the slab or vapor barrier.

425.2.9 Vent Stack Termination. The vent stack pipe shall meet the following termination requirements:

1. Vent pipes shall terminate at least 24 inches (610 mm) above the roof, measured from the highest point where the vent intersects the roof. When a vent pipe extension terminates on an occupiable roof the vent pipe shall extend at least 10 feet (3 m) above the roof surface.

   Exception: Buildings more than three stories in height shall be allowed to extend vent pipe terminals through a wall provided that the termination is at least 20 feet (6 m) above grade and is effectively screened.

2. No vent terminal shall be located directly beneath any door, window, or other ventilating opening into the conditioned space of the building or of an adjacent building nor shall any such vent terminal be within 25 feet (7620 mm) horizontally of such an opening unless it is at least 2 feet (610 mm) above the top of such opening.
3. No vent terminal shall be closer than 25 feet (7620 mm) horizontally from any lot line.

425.2.10 Labeling. Radon vent pipes shall be identifiable and clearly labeled as a radon reduction system at intervals of at least every 10 feet (7620 mm) and at least once in every room or space. The radon reduction system label of any section of vent pipe above the roof shall caution against placement of air intake valves within 10 feet (7620 mm) of the vent pipe discharge.

425.2.11 Electrical Connection for Fan. A dedicated electrical branch circuit terminating in an electrical box shall be installed proximate to each vent stack where a future in-line vent pipe fan and system failure alarms may be installed.

425.2.12 Air Passages. In order to reduce stack effect, air passages that penetrate the conditioned envelope of the building, such as openings installed in top-floor ceilings, shall be closed, gasketed or otherwise sealed with materials approved for such applications.

Add new standard to Chapter 35 as follows:

ASTM
ASTM E 1745-11 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

US EPA Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

EPA 625-R-92-016-1994 Radon Prevention in the Design and Construction of Schools and Other Large Buildings.

Reason: The purpose of this requirement is to protect occupants from deadly exposure to radon gas in the multifamily residential environment. This proposed change will reduce radon exposure risk for occupants of multifamily residential buildings that are constructed in known areas[1] of high radon potential.

In the current ICC family of codes, provision for radon control, commonly known as radon-resistant new construction, is contained only in the optional Appendix F for the International Residential Code. We intend to propose changes to the IRC in 2013 to require radon resistant new construction in the next code change cycle.

Epidemiological studies confirm that radon increases the risk of lung cancer in the general population. Radon is the second leading cause of lung cancer – second only to smoking – and more significant than secondhand smoke. In the US alone, 21,000 lung cancer deaths each year are caused by radon exposure. [2] The World Health Organization estimates that between 3% and 14% of all lung cancer cases worldwide are caused by radon exposure. [3] The Surgeon General of the United States issued a Health Advisory in 2005 warning Americans about the health risk from exposure to radon in indoor air. Dr. Richard Carmona, the Nation's Chief Physician, urged Americans find out how much radon they might be breathing. Dr. Carmona also stressed the need to remedy the problem as soon as possible when the radon level is 4 pCi/L or more.

Radon is a colorless and odorless gas that is a decay product of uranium and occurs naturally in soil and rock. The main source of high-level radon pollution in buildings is surrounding uranium-containing soil such as granite, shale, phosphate and pitchblende. Radon enters a building through cracks in walls, basement floors, foundations and other openings. There is no known threshold concentration below which radon exposure presents no risk. Even low concentrations of radon can result in a small increase in the risk of lung cancer. EPA recommends that all homes and schools be tested for radon. EPA recommends mitigation if radon is above 4 pCi/L (equivalent to EPA Radon Zone 1) and consideration of mitigation if radon is 2-4 pCi/L (equivalent to Zone 2). [4] In 2009, the World Health Organization released a report indicating that 100 Bq/m^{3}or 2.7 pCi/L should be the reference level for radon.[5]

This proposal consists of the subchapter 10 "Radon Hazard Sub-code of the New Jersey Uniform Construction Code" – which applies to all residential and educational uses – combined with revisions consistent with provisions that were accepted for the IGCC 2012. These provisions improve upon the New Jersey standard by improving the cost-efficiency and effectiveness of this existing radon standard.

[1] "Zone Maps," US EPA, http://www.epa.gov/radon/zonemap.html
[2] "Health Risks," US EPA, http://www.epa.gov/radon/healthrisks.html
[3] "Radon and Cancer," World Health Organization, http://www.who.int/mediacentre/factsheets/fs291/en/index.html

[4] "Health Risks," US EPA, http://www.epa.gov/radon/healthrisks.html
[5] "WHO Handbook on Radon," http://www.who.int/entity/ionizing_radiation/env/9789241547673/en/index.html

Referenced Standards - New
ASTM E 1745 (attached)

Referenced Standards – Existing
ASTM C 33
ASTM C 920

Cost Impact: This code change will increase the cost of construction. This change will also save lives.

Analysis: A review of the standard proposed for inclusion in the code, ASTM E 1745 and EPA 625-R-92-016 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

425 (NEW) #2-G-MALONE

Public Hearing Results

For staff analysis of the content of ASTM E1745-11 and US EPA 625-R-92-016-1994 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: Disapproved

Committee Reason: This proposal was disapproved based upon the action taken in G99-12.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Jane Malone, National Center for Healthy Housing requests Approval as Modified by this Public Comment.

Replace proposal asfollows:

SECTION 425
RADON REDUCING CONSTRUCTION FEATURES FOR GROUP R-2 OCCUPANCIES.

425.1 General. Buildings containing Group R-2 Occupancies shall comply with the provisions of this section where the building is located in a Zone 1 radon potential area as determined by Figure 425.1 and Table 425.1.

> **Exception:** Where approved, radon zone designations or maps adopted by a state agency shall supersede Figure 425.1 and Table 425.1.

425.2 Radon reducing construction features. Buildings, including garages below occupiable space, shall be equipped with radon reducing features in accordance with Sections 425.2.1 through 425.2.6.

425.2.1 Gravel. A layer of clean aggregate that meets the specifications of Size Number 4, 5, 56, or 6 of ASTM C33 shall be installed below the foundation slab. The depth of gravel shall be not less than the diameter of the pipe provided in accordance with Section 425.2.3.

425.2.2 Vapor retarder. A continuous vapor retarder of Class A, B or C complying with ASTM E1745 shall be installed under the slab in basement, crawl space slab, and slab-on-grade construction, and over the soil in crawl space construction. Seams of the vapor retarder shall be overlapped not less than 12 inches (305 mm). Seams shall be sealed with a caulk of not less than Class 25 complying with ASTM C920, or by tape specified by the vapor retarder manufacturer's instructions. The vapor retarder in a crawl space shall turn up onto the foundation walls not less than 12 inches (153 mm) and shall be continuously sealed to the wall with a caulk of not less than Class 25 complying with ASTM C920. Openings or penetrations in the retarder shall be sealed.

425.2.3 Vent stack pipe. A solid, rigid, gas tight, non-perforated, ABS or PVC vent stack pipe shall be installed in a continuous vertical stack, from the tee pipe fitting for each suction point in accordance with Section 425.2.3.6 within the interior of the building, to the termination point installed in accordance with Section 425.2.6. The vent stack pipe shall be without dips or sags and shall slope upward toward the vent or chimney at least 1/8 inch per foot (21 mm per 305 mm).

425.2.3.1 Pipe dimensions. Vent stack pipe shall be not less than 4 inches (102 mm) nominal inside diameter. Pipe wall thickness shall be Schedule 40.

425.2.3.2 Pipe joints. The joint surfaces for ABS or PVC pipe shall be prepared with a primer and solvent welded in accordance with the pipe manufacturer's instructions.

425.2.3.3 Pipe support. Above ground piping shall be supported by the structure of the building in accordance with the International Plumbing Code.

425.2.3.4 Coverage area. Where 4-inch (102 mm) nominal inside diameter pipe is used, not less than one independent vent stack shall be installed for vent coverage for each 5,000 square feet (464 m^2) area of slab or crawlspace. Where 6-inch (152 mm) nominal inside diameter pipe is used, not less than one independent vent stack shall be installed for each 15,000 square feet (1,392 m^2) area of slab or crawlspace.

425.2.3.5 Interconnected coverage areas. Where a 4-inch (102 mm) nominal inside diameter solid piping located above the slab ~~that~~ interconnects the pipes from separate areas in combination basement and crawl space buildings, separate areas in combination slab-on-grade and crawl space buildings, or separate areas under slabs divided by internal footings, the coverage area shall not be greater than 5,000 square feet (464 m^2). Where a 4-inch (102 mm) nominal inside diameter perforated piping interconnects areas separated by interior footings in a pipe loop located along the perimeter of the foundation under the slab, the coverage area shall not be greater than 5,000 square feet (464 m^2). Where 6-inch (152 mm) nominal inside diameter pipe is used, the piping shall serve a total coverage area not greater than 15,000 square feet (1,392 m^2).

425.2.3.6 Suction point. A suction point consisting of a tee pipe fitting or saddle fitting shall be installed o connect horizontal piping below the structure and an independent solid vent stack in accordance with sections 425.3.6.1 through 425.3.6.3.

425.2.3.6.1. Suction points in basement slabs, crawl space slabs and slab on grade foundations. For basement slab, crawl space slab and slab on grade foundations, a tee pipe fitting or saddle fitting shall be installed in the sub-slab aggregate for each coverage area. Each of the horizontal openings of the tee pipe fitting or saddle fitting shall be connected to not less than 10 feet (?? mm) of perforated pipe having not less than 1 square inch (645 mm^2) of opening for each lineal foot of pipe. The perforated pipe shall be covered by the sub-slab aggregate. The vertical portion of the tee pipe fitting or saddle fitting shall be connected to an independent solid vent stack.

425.2.3.6.2 Suction points in crawl spaces with soil floors. Crawl spaces with soil floors shall be provided with a tee pipe fitting or saddle fitting for each coverage area. Each of the horizontal openings of the tee pipe fitting or saddle fitting shall be connected to not less than 10 feet (3048 mm) of perforated pipe having not less than 1 square inch (645 mm^2) of opening for each lineal foot of pipe. The perforated pipe shall be installed on top of the soil. The vertical portion of the tee pipe fitting or saddle fitting shall be connected to an independent solid vent stack.

425.2.3.6.3 Sump cover. A sump cover shall not be used as a suction point location**.**

425.2.3.7 Vent stack termination. The independent vent stack pipe shall discharge outside of the building and be installed in accordance with Sections 426.2.3.7.1 and 425.2.3.7.2.

425.2.3.7.1 Rooftop termination. Vent stack pipes shall terminate at least not less than 2 feet (610 mm) above the roof surface, measured from the highest point where the pipe intersects the roof surface. Where a vent stack pipe terminates on an occupiable roof, the pipe shall extend at least not less than 10 feet (3048 mm) above the roof surface.

> **Exception:** In a building more than three stories in height, the vent stack pipe shall not be required to terminate above the roof surface provided that it terminates through an exterior wall at a point at least not less than 20 feet (6096 mm) above grade and at least not less than 10 feet (3048 mm) in any direction from any operable window, door, or other gravity intake opening into the building.

425.2.3.7.2 Clearance from other buildings and lots. Vent terminals shall not be closer than 25 feet (7620 mm), measured horizontally, from any adjacent building or lot line.

425.2.4. Sealing. Openings and penetrations shall be sealed in accordance with Sections 425.2.4.1 through 452.2.4.5.

425.2.4.1 Foundation walls and floors. Joints, openings and penetrations in foundation walls and floors, that are in contact with the soil shall be sealed by a caulk of not less than Class 25 complying with ASTM C920. Prior to sealing, backer rods shall be used to fill openings greater than ½ inch (12.7 mm) in width.

425.2.4.1.1 Hollow masonry unit walls. The top course of hollow block masonry foundation walls shall be made of solid masonry units or the top course shall be fully grouted. The top course under the full width of door and window openings shall be made of solid masonry units or the hollow masonry units shall be fully grouted. Where a brick veneer or other masonry ledge is installed, the course immediately below the ledge shall be made of solid masonry units or the top course shall be fully grouted. Other penetrations through walls shall be sealed.

425.2.4.2 Floor drains. Floor drains and condensate drains shall not be open to the soil.

425.2.4.3 Sump cover. A solid sump cover, equipped with a seal or gasket, shall be provided for sump installations.

425.2.4.4 Ductwork. Where ductwork passes through a crawl space, or through or beneath a slab, all openings and joints shall be seamless or taped or sealed water-tight.

25.2.4.5. Top floor ceilings. Openings in top-floor ceilings shall be closed, gasketed or otherwise sealed with materials approved for such applications.

425.2.5 Provision for depressurization fan. A section of the vent stack pipe that is located outside of the building or in a non-conditioned space above the basement or crawl space shall be accessible for the future installation of an in-line depressurization fan. Where provided, the fan shall not be mounted in any location where pipe positively pressurized by the fan is located inside of a conditioned or occupiable space.

425.2.5.1 Accessible fan installation location. A space having a vertical height of not less than 48 inches (1220 mm) and a diameter of not less than 21 inches (530 mm) shall be provided in the area designated for a depressurization fan.

425.2.5.2 Electrical connection for fan. An outlet box for an electrical connection, supplied by a branch circuit ,shall be installed within 6 feet (1829 mm) of the area designated for a depressurization fan.

425.2.6 Labeling. Radon vent pipes shall be identifiable and labeled as a component of a radon reduction system at intervals of not less than 10 feet (3048 mm) and not less than once in every room or space. The section of vent pipe above the roof shall have a label that cautions against placement of air intake openings within 10 feet (3048 mm) of the vent pipe discharge.

Add new standard to Chapter 35 as follows:

ASTM
ASTM E 1745-11 Standard Specification for Plastic Water Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

Figure 425.1 EPA Map of Radon Zones

The United States Environmental Protection Agency and the United States Geological Survey have evaluated the radon potential in the United States and developed this map of radon zones. The map assigns each of the 3,141 counties in the United States to one of three zones based on radon potential. Zone 1 areas have a predicted average indoor radon screening level greater than 4 pCi/L (picocuries per liter). Table 425.1 lists the Zone 1 counties illustrated on the map.

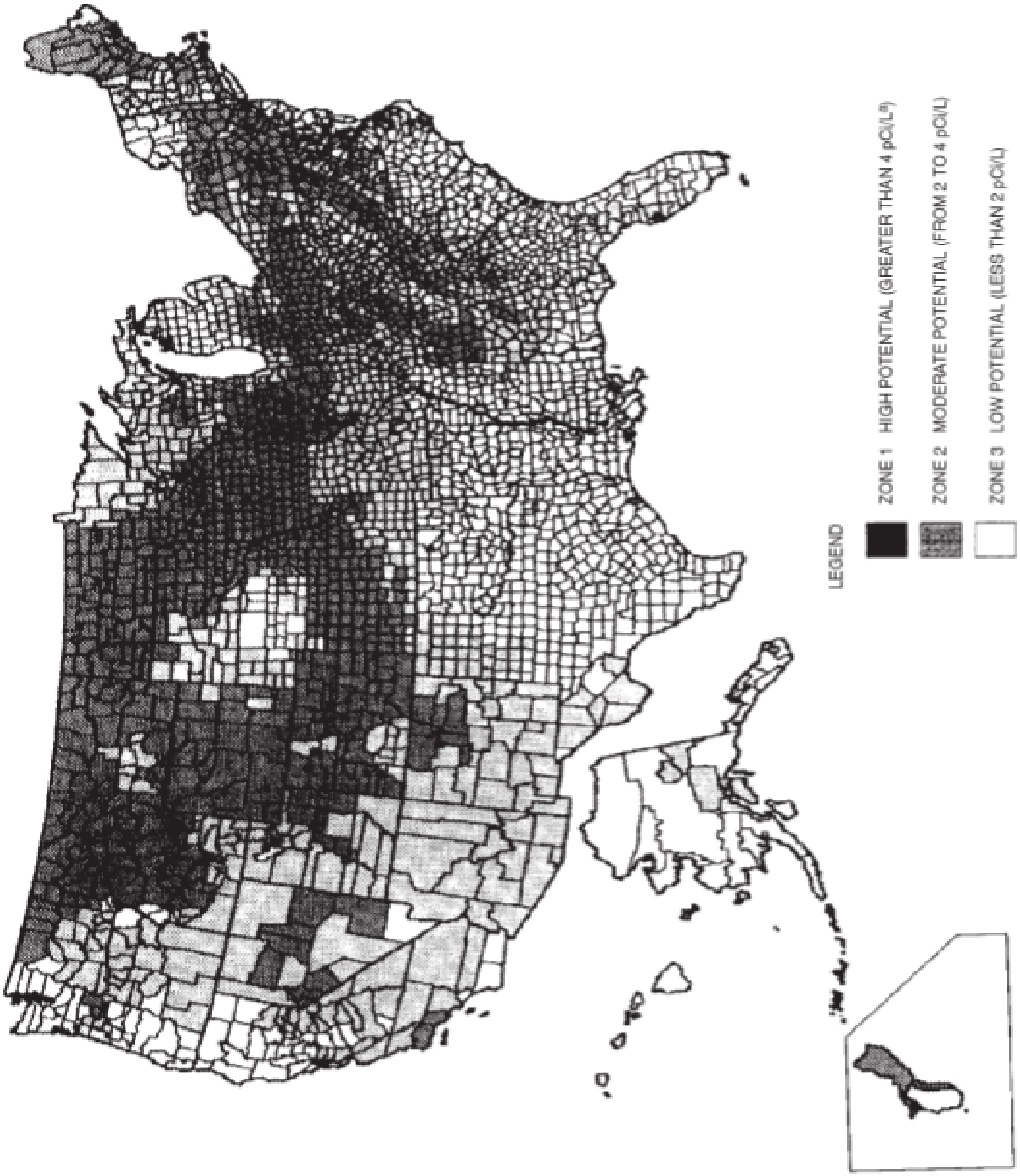


Table 425.1
List of Counties with High Radon Potential (Zone 1)

ALABAMA
Calhoun
Clay
Cleburne
Colbert
Coosa
Franklin
Jackson
Lauderdale
Lawrence
Limestone
Madison
Morgan
Talladega

CALIFORNIA
Santa Barbara
Ventura

COLORADO
Adams
Arapahoe
Baca
Bent
Boulder
Chaffee
Cheyenne
Clear Creek
Crowley
Custer
Delta
Denver
Dolores
Douglas
El Paso
Elbert
Fremont
Garfield
Gilpin
Grand
Gunnison
Huerfano
Jackson
Jefferson
Kiowa
Kit Carson
Lake
Larimer
Las Animas
Lincoln
Logan
Mesa
Moffat
Montezuma
Montrose
Morgan
Otero
Ouray
Park
Phillips
Pitkin
Prowers
Pueblo
Rio Blanco
San Miguel
Summit
Teller
Washington
Weld
Yuma

CONNECTICUT
Fairfield
Middlesex
New Haven
New London

GEORGIA
Cobb
De Kalb
Fulton
Gwinnett

IDAHO
Benewah
Blaine
Boise
Bonner
Boundary
Butte
Camas
Clark
Clearwater
Custer
Elmore
Fremont
Gooding
Idaho
Kootenai
Latah
Lemhi
Shoshone
Valley

ILLINOIS
Adams
Boone
Brown
Bueau
Calhoun
Carroll
Cass
Champaign
Coles
De Kalb
De Witt
Douglas
Edgar
Ford
Fulton
Greene
Grundy
Hancock
Henderson
Henry
Iroquois
Jerse
Jo Daviess
Kane
Kendall
Knox
La Salle
Lee
Livingston
Logan
Macon
Marshall
Mason
McDonough
McLean
Menard
Mercer
Morgan
Moultrie
Ogle
Peoria
Piatt
Pike
Putnam
Rock Island
Sangamon
Schuyler
Scott
Stark
Stephenson
Tazewell
Vermilion
Warren
Whiteside
Winnebago
Woodford

INDIANA
Adams
Allen
Bartholomew
Benton
Blackford
Boone
Carroll
Cass
Clark
Clinton
De Kalb
Decatur
Delaware
Elkhart
Fayette
Fountain
Fulton
Grant
Hamilton
Hancock
Harrison
Hendricks
Henry
Howard
Huntington
Jay
Jennings
Johnson
Kosciusko
Lagrange
Lawrence
Madison
Marion
Marshall
Miami
Monroe
Montgomery
Noble
Orange
Putnam
Randolph
Rush
Scott
Shelby
Steuben
St. Joseph
Tippecanoe
Tipton
Union
Vermillion
Wabash
Warren
Washington
Wayne
Wells
White
Whitley

IOWA
All Counties

KANSAS
Atchison
Barton
Brown
Cheyenne
Clay
Cloud
Decatur
Dickinson
Douglas
Ellis
Ellsworth
Finney
Ford
Geary
Gove
Graham
Grant
Gray
Greeley
Hamilton
Haskell
Hodgeman
Jackson
Jewell
Johnson
Keary
Kingman
Kiowa
Lane
Leavenworth
Lincoln
Logan
Marion
Marshall
McPherson
Meade
Mitchell
Nemaha
Ness
Norton
Osborne
Ottawa
Pawnee
Phillips
Pottawatomie
Pratt
Rawlins
Republic
Rice
Riley
Rooks
Rush
Russell
Saline
Scott
Sheridan
Sherman
Smith
Stanton
Thomas
Trego
Wallace
Washington
Wichita
Wyandotte

KENTUCKY
Adair
Allen
Barren
Bourbon
Boyle
Bullitt
Casey
Clark
Cumberland
Fayette
Franklin
Green
Harrison
Hart
Jefferson
Jessamine
Lincoln
Marion
Mercer
Metcalfe
Monroe
Nelson
Pendleton
Pulaski
Robertson
Russell
Scott
Taylor
Warren
Woodford

MAINE
Androscoggin
Aroostook
Cumberland
Franklin
Hancock
Kennebec
Lincoln
Oxford
Penobscot
Piscataquis
Somerset
York

MARYLAND
Baltimore
Calvert
Carroll
Frederick
Harford
Howard
Montgomery
Washington

MASS.
Essex
Middlesex
Worcester

MICHIGAN
Branch
Calhoun
Cass
Hillsdale
Jackson
Kalamazoo
Lenawee
St. Joseph
Washtenaw

MINNESOTA
Becker
Big Stone
Blue Earth
Brown
Carver
Chippewa
Clay
Cottonwood
Dakota
Dodge
Douglas
Faribault
Fillmore
Freeborn
Goodhue
Grant
Hennepin
Houston
Hubbard
Jackson
Kanabec
Kandiyohi
Kittson
Lac Qui Parle
Le Sueur
Lincoln
Lyon
Mahnomen
Marshall
Martin
McLeod
Meeker
Mower
Murray
Nicollet
Nobles
Norman
Olmsted
Otter Tail
Pennington
Pipestone
Polk
Pope
Ramsey
Red Lake
Redwood
Renville
Rice
Rock
Roseau
Scott
Sherburne
Sibley
Stearns
Steele
Stevens
Swift
Todd
Traverse
Wabasha
Wadena
Waseca
Washington
Watonwan
Wilkin
Winona
Wright
Yellow Medicine

MISSOURI
Andrew
Atchison
Buchanan
Cass
Clay
Clinton
Holt
Iron
Jackson
Nodaway
Platte

MONTANA
Beaverhead
Big Horn
Blaine
Broadwater
Carbon
Carter
Cascade
Chouteau
Custer
Daniels
Dawson
Deer Lodge
Fallon
Fergus
Flathead
Gallatin
Garfield
Glacier
Granite
Hill
Jefferson
Judith Basin
Lake
Lewis and Clark
Liberty
Lincoln
Madison
McCone
Meagher
Mineral
Missoula
Park
Phillips
Pondera
Powder River
Powell
Prairie
Ravalli
Richland
Roosevelt
Rosebud
Sanders
Sheridan
Silver Bow
Stillwater
Teton
Toole
Valley
Wibaux

Table 425.1 (continued)
List of US Counties with High Radon Potential (Zone 1)

Yellowstone National Park

NEBRASKA
Adams
Boone
Boyd
Burt
Butler
Cass
Cedar
Clay
Colfax
Cuming
Dakota
Dixon
Dodge
Douglas
Fillmore
Franklin
Frontier
Furnas
Gage
Gosper
Greeley
Hamilton
Harlan
Hayes
Hitchcock
Hurston
Jefferson
Johnson
Kearney
Knox
Lancaster
Madison
Nance
Nemaha
Nuckolls
Otoe
Pawnee
Phelps
Pierce
Platte
Polk
Red Willow
Richardson
Saline
Sarpy
Saunders
Seward
Stanton
Thayer
Washington
Wayne
Webster
York

NEVADA
Carson City
Douglas
Eureka
Lander
Lincoln
Lyon
Mineral
Pershing
White Pine

NEW HAMPSHIRE
Carroll

NEW JERSEY
Hunterdon
Mercer
Monmouth
Morris
Somerset
Sussex
Warren

NEW MEXICO
Bernalillo
Colfax
Mora
Rio Arriba
San Miguel
Santa Fe
Taos

NEW YORK
Albany
Allegany
Broome
Cattaraugus
Cayuga
Chautauqua
Chemung
Chenango
Columbia
Cortland
Delaware
Dutchess
Erie
Genesee
Greene
Livingston
Madison
Onondaga
Ontario
Orange
Otsego
Putnam
Rensselaer
Schoharie
Schuyler
Seneca
Steuben
Sullivan
Tioga
Tompkins
Ulster
Washington
Wyoming
Yates

N. CAROLINA
Alleghany
Buncombe
Cherokee
Henderson
Mitchell
Rockingham
Transylvania
Watauga

N. DAKOTA
All Counties

OHIO
Adams
Allen
Ashland
Auglaize
Belmont
Butler
Carroll
Champaign
Clark
Clinton
Columbiana
Coshocton
Crawford
Darke
Delaware
Fairfield
Fayette
Franklin
Greene
Guernsey
Hamilton
Hancock
Hardin
Harrison
Holmes
Huron
Jefferson
Knox
Licking
Logan
Madison
Marion
Mercer
Miami
Montgomery
Morrow
Muskingum
Perry
Pickaway
Pike
Preble
Richland
Ross
Seneca
Shelby
Stark
Summit
Tuscarawas
Union
Van Wert
Warren
Wayne
Wyandot

PENNSYLVANIA
Adams
Allegheny
Armstrong
Beaver
Bedford
Berks
Blair
Bradford
Bucks
Butler
Cameron
Carbon
Centre
Chester
Clarion
Clearfield
Clinton
Columbia
Cumberland
Dauphin
Delaware
Franklin
Fulton
Huntingdon
Indiana
Juniata
Lackawanna
Lancaster
Lebanon
Lehigh
Luzerne
Lycoming
Mifflin
Monroe
Montgomery
Montour
Northampton
Northumberland
Perry
Schuylkill
Snyder
Sullivan
Susquehanna
Tioga
Union
Venango
Westmoreland
Wyoming
York

RHODE ISLAND
Kent
Washington

S. CAROLINA
Greenville

S. DAKOTA
Aurora
Beadle
Bon Homme
Brookings
Brown
Brule
Buffalo
Campbell
Charles Mix
Clark
Clay
Codington
Corson
Davison
Day
Deuel
Douglas
Edmunds
Faulk
Grant
Hamlin
Hand
Hanson
Hughes
Hutchinson
Hyde
Jerauld
Kingsbury
Lake
Lincoln
Lyman
Marshall
McCook
McPherson
Miner
Minnehaha
Moody
Perkins
Potter
Roberts
Sanborn
Spink
Stanley
Sully
Turner
Union
Walworth
Yankton

TENNESSEE
Anderson
Bedford
Blount
Bradley
Claiborne
Davidson
Giles
Grainger
Greene
Hamblen
Hancock
Hawkins
Hickman
Humphreys
Jackson
Jefferson
Knox
Lawrence
Lewis
Lincoln
Loudon
Marshall
Maury
McMinn
Meigs
Monroe
Moore
Perry
Roane
Rutherford
Smith
Sullivan
Trousdale
Union
Washington
Wayne
Williamson
Wilson

UTAH
Carbon
Duchesne
Grand
Piute
Sanpete
Sevier
Uintah

VIRGINIA
Alleghany
Amelia
Appomattox
Augusta
Bath
Bland
Botetourt
Bristol
Brunswick
Buckingham
Buena Vista
Campbell
Chesterfield
Clarke
Clifton Forge
Covington
Craig
Cumberland
Danville
Dinwiddie
Fairfax
Falls Church
Fluvanna
Frederick
Fredericksburg
Giles
Goochland
Harrisonburg
Henry
Highland
Lee
Lexington
Louisa
Martinsville
Montgomery
Nottoway
Orange
Page
Patrick
Pittsylvania
Powhatan
Pulaski
Radford
Roanoke
Rockbridge
Rockingham
Russell
Salem
Scott
Shenandoah
Smyth
Spotsylvania
Stafford
Staunton
Tazewell
Warren
Washington
Waynesboro
Winchester
Wythe

WASHINGTON
Clark
Ferry
Okanogan
Pend Oreille
Skamania
Spokane
Stevens

W. VIRGINIA
Berkeley
Brooke
Grant
Greenbrier
Hampshire
Hancock
Hardy
Jefferson
Marshall
Mercer
Mineral
Monongalia
Monroe
Morgan
Ohio
Pendleton
Pocahontas
Preston
Summers
Wetzel

WISCONSIN
Buffalo
Crawford
Dane
Dodge
Door
Fond du Lac
Grant
Green
Green Lake
Iowa
Jefferson
Lafayette
Langlade
Marathon
Menominee
Pepin
Pierce
Portage
Richland
Rock
Shawano
St. Croix
Vernon
Walworth
Washington
Waukesha
Waupaca
Wood

WYOMING
Albany
Big Horn
Campbell
Carbon
Converse
Crook
Fremont
Goshen
Hot Springs
Johnson
Laramie
Lincoln
Natrona
Niobrara
Park
Sheridan
Sublette
Sweetwater
Teton
Uinta
Washakie

Commenter's Reason: This modification is presented as a substitute for this code change proposal. It is not entirely new, rather it is the original with several modifications. It is more readily understood without strikethrough. The proposed language addresses the IBC Committee's reasons for declining the proposal as follows:

(1) "There was still concern on the need for such provisions, and it was felt that perhaps an appendix would be a better location for the requirements." Response: This extremely modest approach to reduce radon exposure risk in only buildings in the highest risk localities belongs in the body of the code. Radon is a life, safety issue and is responsible for 21,000 lung cancer deaths each year. The public deserves radon protection in high risk areas.

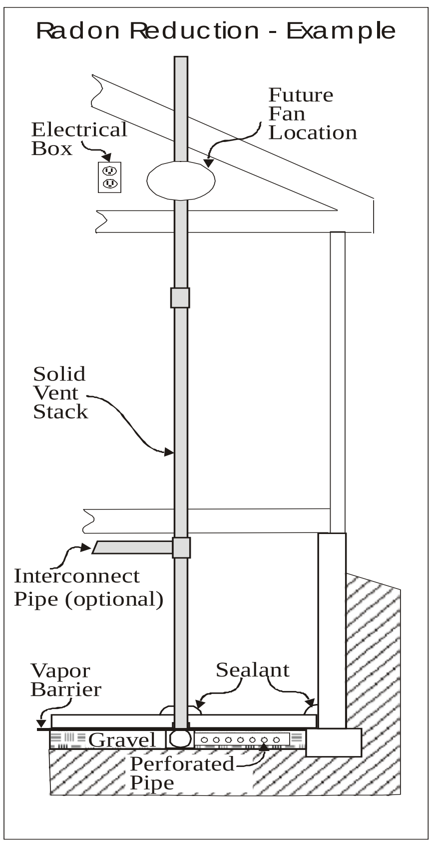
(2) "The map should be placed within the provisions versus simply referencing the IRC." Response: The EPA Radon Map and county list are included in the proposal as modified, and we have added a provision allowing the code official to approve the use of state and local data to supersede the older EPA information.

(3) "The presentation of the requirements could be simplified." Response: The requirements have gone through extensive editing and review to deliver this modified version. Text has been converted to code language and ambiguous terminology has been deleted. The section on sealing has been streamlined. The most complex section pertaining to piping has been broken down into distinct elements such as pipe dimensions, pipe support, coverage areas, interconnected coverage areas, and suction points.

During the IBC hearing, arguments were raised that are addressed briefly here:

- *Data is old:* The earth is old and progeny of radium have been finding their way into structures for a long time. The EPA maps from 1993 have withstood the test of time in the sense that they have provided a solid baseline of information for counties. New York, New Jersey, Nebraska, and other states collected additional data that have identified additional high risk counties beyond those that the EPA maps indicate. Some have compiled radon data below the county level to the zip code and municipal levels. This comment adds a provision to permit approval of the use of state and local data to supersede the EPA map and list.
- *Building tightness:* As buildings have become more tight to improve energy efficiency, the risk of radon entry into the building has grown.
- *Relation to other sections of the code:* These provisions complement but do not conflict with other segments of the building code.
- *Multiple proposals for different occupancies:* The proposals for G99 and G100, as revised by the comments, are the same. They could be combined in a single new section 425 covering both occupancies.

For reference, the figure below shows an example of how the radon-reducing features are installed.



G100-12

Final Action: AS AM AMPC____ D

G103-12
503.1, 706.1

<u>Proposed Change as Submitted</u>

Proponent: Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee (BCAC)

Revise as follows:

503.1 General. The *building height and area* shall not exceed the limits specified in Table 503 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. <u>For the purposes of determining area limitations, height limitations and type of construction</u>, each portion of a building separated by one or more *fire walls* complying with Section 706 shall be considered to be a separate building.

Revise as follows:

706.1 General. <u>For the purposes of determining area limitations, height limitations and type of construction,</u> each portion of a building separated by one or more *fire walls* that comply with the provisions of this section shall be considered a separate building. The extent and location of such *fire walls* shall provide a complete separation. Where a *fire wall* also separates occupancies that are required to be separated by a *fire barrier* wall, the most restrictive requirements of each separation shall apply.

Reason: Consistency and coordination among the International Codes is one of the cornerstones of the ICC Code Development process. The ICC Board established the ICC Building Code Action Committee (BCAC) to act as a forum to deal with complex issues ahead of the Code Development Process, identify emerging issues and draft proposed code changes.
This proposed change is a result of the BCAC's work.

Clarifies the intent of the these sections of the Code that the requirement for a fire wall in Sections 503.1 and 706.1 is predicated on the determination of the maximum allowable height and area calculations under Chapter 5. Using these sections of Code to control other building features or elements such as means of egress, building systems or building utilities is not intended or implied by these sections of the Code. There are no requirements in the I Codes that mandate that the placement of fire walls create a separate building such that its building features need to be separated from other like building features in adjacent buildings.

Cost Impact: The proposed changes will not increase the cost of construction.

503.1-G-BAJNAI-BCAC

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon concerns on how it would affect the use of fire walls in place of fire barriers. Generally, the concern related to the possible limitations created by the revisions to Section 706.1.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Chuck Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

706.1 General. ~~For the purposes of determining area limitations, height limitations and type of construction,~~ Each portion of a building separated by one or more *fire walls* that comply with the provisions of this section shall be considered a separate building. The extent and location of such *fire walls* shall provide a complete separation. Where a *fire wall* also separates occupancies that are required to be separated by a *fire barrier* wall, the most restrictive requirements of each separation shall apply.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This public comment is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 5 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The revised wording in this public comment is consistent with the requirements of NFPA 221, "Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls", that we referenced in IBC Section 706.2 for the design of double fire walls. NFPA 221 definition of a "fire wall" and its Annex note state:

"3.3.14.6* Fire Wall. A wall separating buildings or subdividing a building to prevent the spread of fire and having a fire resistance rating and structural stability.

This public comment is only intended to clarify the existing code requirements relating to the application of fire walls and no technical changes are intended by this public comment to the existing 2012 IBC.

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

G103-12

Final Action: AS AM AMPC____ D

G104-12
503.1

Proposed Change as Submitted

Proponent: Gene Boecker, Code Consultants, Inc., representing self

Revise as follows:

503.1 General. ~~The~~ Unless otherwise specifically modified in Chapter 4, *building height and area* shall not exceed the limits specified in Table 503 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. Each portion of a building separated by one or more *fire walls* complying with Section 706 shall be considered to be a separate building.

Reason: Section 503.1 needs to include this provision to make it clear that Chapter 4 also contains height and area requirements which may be more or less restrictive than those in Chapter 5. The problem is that except as a footnote to Table 503, no reference is made in the code to the fact that Chapter 4 contains specific language that modifies the allowable heights and areas for various structures based on their unique conditions. This occurs in 402.4, 403.2, 405.2, 406.5.1, 406.5.5, 406.7.2, 410.3.1, 410.3.2, 410.4, 412.3.1, 412.4.2, 412.4.6, 412.6.2, 415.8.1.1, 415.8.1.6.

Numerous sections of the IBC as well as other codes in the ICC family refer back to the limiting the height and area based on the requirements in Chapter 5 of the IBC. Without this reference, these other sections in Chapter 4 are not tied in; and, the IBC itself is more complete. For example, the IEBC refers to allowing building height and area based on the Chapter 5 but makes no reference to Chapter 4. Essentially, any modification to a covered mall, high-rise building, open parking garage and various High Hazard occupancies could be literally interpreted to require compliance with Table 503, rendering the initial construction noncompliant. This proposal closes a gap in the code.

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

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Although starting the section with an exception seemed awkward the concept was acceptable based upon the proponents justification. Chapter 4 has various specific allowances and limitations on height and area of special uses.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Gene Boecker, AIA, Code Consultants, Inc (CCI) requests Approved as Modified by this Public Comment.

Modify the proposal as follows:

503.1 General. Unless otherwise specifically modified in Chapters 4 and 5, *building height and area* shall not exceed the limits specified in Table 503 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. Each portion of a building separated by one or more *fire walls* complying with Section 706 shall be considered to be a separate building.

Commenter's Reason: *Reason:* As proponent of G104-12 it was noted to me that I had left out also referring to IBC Section 510, "Special Provisions", that also contains numerous requirements that differ from the limits in Table 503 and for consistency with the intent of this code proposal should be included in this code proposal. Therefore, to resolve this omission that was certainly not my intent for this code proposal that was intended only to clarify the Code, I am proposing to provide a more general reference in

Section 503.1 to resolve my original concerns. This code comment will not change the code requirements in the Code; it will only provide the code user additional information on how to apply the requirements under Section 503. Numerous modifications take place in Sections 402, 403, 405, 406, 410, 412, 415, 504, 506, 507, 508 and 510. There are 41 locations in all, 20 in Chapter 4 and 21 in Chapter 5. Rather than list all the Sections, this is a reasonable method for addressing the external modifications to the height and area provisions of Section 503.

Public Comment 2:

Marshall A. Klein, P.E., Marshall A. Klein & Associates, Inc., representing National Multi-Housing Council (NMHC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

503.1 General. Unless otherwise specifically modified in Chapter 4 <u>and Section 510</u>, *building height and area* shall not exceed the limits specified in Table 503 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. Each portion of a building separated by one or more *fire walls* complying with Section 706 shall be considered to be a separate building.

Commenter's Reason: IBC Section 510, "Special Provisions", contains numerous requirements that differ from the limits in Table 503 and for consistency with the intent of this code proposal should be included in this code proposal. This code proposal and this code comment will not change the code requirements in the Code, it will only provide the code user additional information on how to apply the requirements under Section 503.

G104-12
Final Action: AS AM AMPC____ D

G108-12
Table 503

Proposed Change as Submitted

Proponent: Dennis Richardson, P.E., CBO, City of Salinas, Tri-Chapter (Peninsula, East Bay and Monterey Chapters, ICC) (dennisrichardsonpe@yahoo.com)

Revise as follows:

TABLE 503
ALLOWABLE BUILDING HEIGHTS AND AREAS[a, b]
Building height limitations shown in feet above grade plane. Story limitations shown as stories above grade plane.
Building area limitations shown in square feet, as determined by the definition of "Area, building," per story

Group		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
	HEIGHT (feet)	UL	160	65	55	65	55	65	50	40
	STORIES(S) AREA (A)									
R-2	S A	UL UL	11 UL	~~4~~ 5 24,000	4 16,000	4 24,000	4 16,000	4 20,500	~~3~~ 4 12,000	2 7,000

(Portions of table not shown remain unchanged)

Reason: This code change encourages the use of light-frame one hour rated construction for a greater portion of the construction of apartment buildings. Not only is this a sustainable practice reducing greenhouse gas emissions, but by utilizing more light-frame construction for this type of project, costs are reduced making rental housing more viable on difficult urban infill projects. The City of Seattle has utilized a similar code modification for type VA construction for years with excellent safety results. Construction over 4 stories requires the use of an NFPA 13 sprinkler system throughout instead of the NFPA 13R system permitted for projects 4 stories and under. R-2 apartment construction is highly compartmentalized and fully sprinklered one hour construction has an excellent track record. Structural systems and construction methods to allow this type of multi level light frame construction continues to evolve and improve.

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

T503-G-RICHARDSON

Public Hearing Results

The following errata were not posted to the ICC website.

Replace the reason statement as follows:

Reason: This code change encourages the use of light-frame one hour rated construction for a greater portion of the construction of apartment buildings. Not only is this a sustainable practice reducing greenhouse gas emissions, but by utilizing more light-frame construction for this type of project, costs are reduced making rental housing more viable on difficult urban infill projects. The City of Seattle has utilized a similar code modification for type VA construction for years with excellent safety results. Construction over 4 stories requires the use of an NFPA 13 sprinkler system throughout instead of the NFPA 13R system permitted for projects 4 stories and under. R-2 apartment construction is highly compartmentalized and fully sprinklered one hour construction has an excellent track record. Structural systems and construction methods to allow this type of multi level light frame construction continues to evolve and improve.

Currently a type VA, R-2 apartment can be constructed up to 4 stories with an NFPA 13R sprinkler system. This code change would not change that but would allow a type VA R-2 apartment to be constructed up to 5 stories if an NFPA 13 sprinkler system is provided in lieu of the 13R sprinkler system required for 4 stories.

It is important to note this code change would not allow the height of the building to be increased with either change so the volume of the fire compartment would be smaller as more floors could be fit into the same height.

In summary this code change encourages the sustainable practice of utilizing light frame construction on infill projects, results in a smaller fire compartment volume and when a wood frame apartment is increased to 5 stories, this code change requires an upgrade to an NFPA 13 sprinkler system.

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon concern that Group R buildings, where people sleep, should not be afforded the same height as storage occupancies. Additionally, there was concern that this would encourage more wood framed construction. Generally, more substantiation was needed to make this change.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Dennis Richardson, P.E., CBO, City of Salinas, Tri-Chapter (Peninsula, East Bay and Monterey Chapters, ICC) requests Approval as Submitted.

Commenter's Reason: G108-12 as submitted encourages the use of light frame wood and steel construction for infill apartment projects by increasing (by one) the number of stories that can be constructed for Type II A and Type VA construction with the same height limitations. This proposal does not increase the allowed building height!

The maximum # and stories and height is currently: 4 stories and 70 ft. for VA and: 5 stories and 85 ft. for type IIA, both with a NFPA 13 sprinkler system. If the architect is trying to maximize density for an infill project, utilizing light frame construction, within these current limitations there is height for at least three mezzanine levels to be installed in each type of construction.

When trying to maximize density and contrasting maximum build-out under this proposal (with that is allowed by the current code) the architect is could replace one mezzanine level with a story to reach the maximum density keeping the same maximum height. Since this proposal neither changes the height or the total floor area, the individual floor area between fire-walls actually decreases 20% to keep the total floor area the same. Since the total floor area is the same and because there is one less mezzanine and the maximum mezzanine size is smaller, the fire area is smaller between fire walls as are the number of occupants in each 2 hour compartment.

In the maximum build-out in order to get a greener building there is the unintended benefit of a safer building because the number of occupants per one hour compartment is also reduced. Since the height above grade plane for the highest mezzanine remains unchanged and the footprint is smaller between fire walls, the exit access travel distance decreases and the highest occupant in the structure has the same number of stair steps in the two hour stair enclosure. From an engineering standpoint the maximum number of levels (or load) per square foot is no different between the maximum build-out areas with mezzanines.

The only argument heard against this proposal is: “there is a lot of wood”….but actually there is less wood per compartment and no height increase.

In summary: when comparing the maximum build-out before and after this proposal, the maximum height is the same, the individual story area between fire walls is smaller, the maximum fire area is the less, the total combined sum of mezzanine levels and floors is limited by height and is the same, protection of stairs is the same, the exit access travel distance is less, the maximum number of steps the highest occupant must travel down exit stairs is the same, the maximum structural load per square foot is the same, the number of complete one hour compartments in each fire area goes up by one……..by every objective measure this change in the maximum state does not decrease the safety of the building and overall it increases safety….and results in greener construction.

Two examples are attached with a summary of information comparing maximum conditions that may be built under current code with maximum build-out utilizing this proposed code change.

G108-12/13 Maximum build-out example:

Type IIA Apartment, NFPA 13 Sprinkler throughout

Maximum build-out assuming 8. 5' floor to floor dimension and 17' floor to floor at type IA podium floor (IBC section 510.2)

	IIA const on grade		IIA const on podium	
code provision	2012 IBC	w/ G108	2012 IBC	w/G108
number of IIA levels	10	10	8	8
max total height	85'	85'	85'	85'
# IIA stories	5	6	5	6
area per story	14,400 sf	12,000 sf	14,400 sf	12,000 sf
allowable area	72,000 sf	72,000 sf	72,000 sf	72,000 sf
# mezzanines (# of levels - # of stories)	5	4	3	2
area per mezzanine	4,800 sf	4,000 sf	4,800 sf	4,000 sf
total mezzanine area	24,000 sf	16,000 sf	14,400 sf	8,000 sf
total fire area	96,000 sf	88,000 sf	86,400 sf	76,000 sf
total occupants per fire area	480	440	432	380
footprint	14,400	12,000	14,400	12,000
sf per occupant gross	30.0	27.3	33.33	31.6
stairway rating	2 hour	2 hour	2 hour	2 hour
exit access travel *	120 ft	110 ft	120 ft	110 ft
maximum number of stair steps (7" rise)	132	132	132	132

* Exit access travel is assumed to be calculated based on a square floor area with a corridor down the middle and 2 hour fire walls on each end

G108-12/13 Maximum build-out example:

Type VA Apartment, NFPA 13 Sprinkler throughout

Maximum build-out assuming 8. 75' floor to floor dimension and 17.5' floor to floor at type IA podium floor (IBC section 510.2)

	VA const on grade		VA const on podium	
code provision	2012 IBC	w/ G108	2012 IBC	w/G108
number of VA levels	8	8	6	6
max total height	70'	70'	70'	70'
# VA stories	4	5	4	5
area per story	9,000 sf	7,200 sf	9,000 sf	7,200 sf
allowable area	36,000 sf	36,000 sf	36,000 sf	36,000 sf
# mezzanines (# of levels - # of stories)	4	3	2	1
area per mezzanine	3,000 sf	2,400 sf	3,000 sf	2,400 sf
total mezzanine area	12,000 sf	7,200 sf	6,000 sf	2,400 sf
total fire area	48,000 sf	43,200 sf	42,000 sf	38,400 sf
total occupants per fire area	240	216	210	192
footprint	9,000 sf	7,200 sf	9,000 sf	7,200 sf
sf per occupant gross	37.5	33.3	42.9	37.5
stairway rating	2 hour	2 hour	2 hour	2 hour
exit access travel *	95 ft	85 ft	95 ft	85 ft
maximum number of stair steps (7" rise)	105	105	105	105

* Exit access travel is assumed to be calculated based on a square floor area with a corridor down the middle and 2 hour fire walls on each end.

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

Public Comment 2:

Ali Fattah, City of San Diego, representing City of San Diego Development Services Department, requests Approval as Submitted.

Commenter's Reason: This public comment is to urge the membership to vote in support of overturning the General Committee's action of disapproving the code change submitted by the Tri Chapter. We request approval of the code change as submitted.

At first we were opposed to the code change as submitted since it seems to blur the transition between type V and Type III construction, both of which can be entirely of wood construction.

If approved this code change provides another option that provides a safer building when constructed as Type V A construction. We agree with the following reasons to support the proposed code change:

a. The fifth story will result in better compartmentation since the floor will fully separate the story whereas the permitted mezzanine will not.
b. By including a story in lieu of a mezzanine the total area of the 5 story building will be less than the 4 story building with three mezzanines.
c. The overall height allowable for Type VA will limit the design as will the total floor area.
d. The total allowable area for the Type VA 5 story building will be almost 50% less since the tabular area is less and no increases for sprinklers can be taken.
e. A Type IIIA building can include one hour exterior walls that are not constructed of fire retardant treated wood simply by changing the direction of roof and floor framing so as to have exterior non-bearing walls. This will result what in essence is a taller and larger Type VA building.
f. This will solve many of the arguments that jurisdictions have with developers and designers that do not wish to redesign their buildings by reversing the framing.

We respect the work of the committee, and some of the comments made at the code development hearing, however, we believe this code change will provide for an equivalent level of safety without impacting fire fighting access nor occupant safety. Furthermore, exposure hazard to adjacent properties will be less than that for Type IIIA due to the smaller bulk and scale. We urge approval of the code change as submitted.

G108-12
Final Action: AS AM AMPC____ D

G109-12
505.2.4 (New)

Proposed Change as Submitted

Proponent: Jonathan Siu, City of Seattle Dept of Planning & Development, representing Washington Association of Building Officials Technical Code Development Committee (jon.siu@seattle.gov)

Add new text as follows:

<u>**505.2.4 Construction.** Mezzanines and their supporting construction shall be of not less than one-hour fire-resistance-rated construction.</u>

> <u>**Exception:** Mezzanines in buildings of Types IIB, IIIB and VB construction shall be permitted to be of unprotected construction, provided the materials used are allowed for the building type of construction.</u>

Reason: The purpose of this code change is to provide clear guidance to the code user as to what is required for mezzanine and equipment platform construction. This is a companion to a code change proposal being submitted by the WABO Technical Code Development Committee relating to construction requirements for equipment platforms (Section 505.3).

The 2012 IBC is silent on the type of construction and fire resistance rating requirements for mezzanines. This can be interpreted to mean that any materials can be used—for example, unprotected wood construction would be allowed in a Type VA or even a Type IA building. This code change proposal seeks to clarify the requirement by requiring 1-hour protected construction for mezzanines, but has an exception for non-rated construction types.

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

505.2.4 (NEW)-G-SIU

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There was concern with trying to recreate Section 601 in Section 505. This would also exclude heavy timber which did not seem appropriate. The mezzanine would be considered a floor and the structure would be regulated currently.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jonathan Siu, City of Seattle, Department of Planning & Development, representing the Washington Association of Building Officials, Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

<u>**505.2.4 Construction.** Mezzanines and their supporting construction shall comply with the fire-resistance ratings for floor construction in Table 601.</u>

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A[d]	B	A[d]	B	HT	A[d]	B
(No change)									
(No change)									
(No change)									
(No change)									
Floor construction and associated secondary members (see Section 202)	2[h]	2[h]	1	0	1	0	HT	1	0
(No change)									

a – g. *(no change)*
h. The fire-resistance rating for mezzanines constructed in accordance with Section 505.2 need not exceed 1 hour.

Commenter's Reason: The code is ambiguous as to the requirements for fire-resistance rated construction for mezzanines. In buildings of Types I and II construction, interpreting the code to require mezzanines to meet the floor construction requirements appropriately provides non-combustible construction, but the 2-hour rating for Types IA and IB seems to be onerous for a mezzanine.

The Fire Safety Committee disapproved the originally submitted proposal because they felt there should be a better relationship to Section 601 (rather than reproducing Section 601 in the mezzanine section), and because the original proposal did not deal with heavy timber construction.

In response to the committee comments, we are now proposing the allowance for the 1-hour fire resistance rating for mezzanines be placed in a footnote to Table 601. The footnote only applies to Types IA and IB construction, since they are the only types of construction that need the allowance. The result is mezzanines in types of construction other than Types IA and IB merely conform to the requirements for that particular type of construction. This will accomplish the intent of the original proposal in a simpler, more direct manner.

It is to be noted that the cross-reference in the proposed new Section 505.2.4 is still necessary because the definition for "mezzanine" does not indicate they are to be treated as floors for the purposes of type of construction.

Note to ICC staff: if G109-12 and G110-12 are both approved as modified by public comment (AMPC), footnote h on each proposal could be editorially combined into one footnote as follows:

h. The fire-resistance rating for mezzanines and equipment platforms constructed in accordance with Section 505.2 or 505.3, respectively, need not exceed 1 hour.

G109-12
Final Action: AS AM AMPC____ D

G110-12
505.3

Proposed Change as Submitted

Proponent: Jonathan Siu, City of Seattle Department of Planning & Development, representing Washington Association of Building Officials Technical Code Development Committee (jon.siu@seattle.gov)

Revise as follows:

505.3 Equipment platforms. *Equipment platforms* in buildings shall not be considered as a portion of the floor below. Such *equipment platforms* shall not contribute to either the *building area* or the number of *stories* as regulated by Section 503.1. The area of the *equipment platform* shall not be included in determining the *fire area* in accordance with Section 903. *Equipment platforms* shall not be a part of any *mezzanine* and such platforms and the walkways, *stairs*, *alternating tread devices* and ladders providing access to an *equipment platform* shall not serve as a part of the *means of egress* from the building. <u>Equipment platforms and their supporting construction shall be of not less than one-hour fire-resistance-rated construction</u>

<u>Exceptions:</u>

1. <u>Equipment platforms in buildings of Types IIB, IIIB and VB construction are permitted to be of unprotected construction provided the materials used are allowed for the building type of construction.</u>
2. <u>Equipment platforms with no occupied space below are permitted to be of unprotected construction provided the materials used are allowed for the building type of construction.</u>

Reason: The purpose of this code change is to provide clear guidance to the code user as to what is required for equipment platform construction. This is a companion to a code change proposal being submitted by the WABO Technical Code Development Committee relating to construction requirements for mezzanines (Section 505.2).

The 2012 IBC is silent on the type of construction requirements for equipment platforms. This can be interpreted to mean that any materials can be used—for example unprotected wood construction would be allowed in a Type VA or even a Type IA building. This code change proposal seeks to clarify the requirement by requiring 1-hour protected construction for equipment platforms with an exception for non-rated construction types. Where there is no occupied space below a platform (i.e., where the platform is close to the floor), the proposal gives the option of using unprotected construction, as long as the materials used are consistent with the type of construction for the building.

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

505.3-G-SIU

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: G110-12 was disapproved based upon action taken on G109-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jonathan Siu, City of Seattle, Department of Planning & Development, representing the Washington Association of Building Officials, Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

505.3 Equipment platforms. *Equipment platforms* in buildings shall not be considered as a portion of the floor below. Such *equipment platforms* shall not contribute to either the *building area* or the number of *stories* as regulated by Section 503.1. The area of the *equipment platform* shall not be included in determining the *fire area* in accordance with Section 903. *Equipment platforms* shall not be a part of any *mezzanine* and such platforms and the walkways, *stairs*, *alternating tread devices* and ladders providing access to an *equipment platform* shall not serve as a part of the *means of egress* from the building. Equipment platforms and their supporting construction shall comply with the fire-resistance rating requirements for floor construction in Table 601.

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	**TYPE I**		**TYPE II**		**TYPE III**		**TYPE IV**	**TYPE V**	
	A	**B**	**A**[d]	**B**	**A**[d]	**B**	**HT**	**A**[d]	**B**
(No change)									
(No change)									
(No change)									
(No change)									
Floor construction and associated secondary members (see Section 202)[i]	2[h]	2[h]	1	0	1	0	HT	1	0
(No change)									

a – g. *(no change)*

h. The fire-resistance rating for equipment platforms constructed in accordance with Section 505.3 need not exceed 1 hour.

i. Equipment platforms with no occupied space between the platform and the floor/ceiling assembly immediately below are permitted to be of unprotected construction.

Commenter's Reason: The code is ambiguous as to the requirements for fire-resistance rated construction for equipment platforms. Interpreting the code to require them to meet the floor construction requirements would mean they would need a 2-hour rating in Types IA and IB construction, which seems to be onerous.

The Fire Safety Committee disapproved the originally submitted proposal consistent with their action on a related proposal for mezzanines (G109-12). The implication is they felt there should be a better relationship to Section 601 (rather than modifying Section 601 in the equipment platform section), and because the original proposal did not deal with heavy timber construction.

In response to the committee comments, we are now proposing the allowances for the 1-hour fire resistance rating for equipment platforms be placed in footnote to Table 601. The footnote only applies to Types IA and IB construction, since they are the only types of construction that need the allowance. The result is equipment platforms in types of construction other than Types IA and IB merely conform to the requirements for that particular type of construction. In addition, a second footnote applying to all types of construction is added to allow unprotected construction, if there is no occupiable space immediately below the equipment platform. This allows equipment to be placed on raised platforms without requiring them to be fire-resistance rated, if the platforms are not overhead. This will accomplish the intent of the original proposal in a simple, direct manner.

It is to be noted that the cross-reference to Table 601 in the proposed new text in Section 505.3 is necessary because the current code is not clear that equipment platforms are to be treated as floors for the purposes of type of construction. This proposal does not define equipment platforms as floors—it just says they must have a fire-resistance rating consistent with floor construction.

Note to ICC staff: if G109-12 and G110-12 are both approved as modified, footnote h on each proposal could be editorially combined into one footnote as follows:

h. The fire-resistance rating for mezzanines and equipment platforms constructed in accordance with Section 505.2 or 505.3, respectively, need not exceed 1 hour.

G110-12

Final Action: AS AM AMPC____ D

G115-12
507.1

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee (BCAC)

Revise as follows:

507.1 General. The area of buildings of the occupancies and configurations specified in Sections 507.1 through 507.12 shall not be limited. <u>Basements not more than one story below grade plane shall be permitted.</u>

> **Exception:** Other occupancies shall be permitted in unlimited area buildings in accordance with the provisions of Section 508.2.

Where Sections 507.2 through 507.12 require buildings to be surrounded and adjoined by *public ways* and *yards,* those open spaces shall be determined as follows:

1. *Yards* shall be measured from the building perimeter in all directions to the closest interior *lot lines* or to the exterior face of an opposing building located on the same *lot*, as applicable.
2. Where the building fronts on a *public way*, the entire width of the *public way* shall be used.

Reason: Intended to clarify the existing provision that is currently silent on whether or not a basement is permitted under any of the unlimited area building provisions. However, the code is a permissive code, i.e. either the code provisions explicitly prohibit or provide specific requirements that control the construction of buildings and conditions. If the Code does not prohibit a particular building design or process, or the Code does not control the building design or process with specific requirements, then it is permitted by Code. Therefore, since the Code is silent on whether or not an unlimited area building can have a basement, the Code therefore permits a basement, or for that matter, multiple basements.

This issue had been discussed in the past at one of the legacy code development cycles back in 1985 (BOCA Code Proposal B23-85). That code proposal attempted to add to the unlimited one story sprinklered building provisions that such building "…do not contain a basement…". It should be noted that the legacy BOCA & SBCCI Codes did not have unlimited area provisions for 2 story sprinklered buildings like the legacy UBC or the present IBC do permit. BOCA Code Proposal B23-85 was denied by the BOCA Code Development Committee with the following reason: "A total prohibition of basement areas would be unnecessarily restrictive. Certain industrial processes require the use of below-floor areas by nature of the process. Some amount of basement area would be acceptable if limited in size."

Through discussion between the BCAC and FCAC Committee it was agreed that the basement conditions should be codified similar to what is now permitted for buildings designed under the general height and area requirements of the Code (See Section 506.4 Exception and Section 506.5). Any sprinkler provisions in Section 507 would also be applicable to the basement as well. In addition, the sprinkler provisions of Section 903.2.11.1 would also be applicable to unlimited area nonsprinklered buildings designed under Section 507.2 (Group F-2 or S-2).

This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Cost Impact: The proposed changes will not increase the cost of construction.

507.1#1-G-BAJNAI-BCAC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved as it clarifies the intent that the code would allow a single basement in unlimited area buildings.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jason Thompson, National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards, requests Disapproval.

Commenter's Reason: This proposal adds a statement to the general provisions for unlimited area buildings in Section 507.1 to permit these unlimited area buildings to have a single basement below ground whose size is also unlimited in area. The proponent's reason is to clarify the code because the code is silent on whether basements are permitted beneath unlimited area buildings. However, allowing single level basements that are unlimited in area ignores the safety factors in the code to protect the fire service and occupants and should be disapproved for the following reasons.

First, one of the criteria all buildings permitted to have unlimited area are required to meet is having an open space around the building perimeter of at least 60 feet. This open space allows the fire service to stage firefighting tactics as they attack fires that may be located far into the interior of very large buildings. Though this open space can also help with fighting fires far into the interior of the basement in an unlimited area building, the capability for the fire service is significantly hampered because the basement story is below ground. The risk to the safety of the fire service increases because of the difficult access to the interior of the building below ground.

Second, when code provisions are modified to permit alternative requirements, the alternatives commonly require increased fire safety features to offset some of the basic provisions. Area modifications to the allowable building areas in Section 506 are a good example. The basic code limits the size of buildings based on the occupancy group and type of construction through the allowable heights and areas of Table 503. However, when additional fire safety features such as wider open space around the perimeter of the building in 506.2 or sprinkler protection in 506.3 are provided the code allows these buildings to be larger in area than that regulated by Table 503. This proposal requires no additional fire safety features in the code to permit these unlimited area basements.

Finally, the provisions will permit some circumstances where large numbers of people can be placed at a higher safety risk from fire if located on a floor above an unlimited area basement of unlimited area buildings with combustible materials used for the construction of the floor assembly. For example, assembly occupancies with large occupant loads, such as Group A4, skating rinks and tennis courts with spectator seating, or Group A-3, community halls, courtrooms, lecture halls and places of worship, can be on the ground level of an unlimited area building and be located over a basement of equal size with combustible materials stored below ground. Per Section 507.3 for the Group A-4 assembly occupancy and Section 507.7 for the Group A-3 assembly occupancy, Type IIIB construction which includes combustible framing for the floor system is permitted. Assuming the unlimited area basement is used for storage of combustibles the non-separated occupancy provisions in Section 508.3 would permit high occupant load assembly functions to be placed on a floor over the combustible materials stored below in the unlimited area basement with no fire separation. There is no justification to increase the risk of injury or death to persons in an unlimited area building by allowing an unlimited area basement.

Permitting the use of unlimited area basements in buildings which meet the provisions for unlimited area buildings, without specifying additional fire safety requirements or placing some limitations on their use to protect the fire service or large numbers of occupants, is not warranted.

G115-12

Final Action: AS AM AMPC____ D

G116-12
507.1, 507.1.1 (New)

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee (BCAC)

Revise as follows:

507.1 General. The area of buildings of the occupancies and configurations specified in Sections 507.1 through 507.12 shall not be limited.

> ~~**Exception:** Other occupancies shall be permitted in unlimited area buildings in accordance with the provisions of Section 508.2.~~

Where Sections 507.2 through 507.12 require buildings to be surrounded and adjoined by *public ways* and *yards,* those open spaces shall be determined as follows:

1. *Yards* shall be measured from the building perimeter in all directions to the closest interior *lot lines* or to the exterior face of an opposing building located on the same *lot*, as applicable.
2. Where the building fronts on a *public way*, the entire width of the *public way* shall be used.

<u>**507.1.1 Accessory occupancies.** Accessory occupancies shall be permitted in unlimited area buildings in accordance with the provisions of Section 508.2, otherwise the requirements of Sections 507.2 through 507.12 shall be applied, where applicable.</u>

Reason: Intended to be editorial to provide better understanding and clarify the existing provision. The exception was deleted and placed as a subsection of Section 507.1. As a subsection, the requirement for accessory occupancies permitted in unlimited area buildings is clarified that if such occupancies do not meet the Section 508.2 (and its subsections) requirements, then the requirements for unlimited area buildings in Section 507.2 through 507.12 would be applied to any such occupancy.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Cost Impact: The proposed changes will not increase the cost of construction..

507.1#2-G-BAJNAI-BCAC

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This new section addressing accessory occupancies was not felt necessary. Professionals using the code should be able to use the current exception to Section 507.1 to allow accessory occupancies. It was felt that this new section would actually cause confusion.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Eirene Oliphant, MCP, BRR Architecture, requests Approval as Submitted.

Commenter's Reason: In the report of the public hearing, the committee stated that "professionals using the code should be able to use the current exception to Section 507.1 to allow accessory uses". In a perfect world, yes professionals who understand how to apply the code correctly would allow the exception to apply. However, this is not a perfect world and not every code official applies the exception the way it was intended. As a design firm that does work all over the United States, we have on a number of occasions, received plan review comments back which do not recognize the application of an accessory use in an unlimited building of which the accessory use is not a B, F, M or S use group. We had a project for a sprinklered, one story retail store which was approximately 150,000 total square feet. There was an employee breakroom which amounted to approximately 1,500 square feet. This employee breakroom, along with some office space amounted to well under ten percent of the total square footage and met all of the requirements to be considered accessory uses. The code official performing the plan review insisted that the "assembly area" meet the requirements of Section 507.3.1, which required a two-hour occupancy separation between the break room (A-2 use group) and all other uses as well as having the exits discharge directly to the exterior of the building. Even with reference to the IBC Commentary, the code official would not recognize the exception for the accessory use.

In spite of the committee's opinion that this new section would cause confusion, based on my experience, it will help avoid confusion.

G116-12

Final Action: AS AM AMPC____ D

G117-12
507.1

Proposed Change as Submitted

Proponent: Ali M. Fattah City of San Diego, Development Services Department, representing San Diego Area Chapter of ICC (afattah@sandiego.gov)

Revise as follows:

507.1 General. The area of buildings of the occupancies and configurations specified in Sections 507.1 through 507.12 shall not be limited.

Exceptions:

1. Other occupancies shall be permitted in unlimited area buildings in accordance with the provisions of Section 508.2.
2. <u>Accessory occupancies classified as Group A, B, E, F, M, or S shall be permitted in unlimited area buildings when they exceed the limits in Section 508.2 where the most restrictive requirements in Sections 507.2 through 507.7 are satisfied and where the occupancies are separated in accordance with Section 508.4.</u>

Where Sections 507.2 through 507.12 require buildings to be surrounded and adjoined by *public ways* and *yards,* those open spaces shall be determined as follows:

1. *Yards* shall be measured from the building perimeter in all directions to the closest interior *lot lines* or to the exterior face of an opposing building located on the same *lot*, as applicable.
2. Where the building fronts on a *public way*, the entire width of the *public way* shall be used.

Reason: This code change is necessary to allow two unlimited area buildings to in essence be combined into one building. The permitted occupancies allowed in buildings not limited in area have been expanded since the legacy codes were combined into the IBC. Exception 1 permits accessory occupancies to be located in unlimited area buildings complying with Section 508.2 that limits the area of all accessory occupancies in the building to 10%.

The Section as published in the 2012 IBC limits the area of an accessory occupancy with a lower fire loading to that of the main occupancy for example a group E accessory to a group M. Strip shopping centers can include unlimited area buildings that house in the same building Group M, B, A-2, A-3, E occupancies.

- An existing multi-tenant unlimited area building complying with Section 507.7 can include a fitness center classified as Group A-3 however a mercantile occupancy cannot be permitted in the building since it is not accessory to the Group A. Even if the mercantile occupancy were accessory it would be limited to 10% of the floor area.
- An existing multi-tenant unlimited area building complying with Section 507.3 can include unlimited areas of Group S, F and M as well as Group B. however if a remodel changes a portion to Group A-3 such as a fitness center the group A would not be permitted even though it will include a fire load that is substantially less than group S storage or potentially more hazardous Group F.
- The reverse could be true where a large amusement facility such as a bowling alley cannot be included in a building that includes restaurants and mercantile occupancies however independently these uses can be in unlimited area buildings.

Section 507.3 includes B, F, M and S and allows limited A and E accessory uses. Section 507.3.1, 507.6, 507.7 and 507.10 allow Group A or E to be the primary occupancy and Group B, F, M and S or A or E to be accessory.

The proposed new exception 2 allows any combination of the occupancies other than Group H that area addressed in Section 507 to be located in combination with any of the other occupancies in the Section if the most restrictive requirements are satisfied.

Section 508.3 addresses non separated uses and is less restrictive than Section 508.2 in that it does not limit the aggregate area to 10% as the accessory uses occupancies and allows them to be located in a building not however unlike accessory occupancies the occupancies do not go away notwithstanding the type of construction limitation in Section 508.3.2 require

Cost Impact: None. The code change proposal will not increase the cost of construction.

507.1-G-FATTAH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The language in the proposal is confusing. Additionally, there was concern that this new exception will cause confusion with the application of the current exception to Section 507.1 allowing accessory occupancies in unlimited area buildings. Potentially separations would be required that were not intended by the current provisions.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., City of San Diego, representing City of San Diego Development Services Department, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

507.1 General. The area of buildings of the occupancies and configurations specified in Sections 507.1 through 507.12 shall not be limited.

Exception<u>s</u>:

1. Other occupancies shall be permitted in unlimited area buildings in accordance with the provisions of Section 508.2.
2. <u>Occupancies classified as Group A, B, E, F, M, or S shall be permitted in combination in unlimited area buildings where the most restrictive requirements in Sections 507.2 through 507.7 are satisfied.</u>

(Portions of proposal not shown remain unchanged)

Commenter's Reason: We request the membership consider approval of the proposed modification to our original code change. As we have stated in the original submittal the IBC, since the drafting of the 2000 edition, has been changed to allow a variety of occupancies in unlimited area buildings that did not exist in the legacy code my jurisdiction enforced. Furthermore, Section 508.2.3 can limit the size of an occupancy combined with another occupancy permitted to be not limited in area even though it may pose a lesser hazard than the main occupancy not limited in area. The accessory use is not permitted increases to the tabular area so are not permitted to be unlimited in area. We request that the membership approve the proposed modification based on this public comment. Please refer to the justification provided in the original code change. We had sought input from other stakeholders during the development of the code change and have decided to revert to the code change to the form it was initially develop prior to submittal.

In many cases the limited occupancy cannot be considered an accessory occupancy since it is located in a different tenant space.

For example the IBC would not permit a large Group A-3 fitness center to be located in an existing multi-tenant building not limited in area containing Group B and M since the A-3 is not an accessory occupancy and in many cases will exceed the limits placed on the size of the accessory occupancy. This limitation makes no sense when consideration is given to the larger fire load in a mercantile occupancy when compared to the fitness center and possibly the business occupancy.

G117-12

Final Action: AS AM AMPC____ D

G118-12
507.4, 507.4.1 (New), 507.4.2 (New)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., The American Institute of Architects (dcollins@preview-group.com)

Revise as follows:

507.4 ~~Two story~~ Group B, F, M or S. The area of a Group B, F, M or S ~~building no more than two *stories above grade plane*~~ shall not be limited where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, and is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

507.4.1 Two Story. Unlimited area buildings of Group B, F, M or S occupancies shall be limited to two stories in height if of Type V construction.

507.4.2 Three Story. Unlimited area buildings of Group B, E, F, M or S occupancies shall be limited to three stories in height if of Type I, II, III or IV construction.

Reason: The mall criteria in Section 402 are nothing more than a detailed description of another unlimited area building that includes many of the same occupancies that are already permitted to be unlimited based on various heights and types of construction. It isn't clear that there are special provisions within the mall

This change will allow a two story unlimited area building of B, F, M or S of any type of construction (Type V), but will also allow a three story building if of Types I, II, III or IV construction as permitted for mall buildings or anchor buildings in Section 402.

Cost Impact: The increased understanding of what the code intends regarding unlimited area buildings will significantly reduce the cost of design and review.

507.4-G-COLLINS

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Sufficient technical justification was not provided to allow a 3 story unlimited building. In addition these provisions are essentially like a mall but without all the special provisions for malls such as smoke control.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, Greg Nicholls, AIA and Carroll Pruitt, AIA, The Preview Group, Inc., The City of Mason Ohio and Pruitt Consulting, Inc., representing The American Institute of Architects, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

507.4 ~~Group B, F, M or S~~ Two or three story. The area of a ~~Group B, F, M or S~~ building of two or three stories in height above grade plane shall not be limited where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width and which comply with either Sections 507.4.1 or Section 507.4.2.

507.4.1 Two Story. Unlimited area buildings of Group B, F, M or S shall be limited to be two stories in height ~~if~~ where the building is of Type V construction.

507.4.2 Three Story. Unlimited area building of Group B, E, F, M or S occupancies shall be limited to three stories in height ~~if~~ where the building is of Types I, II, III and IV construction.

Commenter's Reason: The committee was concerned that while a mall does allow there occupancies to be three stories in height and unlimited in area that other safeguards that are a part of the requirements for malls provide the necessary additional safety for these occupancies.

In reality, Section 402 of the IBC includes nothing that establish a higher level of safety in a mall, it only addresses the potential use of a mall as a portion of the means of egress. Egress isn't required through the mall, no special provisions for smoke control is part of the mall except if it should include an atrium and that applies to all buildings whether they are malls or not.

The occupancies included in these two new provisions are very low risk and have excellent records of fire safety. Malls have a similarly low risk and these occupancies are frequently included in malls. With the inclusion of full fire suppression and a 60 foot open perimeter they would not provide any additional risk if they were independent of a mall building.

G118-12

Final Action: AS AM AMPC____ D

G119-12
507.4

Proposed Change as Submitted

Proponent: Joel Bringhurst, CH2M Hill Engineers, representing IM Flash Technologies (joel.bringhurst@ch2m.com)

Revise as follows:

507.4 Two story. The area of a Group B, F, <u>H-5</u> M or S building no more than two *stories above grade plane* shall not be limited where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, and is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

Reason: History of H-5 Occupancy

Semiconductor fabrication facilities were first constructed as B-2 occupancy prior to the 1985 Uniform Building Code (UBC). In the 1985 UBC the occupancy group of H-6 was first introduced. It was a new classification for semiconductor fabrication facilities and related support uses. The H-6 occupancy ultimately became the H-5 occupancy in the 2000 International Building Code (IBC).

The definitive guide for the introduction of the H-6 occupancy in the 1985 UBC was the book *H-6 Design Guide to the Uniform Codes for High Tech Facilities* written by Alfred Goldberg, P.E., H.A.I.A. (Consulting Engineer) and Larry Fluer (Technical Consultant – Hazardous Materials) . On page 3-2 the authors state the following:

> "For the new Group H, Division 6 class, the original use of most of the existing fabrication facilities was classified as Group B, Division 2. The new H-6 class has virtually the identical code provisions in Table Nos. 5-C and 5-D as does the B-2 class. The intent of the H-6 code change is to consider that there is no change in use involved where the present and prior use was as a semiconductor fabrication facility. The intent is simply to assign a new name or designation to the existing use (see Section 104(c))."
>
> "However, any future alterations or changes will require compliance with the applicable provisions of the new H-6 classification. As provided in Section 104(c), in no case should an existing fabrication facility be made to conform to the new H-6 provisions simply as a result of a jurisdiction adopting or utilizing the new code provisions, except for those portions where alterations or changes are undertaken."

At the inception of the H-6 occupancy, this statement established an equivalent relative hazard level between H-6 and B-2 occupancies. In their discussion of relative hazards of occupancies Goldberg and Fluer further state on page 3-4 that "these determinations are made based on Table Nos. 5-C and 5-D allowable for each of the occupancies being compared."

Table 5-C is "Basic Allowable Area for Buildings One Story in Height" and Table 5-D is "Maximum Height of Buildings." The allowable areas in Table 5-C for B-2 and H-6 occupancies for all construction types are exactly the same. The maximum heights in Table 5-D for B-2 occupancy are the same except for one story more than H-6 occupancy for all but the Type I-FR and Type II-FR construction types, which are somewhat higher than for H-6 occupancy.

The basic method for comparison of relative hazard of occupancies has long been established as being relative to allowable area and maximum height. On the basis of allowable area the B-2 and H-6 occupancies have the same hazard level. On the basis of height H-6 would be more hazardous than B-2 occupancy in a taller building.

Comparison of H-5 to Groups B, F, M, and S in IBC Section 507.4.

H-5 occupancy has the same allowable areas as B occupancy per IBC Table 503 for all construction types. IBC Table 503 now contains the information previously contained in Tables 5-C and 5-D in the 1985 UBC. The relationship between B and H-5 occupancies are unchanged from the relationship established between B-2 and H-6 occupancies in the 1985 UBC. This unchanged relationship is reinforced in the *2009 IBC Handbook: Fire and Life Safety Provisions*, page 84, which states:

> **"415.8 Group H-5.** The Group H-5 occupancy category was created to standardize regulations for semiconductor manufacturing facilities. This section provides the specific regulations for these occupancies. The H-5 category requires engineering and fire-safety controls that reduce the overall hazard of the occupancy to a level thought to be equivalent to a moderate hazard Group B occupancy. Accordingly, the areas permitted for Group H-5 occupancies are the same as for Group B occupancies."

H-5 occupancy has equal or greater allowable areas than F-1, M and S-1 occupancies for all construction types per IBC Table 503. As F-1, M and S-1 occupancies are included in the existing provisions for the unlimited area building, this could even be interpreted to indicate that H-5 occupancy, with all of its code-required mitigating features, is less hazardous than F-1, M and S-1 occupancies.

The maximum height in stories for H-5 occupancy is less than or equal to the maximum height for B occupancy in IBC Table 503, however, in no case is the maximum height of H5 occupancy less than 2 stories. The relative maximum height relationship between B and H-5 occupancies are relatively unchanged from the relationship established between B-2 and H-6 occupancies in the 1985 UBC. When it comes to height in stories it is acknowledged that H5 is more hazardous than B occupancy as the number of stories in the B is higher. This proposal for unlimited area per IBC Section 507.4 is within a provision that is conditional upon a two-story limitation; therefore this proposal is limited to the hazard comparison to allowable area provisions only from IBC Table 503.

H-5 occupancy has a significant number of IBC requirements that mitigate the hazards of H-5 compared to B occupancy in general. These mitigating requirements have effectively equalized the two occupancies in terms of relative hazard, which is demonstrated by the equal allowable areas of the two occupancies within IBC Table 503, which has remained consistent over time. Again from the *2009 IBC Handbook*, p84:

> "The code requires that special ventilation systems be installed in fabrication areas that will prevent explosive fuel to air mixtures from developing. The ventilation system must be connected to an emergency power system. Furthermore, buildings containing Group H-5 occupancies are required to be protected throughout by an automatic fire-sprinkler system and fire and emergency alarm systems. Fire and emergency alarm systems are intended to be separate and distinct systems, with the emergency-alarm system providing a signal for emergencies other than fire. This section also provides requirements for piping and tubing that transport hazardous materials that allow piping to be located in exit corridors and above other occupancies subject to numerous, stringent protection criteria. The provisions for Group H-5 occupancies are correlated with companion provisions in Chapter 18 of the IFC."

Any hazards introduced by the inclusion of an unlimited area H5 occupancy in an unlimited area building per IBC Section 507.4 would be mitigated by sprinklers, side yards, and limits in story height the same as Groups B, F, M and S occupancies, which as compared in previous paragraphs, have equal or more hazard based on a relative allowable area comparison to H-5 occupancy.

Group H occupancies are currently allowed in unlimited area buildings per IBC Section 507.8. The occupancies specifically addressed are H-2, H-3, and H-4. These three occupancies are restricted to an area of 10 percent of the unlimited area building or the Table 503 limits. This establishes that specific uses of H occupancies with more hazard than H-5 are permitted in an unlimited area building. However, the restrictions in these provisions to H occupancies in IBC Section 507.8 are limited to H2, H3 and H4 and do not apply to H-5 occupancy, which is relatively less hazardous.

Differences between H-5 and Groups B, F, M and S

H-5 occupancy contains Hazardous Production Materials (HPMs). The B, F, M, and S occupancies are also permitted to have hazardous materials, but the quantity cannot exceed the Maximum Allowable Quantizes (MAQ) in Tables 307.1 (1) and 307.1 (2). H-5 occupancy has numerous code-required mitigating features that effectively address the hazards of H5 and will not be impacted or reduced by this requested code change. The requirements of IBC Section 415.8 and other areas of the code relating to H-5 occupancy will remain in effect in their entirety with this proposal.

If H-5 occupancy is added to IBC Section 507.4 the H-5 occupancy will still be regulated relative to construction type and building height by IBC Chapter 5.

Conclusion

H-5 occupancy has a relative hazard based on allowable area per IBC Table 503 that is equal to or better than B, F, M, and S occupancies. Adding H-5 occupancy to the occupancies that are allowed to have unlimited area per IBC Section 507.4 would be consistent with the permitted level of hazard and mitigation established by this section. The code-required mitigating features of H-5 occupancy have been demonstrated for over 25 years to be effective since the introduction of the semiconductor fabrication facility occupancy in the 1985 UBC.

Cost Impact: Cost savings from Type I Construction, which is required for unlimited H-5 in Table 503

507.4-G-BRINGHURST

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal was disapproved as it was felt that having an unlimited area H-5 occupancy in unprotected construction was inappropriate. The differences in Group H-5 and Group B occupancies were felt to be too great to provide this allowance even if much of the building area provisions were based originally on group B occupancies.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Joel Bringhurst, AIA, CH2M HILL Engineers, Inc., representing IM Flash Technologies and CH2M HILL Engineers, Inc. requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

507.4 Two story. The area of a Group B, F, <u>H-5</u>, M or S building no more than two *stories above grade plane* shall not be limited when the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, and is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width. <u>Buildings containing Group H-5 occupancy shall be of Type I or II construction.</u>

Commenter's Reason:

G119-12 Objections Put Forward in the Public Hearings in Dallas

- As initially submitted, the proposal would allow unlimited quantities of Group H-5 in Unlimited Area Buildings of <u>any</u> type of construction, including wood frame.
- Hazardous materials found in semiconductor fabrication areas provide undue exposure to the building occupants and to the public at large.

G119-12 Proposed Modifications

1. Limits building construction to Types I and II.
2. The H-5 occupancy is the primary occupancy for semiconductor facilities. This is similar to F occupancy for factory, B occupancy for business, S occupancy for storage and M occupancy for mercantile uses.

G119-12 Inherent Safety of Semiconductor Fabrication Facilities

1. IM Flash Technologies in Lehi, Utah, is a factory not unlike other industrial sites; we have the actual factory floor, a central plant, a substation, a hazardous material warehouse, a regular warehouse, an office building, and a water treatment plant among others. The largest part of the factory resides in an unlimited area, Type IB building with multiple occupancy groups: F-1, F-2, H-2, H-3, H-4, and H-5. We also have an unlimited area building of Type IIB construction with multiple occupancy groups: A-2, A-3, B, F-1, F-2, S-1, H-2, H-3, H-4, and H-5.
2. The hazardous rooms of Group H-2, H-3, and H-4 occupancies are similar to common bulk storage chemical and gas rooms in other factories; they have tanks and cabinets, storage racks, special fire suppression systems when required, blast panels when required, fire-rated separations, higher ventilation/exhaust requirements, exterior exits, and so forth. These rooms have limited access: the rooms are locked, accessed only by the few dozen trained facilities operators, engineers, technicians, and security personnel who are familiar with the hazards. Personal Protective Equipment (PPE) is a requirement for all people accessing these areas. The general population – office and fab personnel and their visitors – have no need to access these hazardous chemical and gas rooms, nor do they have any desire or inclination to access them.
3. The H-5 fabrication facility is very different in several ways from the standard H-2, H-3, H-4 occupancies often grouped together per Section 415 and the International Fire Code. The H-5 fabrication facility is home to hundreds of technicians, operators, engineers, office staff, and any number of invited guests from talkshow hosts to government officials to architects and engineering consultants from all over the world. The levels of protection are much more relaxed; except for specific infrequent production-oriented tasks, the PPE is simply cleanroom garb and safety glasses. The space is occupied every hour of every day of every month of every year. As such it <u>must</u> be made to be a safe working environment for these hundreds of people.
4. The inherent safety of the H-5 fabrication facility is specifically achieved through the existing provisions of the International Codes, which are fundamentally based on principles of health, safety and welfare. These provisions protect the building occupants and the public through the following specialized systems and requirements:
    - Fabrication area aggregate quantities of hazardous materials are limited below other H occupancy limits [IBC 415.10.1.2 & IFC 2704.2.2].
    - Fabrication area compartmentalization from remainder of the building [IBC 415.10.1.2].
    - Fabrication area occupied levels are at or above grade plane [IBC 415.10.1.3].
    - Fabrication mechanical ventilation is a minimum of 1 CFM/SF with an increase of 4 times this amount for relief of electrical hazard classification [IBC 415.10.1.6 & 415.1.8 & IFC 2703.14.1].
    - Workstation ventilation [IBC 415.10.1.8.1 & IFC 2703.14.1].
    - Service corridors separate chemical delivery from egress paths [IBC 415.10.2, & 415.10.3 & IFC 2705.3.3].
    - Service corridor mechanical ventilation meet fabrication area requirements and additionally meet 6 air changes per hour [IBC 415.10.3.2].
    - Fabrication area hazardous materials are contained within cabinets or workstations [IBC 415.10.4 & IFC 2704.2.1].
    - Fabrication building hazardous material production storage and use rooms are separated from each other and other parts of the building with 2-hour fire barriers [IBC 415.10.5.1].
    - Fabrication area, HPM room, gas cabinets and service corridor gas detection with gas shut off [IBC 415.7.2 & IFC 2703.13]

- Emergency power for HPM exhaust ventilation, HPM gas cabinet ventilation, HPM exhaust enclosure ventilation, HPM gas room ventilation, HPM gas detection, emergency alarm, manual fire alarm and automatic sprinkler system monitoring and alarm system, electrically operated systems for HPM use, storage or handling [IBC 415.10.10.1 & IFC 2703.15]
- Automatic sprinkler system protection in exhaust duct for HPM [IBC 415.10.11 & IFC 2703.10.4.4]
- An increase in numbers of exits by basing numbers on an occupant load of 10 [IBC Table 1015.1]
- Exit access travel distances limited to 200 feet and the common path of egress travel limited to 75 feet [IBC Table 1016.2 & IBC Table 1014.3].

5. As stated in the <u>2009 IBC Handbook of Fire and Life Safety Provisions</u>, the inherent safe nature of Group H-5 occupancy is achieved because the "H-5 category requires engineering and fire-safety controls that reduce the overall hazard of the occupancy to a moderate hazard Group B occupancy. Accordingly, the areas permitted for Group H-5 occupancies [IBC Table 503] are the same as for Group B occupancies" [2009 IBC Handbook, Section 415.8, p 84]. Group H-5 occupancies are classified as hazardous because of the use of hazardous materials in the semiconductor fabrication process. However, H-5 becomes safe through the extensive provisions found in the International Codes to remediate the hazards. These provisions protect our staff and our guests and our communities.

Public Comment 2:

Eric Sandoval, CH2M HILL Engineers, Inc., representing IM Flash Technologies and CH2M HILL Engineers, Inc. requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

<u>**507.9 Mixed occupancy buildings with Group H-5.** Group H-5 occupancies shall not be limited within mixed-occupancy buildings of unlimited area complying with Section 507.4, provided all of the following criteria are met:</u>

1. <u>Buildings containing Group H-5 occupancy shall be of Type I or II construction.</u>
2. <u>Group H-5 occupancies are separated from other occupancies as required for separated occupancies in Sections 508.4.4 and 415.10.</u>
3. <u>Each area of the portions of the building used for Group H-5 occupancies shall not exceed the maximum allowable area permitted for such occupancies in Section 503.1 including modifications of Section 506.</u>

Commenter's Reason:

G119-12 Original Intent

Address and clarify the use of Group H-5 Occupancy in Section 507 – Unlimited Area Buildings

1. Currently Group H-5 occupancy is not specifically addressed in Section 507.
2. Table 503 is interpreted as the area limitation for H-5 within Unlimited Area Buildings.
3. For clarity, the Code should specifically address Group H-5 within Section 507.

G119-12 Objections Put Forward in the Public Hearings in Dallas

1. As initially submitted, the proposal would allow unlimited quantities of Group H-5 in Unlimited Area Buildings of <u>any</u> type of construction, including wood frame.
2. Hazardous materials found in semiconductor fabrication areas provide undue exposure to the building occupants and to the public at large.
3. The proposal is heavy on historical perspective but lacks technical justification.
4. An unlimited quantity of Group H-5 occupancy without compartmentalization creates additional hazards for fire containment, for fire department access, and for the community at large.
5. A comparison of several occupancy separations and travel distances suggests that H-5 occupancies are less safe than other occupancies. This comparison broadens the original proposal's argument that a comparison of Table 503 Allowable Building Areas also demonstrates the relative hazards among occupancy classifications.

G119-12 Proposed Modifications

1. Creates a new section for Group H-5 occupancy within unlimited area buildings instead of modifying Section 507.4.
2. Limits building construction to Types I and II.
3. Addresses specific concerns surrounding Group H-5 occupancies in conventional unlimited area buildings (UABs) by controlling fire intensity and volume, by providing safer fire department access, and by limiting fire exposure effects to the public through compartmentalization. Specifically, these measures are:
   a. Each Group H-5 occupancy within the UAB is limited to the tabular quantities of Section 503.1 or to the requirements of Section 415.8.2 Fabrication Areas.
   b. Each Group H-5 occupancy within the UAB is separated from adjacent occupancies per Sections 508.4.4 and Table 508.4.

G119-12 Reasons for Modifications to the Original Proposal

1. Addresses several unintended consequences by removing the possibility of using combustible construction for Group H-5 occupancy in unlimited area buildings.

2. The proposal addresses hazardous materials found in semiconductor fabrication areas through the use of existing provisions for health safety and welfare. These include protection of building occupants and the public through the use of the following systems:
   a. Fabrication area aggregate quantities of hazardous materials are limited below other H occupancy limits [IBC 415.10.1.2 & IFC 2704.2.2].
   b. Fabrication area compartmentalization from remainder of the building [IBC 415.10.1.2].
   c. Fabrication area occupied levels are at or above grade plane [IBC 415.10.1.3].
   d. Fabrication mechanical ventilation is a minimum of 1 CFM/SF with an increase of 4 times this amount for relief of electrical hazard classification [IBC 415.10.1.6 & 415.1.8 & IFC 2703.14.1].
   e. Workstation ventilation [IBC 415.10.1.8.1 & IFC 2703.14.1].
   f. Service corridors separate chemical delivery from egress paths [IBC 415.10.2, & 415.10.3 & IFC 2705.3.3].
   g. Service corridor mechanical ventilation meet fabrication area requirements and additionally meet 6 air changes per hour [IBC 415.10.3.2].
   h. Fabrication area hazardous materials are contained within cabinets or workstations [IBC 415.10.4 & IFC 2704.2.1].
   i. Fabrication building hazardous material production storage and use rooms are separated from each other and other parts of the building with 2-hour fire barriers [IBC 415.10.5.1].
   j. Fabrication area, HPM room, gas cabinets and service corridor gas detection with gas shut off [IBC 415.7.2 & IFC 2703.13]
   k. Emergency power for HPM exhaust ventilation, HPM gas cabinet ventilation, HPM exhaust enclosure ventilation, HPM gas room ventilation, HPM gas detection, Emergency alarm, Manual fire alarm and automatic sprinkler system monitoring and alarm system, electrically operated systems for HPM use, storage or handling [IBC 415.10.10.1 & IFC 2703.15]
   l. Automatic sprinkler system protection in exhaust duct for HPM [IBC 415.10.11 & IFC 2703.10.4.4]
3. This section allows Group H-5 occupancies in mixed occupancy, two-story unlimited area buildings under limited conditions. A typical example of a practical application of this would be the construction of a fabrication building that is used primarily for multiple cleanrooms and may contain laboratories, offices, conference rooms, fan coil unit filter storage, etc. Group H-5 would not be permitted as stand-alone unlimited area buildings. Dissimilar to the requirement in Section 507.4 for Group B, F, M and S buildings, unlimited area buildings that contain a Group H-5 occupancy are permitted to be built of only Type I or II.

   The restrictions on the use of Group H-5 occupancies in mixed occupancy, unlimited area buildings include: (1) type I or II construction; (2) required separation; (3) limited size of each Group H-5 occupancy to the area allowed in Section 503.1 with modifications per 506.

   Item 1. States that the building be constructed of Type I or II construction.
   Item 2. States that the Group H-5 occupancy is required to be separated from the rest of the unlimited area building by fire barriers in accordance with Section 508.4.4. For example, if a fabrication area contains cleanroom facilities next to a lunch room (Group A-2), the lunch room would need to be separated from the cleanroom facilities by a 2-hour fire barrier, as determined from Table 508.4.
   Item 3. Requires each Group H-5 area to be limited to that allowed by Section 503.1 with modifications based on 506. For example, if the fabrication cleanroom mentioned above were Type IIB construction, the allowable area of cleanroom per floor would be 69,000 square feet (6,410 m2) [tabular value of 23,000 square feet (2,136 m2) × 3]. This is a total of 138,000 square feet (12,820 m2) total for each area of the building. Note that the allowable area is increased by 200 percent as permitted by Section 506.3 for multi-story buildings equipped with fire sprinklers. The allowable area could also be increased for frontage in accordance with Section 506.2, depending upon the amount of frontage that the Group H-5 portion has, relative to its own perimeter. The important point is that the area limits for each Group H-5 occupancy area based upon Section 503.1, not the tabular values of Table 503. Thus, because Section 503.1 states that the allowable area is limited to the values in Table 503.1 except as modified hereafter, the allowable increases given in Section 506 would be applicable.

   Also note that each Group H-5 occupancy is evaluated on its own and not as an aggregate (i.e., the area of the Group H-5 occupancies would not have to be added together). When other occupancies are integrated into the area such as F, S, M or B, the rated separation between the H-5 occupancies can be located in a place such that the total area of H-5 in each area is less than the area limits for each H-5 based on Section 503.1. Therefore the other occupancies can be on either side of the rated separation as described in fire barrier provisions of Section 707.3.10 as long as the H-5 occupancy does not exceed the area limits. In occupancies not listed, areas would be limited to provisions of Section 503.1.

Public Comment 3:

Kevin Wright PE, SE, IM Flash Technologies requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

507.9 Unlimited mixed occupancy buildings with Group H-5. The area of a Group B, F, H-5, M or S building no more than two *stories above grade plane* shall not be limited where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, and is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width, provided all of the following criteria are met:

1. Buildings containing Group H-5 occupancy shall be of Type I or II construction.
2. Each area used for Group H-5 occupancy shall be separated from other occupancies as required in Sections 508.4 and 415.10.
3. Each area used for Group H-5 occupancy shall not exceed the maximum allowable area permitted for such occupancies in Section 503.1 including modifications of Section 506.

Exception: When the Group H-5 occupancy exceeds the maximum allowable area, the Group H-5 shall be subdivided into areas that are separated by 2-hour fire barriers.

Commenter's Reason:

G119 Intent

- Address and clarify the area of H-5 occupancy as a part of an unlimited area building (UAB) described in 507.
  - o Currently H-5 is not specifically addressed in section 507.
  - o As a primary occupancy, H-5 occupancy shall be compartmentalized when the type of construction warrants.
  - o Confusion exists when H5 is viewed as a accessory use within the UAB.
  - o Table 503 with modifications per 506 is interpreted as the area limitation for H-5 in type II construction within a UAB.
  - o For clarity, section 507 should specifically address the H-5 occupancy as well as the allowable area of H-5 within mixed occupancy of an UAB.

G119 Deficiencies as Indicated in the Public Hearing in Dallas, TX

- As written, proposed code change G119 would have allowed unlimited area H-5 buildings of any type of construction, including wood frame.
- The proposal is heavy in historical points but is lacking in technical justification.

This Public Comment Proposes the Following Modifications

- Construction limited to Type I & II.
  - o Table 503 limits the area of S occupancy in Type I construction and therefore Type I would be included in the UAB with this proposal.
- This proposal is intended to address single and multiple H-5 occupancies as primary occupancies within an unlimited area building. This is similar to another UAB for A1 and A2 occupancies, Section 507.3.1
- Provide current code equivalency to fire intensity & volume, fire department personnel access and exposure to community of H-5 occupancy through the use of compartmentalization.
  - o This proposal provides a method for allowable area for H-5 occupancy within mixed occupancy buildings per 503 including increases per 506. H-5 area modifications allowed by Section 506 can be used.
  - o This proposal provides clarification for separation of mixed occupancies by use of 508.4 and 415.10. There are provisions specific to 415.10 with require separation of H-5 to HPM rooms, service corridors and other fabrication areas which are based on the program requirements which may be greater than Section 508.4. It is the intent of this proposal to continue to have these provisions remain in effect.
  - o This proposal provides a means similar to table 707.3.10 to compartmentalize when multiple H-5 occupancies are used. As a primary occupancy, H-5 would be compartmentalized by the 2-hour wall to limit the areas to the Table 503 with 506 increases when the type of construction dictates. When the Table 503 is unlimited as is the case with Type IA, the 2-hour compartment would not be required

G119-12 Reasons for Modifications to the Original Proposal

- This section allows Group H-5 occupancies in mixed occupancy, two-story unlimited area buildings under limited conditions. A typical example of a practical application of this would be the construction of a fabrication building that is used primarily for multiple cleanrooms and may contain laboratories, offices, conference rooms, fan coil unit filter storage, etc. Group H-5 would not be permitted as stand-alone unlimited area buildings. Dissimilar to the requirement in Section 507.4 for Group B, F, M and S buildings, unlimited area buildings that contain a Group H-5 occupancy are permitted to be built of only Type I or II.

  The restrictions on the use of Group H-5 occupancies in mixed occupancy, unlimited area buildings include: (1) type I or II construction; (2) required separation; (3) limited size of each Group H-5 occupancy to the area allowed in Section 503.1 with modifications per 506; and (3- Exception) additional Group H-5 occupancy areas are separated from each other by a 2-hour rated fire barrier.

  - o Item 1. States that the building be constructed of Type I or II construction.
  - o Item 2. States that the Group H-5 occupancy is required to be separated from the rest of the unlimited area building by fire barriers in accordance with Section 508.4.4. For example, if a fabrication area contains cleanroom facilities next to a lunch room (Group A-2), the lunch room would need to be separated from the cleanroom facilities by a 2-hour fire barrier, as determined from Table 508.4.
  - o Item 3. Requires each Group H-5 area to be limited to that allowed by Section 503.1 with modifications based on 506. For example, if the fabrication cleanroom mentioned above were Type IIB construction, the allowable area of cleanroom per floor would be 69,000 square feet (6,410 m2) [tabular value of 23,000 square feet (2,136 m2) × 3]. This is a total of 138,000 square feet (12,820 m2) for each area of the building. Note that the allowable area is increased by 200 percent as permitted by Section 506.3 for multi-story buildings equipped with fire sprinklers. The allowable area could also be increased for frontage in accordance with Section 506.2, depending upon the amount of frontage that the Group H-5 portion has, relative to its own perimeter. The important point is that the area limits for each Group H-5 occupancy area based upon Section 503.1, not the tabular values of Table 503. Thus, because

Section 503.1 states that the allowable area is limited to the values in Table 503.1 except as modified hereafter, the allowable increases given in Section 506 would be applicable.

- o Item 3, Exception. Requires that each Group H-5 occupancy is evaluated on its own and not as an aggregate (i.e., the area of the Group H-5 occupancies would not be added together). When other occupancies are integrated into the area such as F, S, M or B, the rated separation between the H-5 occupancies can be located in a place such that the total area of H-5 in each area is less than the area limits for each H-5 based on Section 503.1. Therefore the other occupancies can be on either side of the 2-hour fire barrier as long as the H-5 occupancy does not exceed the area limits. In occupancies not listed, areas would be limited to provisions of Section 503.1, with increases as allowed.

G119-12

Final Action: AS AM AMPC____ D

G120-12
507.5.1 (New)

Proposed Change as Submitted

Proponent: David Scott, Target (David.Scott@target.com)

Add new text as follows:

507.5.1 Property Lines. Multiple, contiguous, individual buildings may be considered as one building for the purpose of determining allowable area if the following conditions are met:

1. Permanent open space on all sides as required by Section 507.1, 507.2, 507.3, 507.4, or 507.5: and
2. Proper legal agreements recorded with the deed for each of the separate properties. These recorded agreements shall require that the buildings as divided by property lines, be in conformance with the applicable provisions of this code, as if the buildings were a single building on a single piece of property. In addition, the agreement must state that no individual building or property owner may modify any portion of the building in any way that would not be in compliance with this code.

Reason: This allows individual building owners to purchase the land under their building within an overall development. Previously, a strip center type development could have a lease line between individual tenants. Replacing a lease line with a property line does not create any further hazard.

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

507.5.1 (NEW)-SCOTT

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproved with concern that this allowance depends upon legal issue related to property ownership. Such issues need to be dealt with by state and local government. This can be accomplished locally with the application of Section 104.11.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David Scott, AIA, Target Corporation requests Approval as Modified by this public comment.

Replace the proposal as follows:

507.5.1 Lot Lines. For the purpose of determining building area, multiple, contiguous, individual buildings shall be considered as one building provided all of the following conditions are met:

1. A legal agreement between the owners of the individual buildings shall be recorded against the deed of each property. The agreement shall contain the following:
   1.1. The recorded description of each property.
   1.2. A statement that for the purposes of complying with the unlimited area provisions of the *International Building Code*, the listed properties shall be considered a single property;

1.3. A site plan or other description identifying the permanent open space being provided in compliance with Section 507.1, 507.2, 507.3, 507.4, or 507.5:

1.4. A statement that the permanent open spaces identified shall be maintained and shall not be modified in any manner in violation of the *International Building Code*

2. The agreement shall not be amended or terminated without the approval of the building official.

Reason: This allows individual building owners to purchase the land under their building within an overall development. Previously, a strip center type development could have a lease line between individual tenants. Replacing a lease line with a property line does not create any further hazard.

It was stated at the committee hearings that such agreements cannot be enforced by local officials. The intent is that local officials are not enforcing the document. However, violations of the idea of a clear yard around the collection of buildings would be considered a building code violation which can be enforced by the local official.

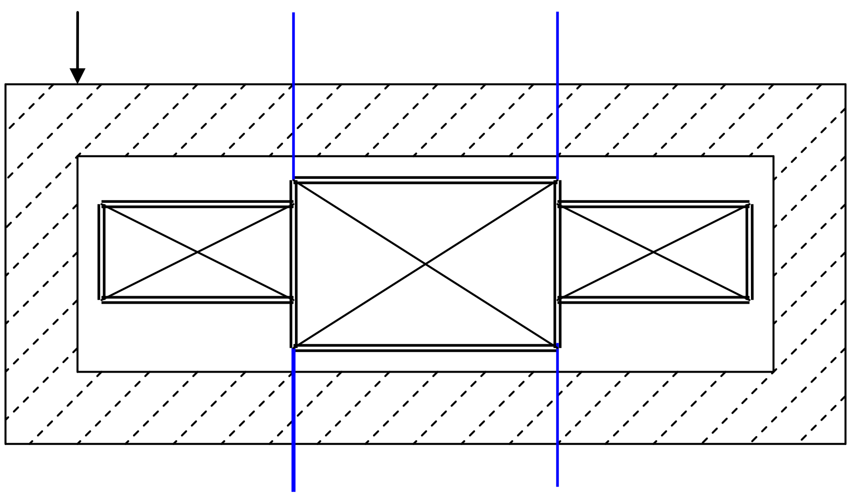
The committee stated that this could be handled under Section 104.11. However, many code officials would prefer some form of standard guidance before using this authority. The adoption of this provision will provide such guidance.

Another comment was the use of the word “Property lines”, which we have revised to “Lot lines” to coincide with terminology within the code.

The purpose of this proposal is to catch up with modern development processes. Retail strip centers used to be divided by lease lines. However, current development may have each property divided by lot lines. This affects the legal design of the same retail strip centers as show in the following examples:

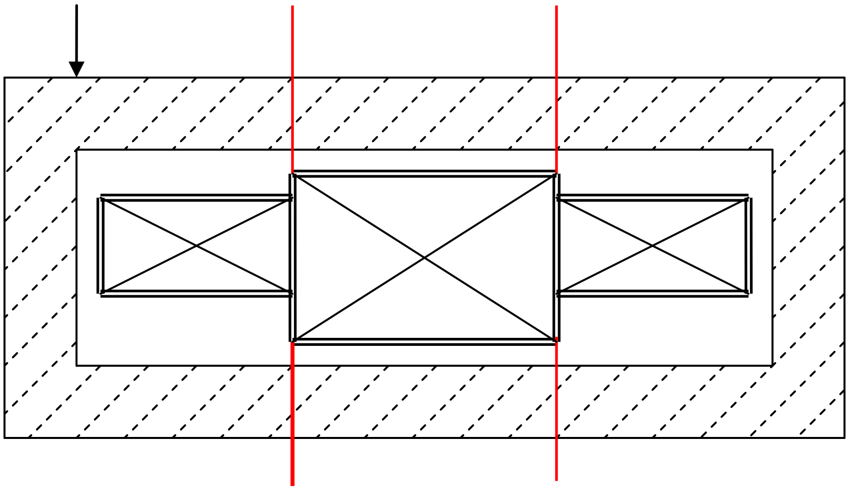
Example 1: A former strip center with the middle anchor retail divided only by lease lines. As a collection of buildings, surrounded by a 60’ yard, each separate owner was permitted unlimited area. The surrounding yard was usually a shared drive lane and fire lane.

Surrounded by 60’ yard, shared drive lane and fire lane



Example 2: The same collection of buildings, but now divided by a lot line between individual properties. As such, they are no longer permitted unlimited area.

Surrounded by the same 60’ yard, shared drive and fire lane



G120-12
Final Action: AS AM AMPC____ D

G123-12
508.1, 508.2, 508.2.1, 508.2.3, 508.3, 508.3.1, 508.3.2, 508.4, 508.4.1, 508.4.2, 508.4.3

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company (grkeith@keith@mac.com)

Revise as follows:

508.1 General. Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy classification ~~group~~, each story containing mixed occupancies shall comply with one of the design options specified in Section 508.2, 508.3 or 508.4. All stories within the same building are not required to use the same mixed occupancy design option. ~~the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections.~~

Exceptions:

1. Accessory occupancies shall be permitted in conjunction with the non-separated design option where remainder of the story complies with Section 508.3.2.

~~1~~ 2. Occupancies separated in accordance with Section 510.

~~2~~ 3. Where required by Table 415.3.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a detached building or structure.

~~3~~ 4. Uses within live/work units, complying with Section 419, are not considered separate occupancies.

508.2 Accessory ~~occupancies~~ occupancy design option. Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Sections 508.2.1 through 508.2.4.

~~**508.2.1 Area limitations.** Aggregate accessory occupancies shall not occupy more than 10 percent of the *building area* of the *story* in which they are located and shall not exceed the tabular values in Table 503, without *building area* increases in accordance with Section 506 for such accessory occupancies.~~

~~508.2.2~~ 508.2.1 Occupancy classification. Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

~~508.2.3~~ 508.2.2 Allowable building area and height. In each *story*, the allowable *building area* ~~*and height*~~ ~~of the building~~ shall be based on the allowable *building area* ~~*and height*~~ for the main occupancy in accordance with Section 503.1. Aggregate accessory occupancies shall not occupy more than 10 percent of the *building area* of the *story* in which they are located and shall not exceed the tabular values in Table 503, without *building area* increases in accordance with Section 506 for such accessory occupancies. The height of each accessory occupancy shall not exceed the tabular values in Table 503, without increases in accordance with Section 504 for such accessory occupancies. ~~The *building area* of the accessory occupancies shall be in accordance with Section 508.2.1.~~

~~508.2.4~~ 508.2.3 Separation of occupancies. No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.

508.3 Nonseparated ~~occupancies~~ occupancy design option. Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.

508.3.1 Occupancy classification. Non-separated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the story ~~building~~ based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that ~~which~~ apply to the non-separated occupancies shall apply to the total story ~~non-separated occupancy area~~. Where non-separated occupancies occur in a high-rise building, the most restrictive requirements of Section 403 that ~~which~~ apply to the non-separated occupancies shall apply throughout the high-rise building.

508.3.2 Allowable building area and height. In each *story*, the allowable *building area and height*, in feet and number of stories, ~~of the building or portion thereof~~ shall be based on the most restrictive allowances for the occupancy classifications ~~groups~~ under consideration for the type of construction of the building in accordance with Section 503.1.

508.3.3 Separation. No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from other occupancies contiguous to them in accordance with the requirements of Section 420.

508.4 Separated ~~occupancies~~ occupancy design option. Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

(No change to table or footnotes)

508.4.1 Occupancy classification. Separated occupancies shall be individually classified in accordance with Section 302.1. ~~Each separated space shall comply with this code based on the occupancy classification of that portion of the building.~~ The requirements of this code shall apply to each portion of the story based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that apply to occupancies not required to have an occupancy separation in accordance with Table 508.4, shall apply to the total un-separated occupancy area. Where such un-separated occupancies occur in a high-rise building, the most restrictive requirements of Section 403 that apply to the un-separated occupancies shall apply throughout the high-rise building.

508.4.2 Allowable building area. In each *story*, the *building area* shall be such that the sum of the ratios of the actual *building area* of each ~~separated~~ occupancy divided by the allowable *building* area of each ~~separated~~ occupancy shall not exceed 1.

508.4.3 Allowable height. Each ~~separated~~ occupancy shall comply with the *building height* and number of story limitations based on the type of construction of the building in accordance with Section 503.1.

Exception: Special provisions permitted by Section 510 shall permit occupancies at *building heights* other than provided in Section 503.1.

508.4.4 Separation. Individual occupancies shall be separated from adjacent occupancies in accordance with Table 508.4.

508.4.4.1 Construction. Required separations shall be *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies.

Reason: Section 508, which specifies the provisions applicable to mixed occupancies, has evolved over the relatively short life of the IBC. Most of these changes resolved inconsistencies between the legacy codes in this fundamental technical area and have resulted in a rational system of viable and relative design options based on relative risk. Some organizational or formatting changes were included in the previous revisions. This proposal is intended to correct lingering technical inconsistencies and offer final improvements to the organization and intent of mixed occupancy requirements.

The most important feature of this proposal is to clarify that individual design options (accessory, non-separated and separated) apply to an entire story; however, different design options can be used for various individual stories within a building. This is necessary so as to maintain the integrity of the IBC system for allowable area determination. Each design option specifies a method for allowable area determination. The allowable area of accessory occupancies is based on the allowable building area for the main occupancy (Section 508.2.3). The allowable area of non-separated occupancies is based on the most restrictive allowances for the occupancy classifications under consideration for the type of construction of the building (Section 508.3.2). The allowable area of separated occupancies is based on a unity formula calculation (Section 508.4.2). It should be noted that a new Exception 1 to Section 508.1 permits accessory occupancies (those occupancies occupying no more than 10% of the area of the story nor more that the tabular allowable area for such occupancy) to occur in conjunction with the non-separated mixed occupancy design option. This is a traditional interpretation based on some legacy codes and does no harm. Since neither the accessory occupancy nor the non-separated design options generally require a physical occupancy separation and the allowable area is reasonably controlled based on the most restrictive allowances of the occupancies not qualifying as accessory, a combination of these two mixed occupancy design options is acceptable.

Otherwise, if different mixed occupancy design options are used within a given story, the resulting gross floor level could be much larger than intended based on Table 503 and relative risk. For instance:

GIVEN:

A sprinklered, two story building of Type IIA construction.
A building story having a floor area of 79,500 square feet and containing three individual occupancies:
A Group A-2 occupancy having a floor area of 5,500 square feet
A Group B occupancy having a floor area of 14,000 square feet
A Group F-1 occupancy having a floor area of 60,000 square feet

DETERMINE:

Is the building area for the story under consideration acceptable?

SOLUTION:

Examine the occupancies under consideration to determine if the story qualifies for the non-separated mixed occupancy design option. The occupancy classification requiring the most restrictive allowable area allowance is Group A-2. The floor area of the story (79,500 sf) is greater than that permitted for the most restrictive occupancy (46,500 sf). Therefore, the story does not qualify for the non-separated occupancy design option. Determine if the story qualifies for the accessory mixed occupancy design option. The floor area of the aggregate accessory occupancies of the story (19,500 sf) is greater than 10 percent of the building area of the story in which they are located (24.5 %). Therefore, the story does not qualify for the accessory occupancy design option. Determine if the story qualifies for the separated mixed occupancy design option. The sum of the ratios of the actual building area of each occupancy divided by the allowable building area of each occupancy exceeds 1: [(5,500 ÷ 46,500) + (14,000 ÷ 112,500) + (60,000 ÷ 75,000)] = 1.042. Therefore, the story does not qualify for the separated occupancy design option. Accordingly, the building does not comply with any of the three mixed occupancy design options. Therefore, the building must be redesigned by upgrading the type of construction, reconfiguring the occupancies, including building frontage, etc.

Combining design options within a given story is not permitted. Creativity may erroneously determine that such combination is acceptable. Such logic might follow:

Consider the Group A-2 occupancy as being accessory to the Group F-1 occupancy (9.2 %). Then consider the accessory occupancy portion of the story as an individual occupancy and evaluate the resultant Group F-1 and B occupancies as separated occupancies [(65,500 ÷ 75,000) + (14,000 ÷ 112,500)] = .997, therefore OK. This is an unacceptable practice for two reasons. First, Section 508.3.2 states that, "The allowable *building area and height* of the building shall be based on the allowable *building area and height* for the <u>main occupancy</u> in accordance with Section 503.1." What is not the main occupancy (Group F-1), is regarded as the accessory occupancy(s) (Groups A-2 and B). In this case, the accessory occupancies comprise 24.5 percent of the building area of the story in which they are located (current Section 508.2.1). Secondly, Section 508.4.1 states, "Separated occupancies shall be <u>individually classified</u> in accordance with Section 302.1." Additionally, Section 508.4.2 states that when determining the allowable area using the separated occupancy design option, "<u>In each *story*</u>, the *building area* shall be such that the sum of the ratios of the actual *building area* of each separated occupancy divided by the allowable *building* area of each separated occupancy shall not exceed 1. The consolidation of occupancies is not recognized. When design options are combined, the technical assumptions and relationships are lost.

The concept of mixed occupancy allowable area determination is based on limiting the area based on relative risk and the degree of occupancy separation. Therefore, it is critical that the allowable area based on fuel load or occupancy related concerns be balanced so as not to exceed acceptable levels of risk.

From a logical point of view, it makes no sense to allow for a building area greater than that allowed by any of the three design methods. The concept of mixed occupancy allowable area determination is based on limiting the area based on relative risk and the degree of occupancy separation. Each of the methods weighs the required occupancy separation with the relative size of the story under consideration. Generally speaking, occupancy separations are not required when using the accessory occupancy or non-separated occupancy design options. The accessory occupancy option assumes that the percentage or size of the ancillary occupancies is sufficiently small so as to not to create an unacceptable level of relative risk without formal occupancy separations. The non-separated option assumes that since the proportion is not regulated, using the most restrictive requirements of the occupancies under consideration mitigates the need for formal occupancy separations. The separated option requires the performance of the sum of the ratios calculation to balance the relative risk and fuel load to no more than would ordinarily be experienced in single occupancy buildings. Additionally, where the occupancies under consideration are of dissimilar risk, formal occupancy separations are required with the separated design option.

In the original example, assuming that the building qualified for the separated occupancy design option, a one-hour fire-resistance rated occupancy separation would be required between the Group A-2 and the Group F-1 occupancies. The incorrect method of combining the design options within a given story allows an area greater than that allowed by the separated mixed occupancy design option <u>and</u> eliminates the required occupancy separation.

This issue also impacts the determination of the total allowable area in multistory mixed occupancy buildings. Section 506.5.2 requires that, "For buildings with more than three *stories above grade plane*, the total *building area* shall be such that the aggregate sum of the ratios of the actual area of each *story* divided by the allowable area of such *stories* based on the applicable provisions of Section 508.1 shall not exceed 3." The divisor necessarily needs to comply with one of the three mixed occupancy design options so as not to skew the overall building area calculation.

It is unfortunate that this rationale could not have been incorporated into previous modifications to Section 508. The nature of the code development process does not generally embrace comprehensive code changes, especially for contentious subject areas. The recommended modifications to Section 508 clarify the intent and introduce additional balance into IBC mixed occupancy procedures.

It is proposed that the sections applicable to allowable building area determination for the accessory and non-separated design options be revised to include identical charging language, "In each story, …" as is the case with the separated design option in Section 508.4.2. Additionally, Section 508.1 has been reworded to specify that, "…<u>each story</u> containing mixed occupancies shall comply with <u>one</u> of the design options specified in Section 508.2, 508.3 or 508.4.

Some additional housekeeping changes are also included. Section 508.2.1 has been deleted and included in current Section 508.2.3. This move is consistent with the format of each of the design option subsections and technically consistent with the section heading, "Allowable building area and height." Additional editorial corrections have been made so as to be consistent with intent.

During discussion of mixed occupancy provisions during the previous code development cycle, it was noted that the provisions of Section 508.3.1 applicable to non-separated occupancies should also be made applicable to those occupancies not requiring an occupancy separation based on Table 508.4 for the separated design option. Section 508.4.1 has been modified to reflect that technical concern.

In summary, mixed occupancy provisions have continually evolved since the publication of the inaugural 2000 Edition of the IBC. The fundamental system of three mixed occupancy design options in Section 508 and incidental uses in Section 509 is contained in the 2012 IBC. This proposal intends to provide final adjustment and clarification to this system. Approval of this proposal will enhance consistency in the application of these very fundament provisions.

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

508.1-G-KEITH

<u>Public Hearing Results</u>

Committee Action: Disapproved

Committee Reason: The current code provisions on mixed occupancies appear adequate. Additionally there is concern that the proposal makes some technical changes.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

508.1 General. Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy classification, each story ~~containing mixed occupancies shall comply with one of the design options specified in Section 508.2, 508.3 or 508.4. All stories within the same building are not required to use the same mixed occupancy design option.~~ <u>shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections in accordance with Section 508.5.</u>

Exceptions:

~~1. Accessory occupancies shall be permitted in conjunction with the non-separated design option where remainder of the story complies with Section 508.3.2.~~
<u>1</u> ~~2~~. Occupancies separated in accordance with Section 510.
<u>2</u> ~~3~~. Where required by Table 415.3.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a detached building or structure.
<u>3</u> ~~4~~. Uses within live/work units, complying with Section 419, are not considered separate occupancies.

508.3.1 Occupancy Classification: Non-separated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the story based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that apply to the non-separated occupancies shall apply to the total ~~story~~ <u>non-separated occupancy area</u>. Where non-separated occupancies occur in a high-rise building, the most restrictive requirements of Section 403 that apply to the non-separated occupancies shall apply throughout the high-rise building.

508.3.2 Allowable building area and height. ~~In each *story*,~~ The allowable *building area and height*, in feet and number of stories, shall be based on the most restrictive allowances for the occupancy classifications under consideration for the type of construction of the building in accordance with Section 503.1.

508.4.1 Occupancy classification. Separated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the story based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that apply to <u>those</u> occupancies not required to have an occupancy separation <u>(N)</u> in accordance with Table 508.4, shall apply to <u>all such unseparated portions of</u> the total ~~un-~~separated occupancy area. Where such ~~un-separated~~ occupancies <u>not required to have an occupancy separation (N) in accordance with Table 508.4</u> occur in a high-rise building, the most restrictive requirements of Section 403 that apply to <u>such</u> ~~the un-separated~~ occupancies shall apply throughout the high-rise building.

<u>**508.5 Combining design options.** Combined mixed occupancy design options within a given story shall be permitted in accordance with the provisions of this section.</u>

<u>**508.5.1 Allowable area.** The allowable area of the story shall be such that the sum of the ratios of the actual area of each design option used divided by the respective allowable area for each design option used shall not exceed 1.</u>

<u>**Exception:** Accessory occupancies shall be permitted to be included in the allowable area of the nonseparated or separated occupancies to which they are accessory provided that the aggregate area of all accessory occupancies shall not exceed 10 percent of the building area of the story under consideration.</u>

<u>**508.5.2 Occupancy separation.** No occupancy separation is required between the accessory occupancy portion and the non-separated portion of a story, except as required by Sections 508.2.4 and 508.3.3. Where the separated occupancy design option is used in conjunction with the accessory occupancy design option or the non-separated occupancy design option on a given story, such separated occupancy portion of a story shall be separated from the remainder of the story in accordance with the requirements of Table 508.4 based on the most restrictive provision for any occupancy in the remainder of such story.</u>

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Section 508, which specifies the provisions applicable to mixed occupancies, has evolved over the relatively short life of the IBC. To this point in time, there are no specific procedures for the determination of allowable area for stories containing mixed occupancies employing different mixed occupancy design options. Section 508.1 of the 2012 IBC simply states, "the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, <u>or a combination</u>

<u>of these sections</u>." That vague language leads to numerous and varied interpretations of how to calculate mixed occupancy allowable areas.

The original submittal of FS123-12 took a simplistic approach that stated that within a given story, mixed occupancy design options were not to be combined, the accessory occupancy and non-separated occupancy design options not withstanding. Several people spoke in opposition stating that they had combined the three methods in the past. Unfortunately, some of their approaches differed in detail achieving varying degrees of compliance.

Based on the opposing testimony and the General Code Committee's stated reason for disapproval, this public comment creates a system for the determination of allowable areas for stories combining mixed occupancy design options. The revised format is very user friendly in that it simply describes how to determine the allowable area and what occupancy separations are required. Additionally, the last sentence of Section 508.2.2 has been deleted so a to be consistent with the General Code Committee's recommendation for approval as submitted on Item FS126-12.

Section 506 provides an absolute limit for the allowable area for single occupancy buildings. It is important from a legal/technical point of view, that the IBC delineates a system to prescribe upper limits for allowable areas in mixed occupancy buildings. The committee has spoken and a logical, combination based system has been created. Given the current three-year code development cycle, it is imperative that a system be approved for inclusion in the 2015 Edition of the IBC. As has been previously stated, there is no prescribed system for combined mixed occupancy story allowable area determination currently in the IBC. This system should be included in the 2015 IBC and if necessary, refined in subsequent code development cycles.

In summary, mixed occupancy provisions have continually evolved since the publication of the inaugural 2000 Edition of the IBC. The fundamental system of three mixed occupancy design options in Section 508 and incidental uses in Section 509 is contained in the 2012 IBC. Approval of this public comment will enhance consistency in the application of these very fundament provisions.

G123-12

Final Action: AS AM AMPC____ D

G126-12
508.2.3

Proposed Change as Submitted

Proponent: Sarah A. Rice, C.B.O., The Preview Group (srice@preview-group.com)

Revise as follows:

508.2.3 Allowable building area and height. The allowable *building area and height* of the building containing accessory occupancies shall be based on the allowable *building area and height* for the main occupancy in accordance with Section 503.1. ~~The height of each accessory occupancy shall not exceed the tabular values in Table 503, without increases in accordance with Section 504 for such accessory occupancies.~~ The *building area* of the accessory occupancies shall be in accordance with Section 508.2.1.

Reason: The current text of 508.2.3 literally limits the location of an accessory occupancy in a building to the tablular height in Table 503 for the occupancy of the accessory occupancy. Imposing this limit is a total contradiction to what the accessory occupancy design option was intended to allow. When literally applied, an office building of Type IIC construction that is allowed to be 4 stories in height with sprinklers, could not have closets or storage rooms above the 2nd story as they are a Group S-1 (storage) occupancy and the tabular height limit in Table 503 is 2 stories.

And I emphasize "tabular" height limit because as the code is currently written, no height increase can be taken for a fully sprinklered building used when determining the vertical location of an accessory occupancy.

Another example would be linen storage rooms (Group S-1) in hotels of Type IIB construction. Based on Table 503 the tabular building height limit (in stories) for a Group S-1 occupancy is 2 stories, where the hotel (Group R-2) is allowed to be up to 5 stories when sprinklered. Because Group S-1 occupancies are not allowed above the 2nd story, linen storage closets would not be allowed above the 2nd story – a hotel cannot literally function without those storage spaces.

Without this code change many building designs as we know them today would continue to literally not be allowed.

Cost Impact: The proposed changes will not increase the cost of construction.

508.2.3-G-RICE sar comments.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved based upon the proponent's reason and since it provides flexibility to accessory occupancies to the location within the building due to the removal of height restrictions.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., City of San Diego, representing City of San Diego Development Services Department, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

508.2.3 Allowable building area and height. The allowable *building area and height* of the building containing accessory occupancies other than Group H, I and E shall be based on the allowable *building area and height* for the main occupancy in accordance with Section 503.1. The *building area* of the accessory occupancies shall be in accordance with Section 508.2.1.

Commenter's Reason: The General Committee approved this code change submitted by the Preview Group modifying Section 508.2.3 to eliminate the accessory use area limits for height. As proponents of G124, which was not approved, we agree with the overall concept of this change however we are concerned that the change is too broad. We request that the membership consider approval of the proposed modification to the approved code change to limit its scope by excluding Groups H, I and E. These occupancies have special requirements and should be limited along the height of the building.

We request that the membership approve the proposed modification to the committee's action.

G126-12

Final Action: AS AM AMPC____ D

G128-12
Table 508.4

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care

Revise as follows:

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

OCCUPANCY	A, E		I-1[a], I-3, I-4		I-2		R[a]		F-2, S-2[b], U		B[e], F-1, M, S-1		H-1		H-2		H-3, H-4		H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
B[e], F-1, M, S-1	—	—	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2	1	NP

(Portions of table not shown remain unchanged)

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.
a. See Section 420.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
c. See Section 406.3.4.
d. Separation is not required between occupancies of the same classification.
e. See Section 422.2 for ambulatory care facilities.

Reason: This proposal is submitted by the ICC Ad Hoc Committee for Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering, a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx.

This footnote reminds the reader that although there is no separation required for many B occupancy to other occupancies that Section 422.2 would still require a 1 hour fire partition between other group B occupancies and F-1, M and S-1 occupancies.

Cost Impact: None

T508.4-G-WILLIAMS-ADHOC

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This provides a helpful clarification that ambulatory care facilities have specific and more restrictive separation requirements even though they are Group B occupancies.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Williams, Adhoc Health Care – MOE study group, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

407.5 Smoke barriers. TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

OCCUPANCY	A, E		I-1[a], I-3, I-4		I-2		R[a]		F-2, S-2[b], U		B[e], F-1, M, S-1		H-1		H-2		H-3, H-4		H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
B[e], F-1, M, S-1	—	—	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2	1	NP

(Portions of table not shown remain unchanged)

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
N = No separation requirement.
NP = Not permitted.
a. See Section 420.
b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
c. See Section 406.3.4.
d. Separation is not required between occupancies of the same classification.
e. See Section 422.2 for ambulatory care facilities.

508.2.4 Separation of occupancies. No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.
3 Ambulatory care facilities shall be separated in accordance with Section 422.2

508.3.3 Separation. No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from other occupancies contiguous to them in accordance with the requirements of Section 420.
3. Ambulatory care facilities shall be separated in accordance with Section 422.2

Commenter's Reason: G128-12 does adds a footnote to the occupancy separation table to remind code users that for Ambulatory Care Facilties a 1-hour separation is required between an ambulatory care facility and any other tenant space. That requirement is going to apply regardless of which Section of 508 is in use. To be consistent, exceptions are proposed to Sections 508.2 and 508.3. The pointer sends the user to a more restrictive requirement that would otherwise be overlooked.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

The AHC is proposing a revision to address some of the oversights in the I-Codes of long-standing and operational requirements for hospitals and healthcare facilities that has not been specifically addressed. The requirements being proposed in this code change have been long-standing provisions of the construction and operational requirements for healthcare facilities.

Cost Impact: None

G128-12

Final Action: AS AM AMPC____ D

G131-12
509.3

Proposed Change as Submitted

Proponent: Steve Thomas, Colorado Code Consulting, LLC, representing Colorado Chapter ICC (sthomas@coloradocode.net)

Delete without substitution:

~~**509.3 Area limitations.** Incidental uses shall not occupy more than 10 percent of the *building area* of the *story* in which they are located.~~

Reason: Incidental uses have been revised in every edition of the code. The original incidental uses did not have any area limitation and there were no reported issues through the 2006 edition of the IBC. When the uses were incorporated into accessory occupancies in the 2009 IBC, the 10 percent limitation was introduced. As the incidental uses were removed from the accessory occupancies, the 10 percent limitation was carried over. History has shown that the 10 percent limitation is not needed for incidental uses. This requirement is problematic in buildings where most if not all of the building is dedicated to uses listed in Table 509. For example a high school may have several classrooms that are classified as laboratories or vocational classrooms. These classrooms and labs typically exceed 10 percent of the story that they are located in. There is no guidance in the IBC to direct the user on how to address these situations. By eliminating the 10 percent limitation, the classrooms would still be required to be separated or protected with automatic sprinklers. However, they would not be limited. This would also address the condition where a large campus style project has a building that serves as a central heating plant as well.

Cost Impact: The proposed changes will not increase the cost of construction.

509.3-G-THOMAS.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The deletion of the section in its entirety was seen as inappropriate as some threshold is necessary for incidental uses otherwise such incidental uses will get too large. See G132-12 committee reason.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Stephen Thomas, Colorado Code Consulting, LLC, representing Colorado Chapter ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

509.1 General. Incidental uses located within single occupancy or mixed occupancy buildings shall comply with the provisions of this section. Incidental uses are ancillary functions associated with a given occupancy that <u>occupy less than 10 percent of the building area of the story in which they are located. Such uses</u> generally pose a greater level of risk to that occupancy and are limited to those uses listed in Table 509.

> **Exception:** Incidental uses within and serving a dwelling unit are not required to comply with this section.

~~**509.3 Area limitations.** Incidental uses shall not occupy more than 10 percent of the building area of the story in which they are located.~~

Commenter's Reason: The purpose of this proposal is to provide direction to the user of the code that incidental uses are ancillary to the major use. The intent of this change is to address the condition where a use that is listed in Table 509 that exceeds the 10%

threshold cannot be designated as an incidental use. The use should then be classified as an occupancy and be designed as outlined in Chapter 5.

For example, a vocational school would obviously have more than 10% of the floor area. The code does not provide direction on how this kind of building should be designed. By moving the 10% threshold into the section that describes what an incidental use is, it clarifies the intent of the code. The vocational school would be designated as a Group E Occupancy. The same would apply to a heating plant building, where the entire building is dedicated to boilers or refrigeration equipment. This change would change the provisions to classify the building as a Group F occupancy.

Public Comment 2:

Al Godwin, CBO, CPM, Aon Fire Protection Engineering Corporation, requests Approval as Submitted.

Commenter Reason: The Committee stated that it is important to maintain a limit on Incidental Use area to prevent them from getting too large. However, I have to ask the question as to when has anyone ever installed extra Mechanical equipment, extra boilers, extra laundry rooms, extra hydrogen cut-off rooms, etc. People only install what is needed for that building and use.

A warehouse may have a small mechanical room to condition the office; whereas, a warehouse used as an AT&T switching center may have a huge mechanical room to keep the equipment cooled. If this room goes over 10% of the floor area, why does it have to be reclassified?

The 10% was added at the Final Action hearings under G107-09/10.There is no justification for a 10% limit. There has been no presentation of a need for this limitation.

G131-12
Final Action: AS AM AMPC____ D

G132-12
509.3

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering (al.godwin@aon.com)

Revise as follows:

509.3 Area limitations. Incidental uses shall not occupy more than 10 percent of the *building area* ~~of the *story*~~ in which they are located.

Reason: In the last code cycle, this provision was added at the Final Action to code change G107-09/10. While it mirrors the requirement for Accessory occupancies, Section 508.2.1, and may have made since at the time, when actually put into practice it creates a problem.

It is not uncommon for high rise buildings to dedicate a full floor, either basement or 5th floor, to mechanical equipment. To expect them to allocate 10% per floor to such incidental uses is impractical.

In such designs, those floors can no longer be considered incidental and require the assignment of an occupancy classification. What is the occupancy classification of a boiler? Is it an F for making hot water or an S for storing hot water? What is the occupancy of refrigeration equipment?

What is the classification of a Group I-3 padded cells when the number of padded cells exceeds the limitation of Incidental Uses? Isn't it still an I-3? Is the 1-hour separation of Table 509 still required between I-3 padded cells exceeding 10% in area and the other I-3 cells on the floor? It would appear that they could use the non-separated mixed use provisions and avoid any separation. In that case, adding more padding eliminates the 1-hour separation.

And once a floor is classified as a Group S-1 or F-1, the building can no longer take the high-rise reduction from IB to IIA of Section 403.2.1.1(2).

Another example of a problem is "Laboratory and vocational shops, not classified as Group H, located in a Group E or I-2 occupancy." If such labs and/or vocational shops cannot be less than 10% of the floor, or with this proposal, 10% of the building, they are no longer an incidental use. They must be classified as something else.

No justification has been presented to show that full floor incidental uses are a problem. It may not be appropriate to limit the area at all, and the entire section should be deleted. However, deleting the "per floor" limitation may solve the problem and still meet the committees concerns of limiting the square footage.

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

509.3-G-GODWIN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Concerned that although this was a better fix than G131-12 that it is focusing only on high-rise buildings and not on low rise buildings with large building areas. The proposal fixes one building type but creates problems in others. It was suggested that perhaps an exception for high-rise buildings could be provided to address this problem.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Al Godwin, CBO, CPM, Aon Fire Protection Engineering Corporation, requests Approval as Submitted.

Commenter Reason: The Committee stated on G131-12 that it is important to maintain a limit on Incidental Use area to prevent them from getting too large. However, I have to ask the question as to when has anyone ever installed extra Mechanical equipment, extra boilers, extra laundry rooms, extra hydrogen cut-off rooms, etc. People only install what is needed for that building and use.

A warehouse may have a small mechanical room to condition the office; whereas, a warehouse used as an AT&T switching center may have a huge mechanical room to keep the equipment cooled. If this room goes over 10% of the floor area, why does it have to be reclassified?

The 10% was added at the Final Action hearings under G107-09/10.There is no justification for a 10% limit. There has been no presentation of a need for this limitation.

If Public Comment on G131-12 is not successful, then here is an alternate. Instead of 10% of the floor, at least reduce it to 10% of the building. All of the comments in the Reason statement are still applicable.

G132-12

Final Action: AS AM AMPC____ D

G133-12
510.2

Proposed Change as Submitted

Proponent: Marshall Klein, P.E., Marshall A. Klein & Associates, Inc., representing (NMHC) (makleinfpe@comcast.net) and Jason Thompson, P.E., National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards

Revise as follows:

510.2 Horizontal building separation allowance. A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where all of the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 3 hours.
2. ~~The building below the *horizontal assembly* is not greater than one *story above grade plane*.~~

(Portions of text not shown remain unchanged)

Reason: (Klein) Item #2 of Section 510.2 is an antiquated section of the Code that was a carryover from the legacy 1997 UBC Section 311.2.2.1, **"Group S, Division 3 with Group A, Division 3; Group B, Group M or R, Division 1 Occupancy above"**. Under this section of the UBC the occupancies permitted below the 3 hour fire rated horizontal separation (i.e. parking garage, B, M and A-3 occupancies) were ***not*** required to be sprinklered. In the 2009 IBC, we revised the requirements under this Section of Code to **require** the building below the 3 hour fire rated horizontal separation to be sprinklered per Section 903.3.1.1 (NFPA 13) (See 2012 IBC Section 510.2(6)). Therefore, to limit the building under Section 510.2 that is of Type 1A Construction Type and sprinklered makes no sense anymore, and limits the use of this section of Code in major urban renewal areas of the US.

From a life safety/fire protection standpoint, permitting the Type 1A portion under the 3 hour horizontal separation to go to any number of stories, is an equal or better type of construction that is permitted by this section of code under Section 510.2(7). Section 510.2(7) permits the building(s) above the Type IA portion to be a maximum height in feet not to exceed the height limits set forth in Section 503 for the "…building having the smaller allowable height as measured from the grade plane…". Therefore, a project built under Section 510.2 can presently have above the Type IA portion an R-2 occupancy, sprinklered per NFPA 13R, 4 story, Type 5A, maximum of 60' above grade plane (or an R-2 occupancy, sprinklered per NFPA 13, 4 story, Type 5A, maximum of 70' above grade plane). However, if Item #2 is deleted, then as the Type IA portion is increased in its number of stories above grade plane, the portion above is still limited by Item #7's height limitation and its "height footprint" is being reduced. The net effect is that because this section of the Code will not permit more stories for the Type IA Construction Type, sprinklered portion of the project, the net effect is the reduction of the height of the portion of the project that is of a lesser construction type that is above the Type IA portion. Therefore, from a life safety/fire protection standpoint, we have an equal or better code requirement that is more flexible to provide for the needs of our urban needs to bring people back into our major cities to live and work.

(Thompson) Section 510.2 of the IBC has requirements to allow buildings with certain occupancies to be constructed with mixed construction types by using what is commonly referred to as pedestal construction where a building of a lesser type of construction is permitted to be built on top of a building of Type IA construction and the different types of construction are allowed to be considered separate buildings. This method of construction is allowed provided specific criteria are met including the installation of a 3 hour horizontal assembly that acts as a de facto "fire wall" separating the two buildings from vertical fire exposure (Item 1) and by limiting the total building height to the maximum height permitted in Table 503 for the lesser construction type (Item 7). However, the present code limits the height of the Type IA portion of the building below the 3 hour horizontal assembly to a single story above grade plane (Item 2).

Type IA is the most stringent construction type in the IBC from a fire resistance and noncombustibility point of view. According to Table 503, except for Group H-1 and H-2 occupancies, all other occupancies in buildings of Type IA construction are permitted to be of unlimited height and area due to the inherent fire safety provided by the most fire resistive construction type. However, Item 2 in Section 510.2 limits the Type IA building serving as the base of the pedestal construction to one story in height. This code change proposes to delete the one story limitation for the Type IA building portion of the pedestal construction. This will allow the Type IA building serving as the base of the pedestal construction to be multiple stories while still maintaining the total building height limit in Item 7 of Section 510.2 which is based on the construction type of the lesser type of construction built on top of the Type IA pedestal. This makes good sense since the more stories of Type IA construction allowed above the grade plane, the less potential stories of combustible construction with less fire resistance there will be in the building above.

Cost Impact: (Klein) The construction will cost more because of the additional cost of Type IA construction, but without the additional story or stories of Type IA podium for commercial development the project would not be cost effective to build to promote urban development.

(Thompson) This will not increase the cost of construction.

510.2-G-KLEIN-COMBINED.doc

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: This proposal solves a problem for urban areas. The revision provides flexibility without changing the overall height of such structures.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Brad Emerick, Denver Fire Department, representing Colorado Chapter of the ICC, requests Disapproval.

Commenter's Reason: Building height is regulated in the code in 2 ways: in feet above grade plane and in number of stories. The proposed amendment retains the height-in-feet limitation but removes the height-in-stories limitation. At the code development hearings all testimony to the committee on this proposal and all subsequent committee discussion focused on height in feet. Height in stories was not analyzed. If the limitation on the number of stories is to be removed, technical discussion should recognize and consider the intended and unintended consequences, and some reasonable mitigating features need to be included to offset the increase in hazards described below.

The requirements allowing for this type of building were carried over from the UBC. Under the UBC the height of these structures was limited in feet to that allowed for the lesser construction type. If sprinklered throughout, the UBC permitted one additional story but no increase in feet-height. When the provisions for this type of building were brought into the IBC they were essentially duplicated – but the corresponding restrictions were not. The IBC allowed for an increase in height of 20 feet plus an allowable area increase in addition to the added story. The only limitation retained from the original concept was the cap on overall height in stories corresponding to the lesser construction type. The proposed change removes this cap.

For ease of discussion, the typical building constructed under the current provisions will be compared to one constructed under the proposed changes. Under current provisions, the typical building is comprised of 1-story of Type 1 construction with 4-stories of Type 5A above. Type 5A construction is combustible and usually houses an R2 occupancy. Though this building is permitted to be 70 feet in height (60 feet with a 13R system in some jurisdictions), under current code, there's a financial disincentive and it's unusual for developers to build them this tall as the average floor-to-floor height would be 14 feet. So typical buildings constructed under these provisions are 5-stories tall with the first story of combustible construction located 10 feet above grade plane, and the roof of the combustible construction close to 50 feet above grade plane (as a sidelight 50 feet was the height limit imposed under the UBC).

Under the proposed change, there is no limit on the overall number of stories. So in 70 feet, 3 stories of Type 1 could be constructed under 4 stories of Type 5A. This is a 7-story building with the first floor of combustible construction located 30 feet above grade plane and the roof of the combustible construction located 70 feet above grade plane. The primary consequence of this is raising the combustible stories – and from a fire-safety perspective, the riskier occupancy – higher off the ground, complicating firefighting and rescue efforts.

Elevating and consolidating the fuel load in taller combustible framed buildings creates an operationally more challenging fire for firefighters. Most of the higher risk occupancy is located beyond the reach of ground ladders. In jurisdictions without high rise apparatus, firefighters would be forced to attack from the stair enclosures – that are only required to be 1-hour rated. In jurisdictions that permit NFPA 13R sprinkler systems in these types of structures, the attic and the interstitial spaces between floors are permitted to be unsprinklered. In the typical building constructed under the current code, these spaces are located 20, 30, and 40 feet above grade. Under the proposed change they would be located 40, 50 and 60 feet above grade.

Under current code if someone had to be rescued (or worse, jump) from the 2nd story of combustible construction, the operation would occur on the 2nd story above grade plane. Under the proposed change the operation would occur on the 4th story above grade plane.

Finally, several building definitions and requirements are tied to height measured above the lowest level of fire department access which is different than height measured to grade plane. On a sloping site, the issues identified above are exacerbated. Depending on the steepness of the grade, the lowest level of fire department access could easily be facing 8 stories of building height without reaching high rise criteria.

G133-12
Final Action: AS AM AMPC____ D

G134-12
510.2

Proposed Change as Submitted

Proponent: C. Ray Allshouse AIA, CBO, City of Shoreline, WA, representing the Washington Association of Building Officials Technical Code Development Committee (rallshouse@shorelinewa.gov)

Revise as follows:

510.2 Horizontal building separation allowance. A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where all of the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 3 hours.
2. The building below the *horizontal assembly* is not greater than one *story above grade plane*.
3. The building below the *horizontal assembly* is of Type IA construction.
4. *Shaft*, *stairway*, *ramp* and escalator enclosures through the *horizontal assembly* shall have not less than a 2-hour *fire-resistance rating* with opening protectives in accordance with Section 716.5.

   Exception: Where the enclosure walls below the *horizontal assembly* have not less than a 3-hour *fire-resistance rating* with opening protectives in accordance with Section 716.5, the enclosure walls extending above the *horizontal assembly* shall be permitted to have a 1-hour *fire-resistance rating*, provided:

   1. The building above the *horizontal assembly* is not required to be of Type I construction;
   2. The enclosure connects fewer than four *stories*; and
   3. The enclosure opening protectives above the *horizontal assembly* have a *fire protection rating* of not less than 1 hour.

5. The building or buildings above the *horizontal assembly* shall be permitted to have multiple Group A occupancy uses, each with an *occupant load* of less 300, or Group B, M, R or S occupancies.
6. The building below the *horizontal assembly* shall be protected throughout by an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, and shall be permitted to be any ~~of the following occupancies:~~ occupancy allowed by this code except Group H.
   ~~6.1. Group S-2 parking garage used for the parking and storage of private motor vehicles;~~
   ~~6.2. Multiple Group A, each with an *occupant load* of less than 300;~~
   ~~6.3. Group B;~~
   ~~6.4. Group M;~~
   ~~6.5. Group R; and~~
   ~~6.6. Uses incidental to the operation of the building (including entry lobbies, mechanical rooms, storage areas and similar uses).~~
7. The maximum *building height* in feet (mm) shall not exceed the limits set forth in Section 503 for the building having the smaller allowable height as measured from the *grade plane*.

Reason: Current code language unnecessarily limits occupancy types under the building separation allowances in the case of horizontal separation assemblies when compared with vertical assemblies. Since a building is considered separate and distinct provided that all seven conditions listed in Section 510.2 are met, noting that these conditions specifically include Type IA construction below the 3-hour fire resistance rated horizontal assembly and the maximum building height shall not exceed Section 503 limits above the grade plane, why does the code also restrict Group E, I and F occupancies from consideration? Such occupancies could exist immediately next to these buildings limited by precisely the same height limitations with a less restrictive fire separation rating.

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

510.2-G-ALLSHOUSE

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved based upon the proponent's justification. This proposal provides flexibility in a higher construction type building to allow any occupancy besides Group H.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., City of San Diego, representing City of San Diego Development Services Department, requests Disapproval.

Commenter's Reason: The General Committee approved this code change submitted by the Washington Association of Building Officials. We are submitting this public comment to urge disapproval of the code change. The General Committee approved the code change as submitted since it excluded H occupancies.

If adopted this code change will allow a nursing home, detention facility, hospital, school, or other critical occupancies to be located above grade plane and to be considered separate buildings when determining the type of construction and allowable # of stories. If this code change is adopted many occupancies will not be constructed of Type I or II construction since they would not be located above grad plane. For example, and as the code change has been approved, a Group I-3 occupancy will be permitted to be located on the third story in type VA construction as opposed to a building constructed of Type IB construction since the charging paragraph permits consideration of the building above as a separate building when determining the number of stories.

We urge support for our public comment to disapprove the code change.

G134-12
Final Action: AS AM AMPC____ D

G137-12
510.2

<u>Proposed Change as Submitted</u>

Proponent: Joe Nebbia and Mark Nowak, Steel Framing Alliance

Revise as follows:

510.2 Horizontal building separation allowance. A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where all of the following conditions are met:

1. through 7. *(no change)*
8. <u>For Type V buildings with combustible framing members above the horizontal separation, all automatic fire sprinklers required by this code shall be in place and operable prior to continuing construction on any part of the building exceeding three stories above grade plane. Combustible framing members shall be protected by exterior and interior finishes or coverings permitted by this code before the total height of the building can exceed 3 stories above grade plane and before a certificate of occupancy is issued for any part of the building.</u>

Reason: This proposal is designed to reduce the fire risk in Type V buildings to adjacent buildings and property, and reduce the risk of high intensity fires that require significant firefighting resources, leaving other areas in the community without adequate protection. Further, it will reduce the fire risk to occupants in buildings by prohibiting occupancy before all fire resistance and suppression systems are in place and operational in the building. It specifically addresses Type V buildings constructed with combustible materials that are exposed prior to and after construction, when such buildings exceed three stories in height.

Prompted by a series of serious fires in residential buildings, the London (UK) Assembly in 2010 called for an inquiry to examine fire safety issues. Among the findings by the examining commission was the determination that wood framing carries a high fire risk throughout most of the construction process. The risk extends beyond the building to include adjacent and neighboring buildings.

According to the report titled **Fire safety in London, Fire risks in London's tall and timber framed buildings,** "The effects of fire on large timber frame construction sites are significantly greater due to the large amount of exposed wood, the rapid spread and the radiated heat that can impact on surrounding buildings. All this can affect the ability of fire fighters to tackle the blaze."

The report further states "Fire risks in timber framed buildings are greatest during the construction phase when the fire resistant elements such as internal fire separating walls, protective linings and claddings and fire stopping in cavities are incomplete."

Insurance issues are also raised in the report, citing a quote by Zurich Insurance that timber framed buildings under construction "offer limited resistance until virtually the final stages of construction... This contrasts significantly to that provided in a more traditionally constructed or fire resisting construction system where the applied protection measures offer an immediate benefit in being applied to a noncombustible and generally more stable building elements"

Regarding the not uncommon practice of buildings being partially occupied, the report states that "timber frame buildings are not safe for occupation where there is still construction ongoing on site. Incomplete fire compartmentalization would make this extremely dangerous as fires can spread quickly to the occupied parts of the building and more so than "conventional" buildings." A significant recommendation in the report is that local authorities "do not permit the partial or full occupation of timber framed developments until the whole development is complete and signed off as complying with the approved building regulations."

The London report also cites several examples of the fires that initiated their study including the following that demonstrates the risk to adjacent properties and occupants:

> *In the afternoon of Wednesday 12 July 2006 there was a serious fire at a timber framed development situated between Aerodrome Road and Grahame Park Way in Colindale, London NW9. In response to the fire about 100 fire fighters spent five hours at the scene, during which time a number of neighboring premises, including Colindale Police Station and Hendon police college on opposite sides of the site, were evacuated and a stretch of the nearby A41 through Hendon was closed until 21:30 hours. Some 2000 local residents were evacuated from their homes. An adjoining building occupied by Middlesex University as halls of residence, was severely damage as a result of the fire spreading. Radiated heat also severely damaged 30 cars parked in the roads nearby.*

A copy of the London Assembly report is available at http://www.london.gov.uk/who-runs-london/the-london-assembly/publications/housing-planning/fire-safety-in-london

The risk of exposed lumber in taller buildings is not limited to London. In fact, the first wood mid-rise building in British Columbia burned to the ground before it was finished in the spring of 2011. Because it was under construction, the building had no systems in place and the wood framing was exposed directly to the flames. When rebuilt, the project will follow fire department recommendations to include earlier installation and activation of sprinklers and fire doors, among other recommendations. This incident like the similar fires in London, stresses the importance of limiting the heights at which unprotected combustible construction should be permitted. Because the intensity of the fire is so much greater than other fires due to the exposed wood, these fires require substantial firefighting capabilities and often leave little to no protection for other parts of the city during the fire.

The NFPA Fire Protection Handbook (2008 version, Page 11-52) also cites the vulnerability of buildings under construction and their threat to adjacent buildings. The Handbook presents a case study of a fire in a five story, wood framed building. Following is an excerpt:

> *The fire completely destroyed the building under construction and spread fire to many other buildings in the neighborhood. A total of over 20 buildings and 20 vehicles were damaged by the fire. Windows in a brick building across the street and at least 100 feet away were broken from the fire.*

Further, the same case study states: *It (the fire) also emphasizes the importance of expediting the installation of sprinklers and the vulnerability of combustible construction materials before they are sheathed.*

Currently, Table 503 limits Type V construction to at most 3 stories except for low hazard storage (S-2), before any modifications to the allowable height are applied. This proposal, if approved, will require the building to be fully protected as required for a finished building before applying sprinkler or horizontal separations provisions of the code to increase building height. It will also remove an important oversight in the code by requiring combustible materials to be covered before occupancy of any part of the building.

Cost Impact: This code change proposal will increase the cost of construction. Cost impacts will be limited to a small number of Type V buildings.

510.2 #2-G-NEBBIA-NOWAK.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This concept is more appropriately addressed by the IFC and is seen as overly restrictive. Additionally this requirement would be impractical to enforce.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1

Mark Nowak, Steel Framing Alliance, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

510.2 Horizontal building separation allowance. A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where all of the following conditions are met:

1. through 7. *(no change)*

8. For Type V buildings with combustible framing members above the horizontal separation, ~~all automatic fire sprinklers required by this code shall be in place and operable prior to continuing construction on any part of the building exceeding three stories above grade plane. C~~ combustible framing members shall be protected by exterior and interior finishes or coverings ~~permitted by~~ this code ~~before the total height of the building can exceed 3 stories above grade plane and~~ <u>in accordance with Chapter 7 and Sections 803 and 804</u> before a certificate of occupancy is issued for any part of the building.

Commenter's Reason: Economical design in Type V construction typically utilizes floor and roof systems that span multiple occupancy areas, providing large void spaces between the truss chords and joists that would allow fire and smoke to spread horizontally and vertically when combustible materials are used. Chapter 7 of the IBC specifically requires the fire-resistance rating of an assembly to be in place on horizontal and vertical assemblies. Likewise, Sections 803 and 804 specify fire protection requirements for interior finishes. These protections should be in place whether the building is partially finished as in a tenant build out or if the entire building is complete. Unfortunately, more and more mixed use buildings constructed with space to be finished later as units are leased or sold are being built with combustible construction over a horizontal building separation. Even when adequate fire-stopping is employed, and discrete occupancy units in the structure are completed, fire in an unprotected area of the structure can induce structural failure or spread of fire to the entire building. This provision provides necessary protection to all occupants of a structure constructed with combustible materials, particularly when the building includes unimproved areas within the total building envelope.

The committee disapproved the original submission. This proposal is re-submitted without the building height and automatic sprinkler provisions as the Committee viewed these as overly restrictive and impractical to enforce.

Public Comment 2

Larry Williams, Steel Framing Industry Association requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

510.2 Horizontal building separation allowance. A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where all of the following conditions are met:

1. through 7. *(no change)*
8. For Type V buildings with combustible framing members above the horizontal separation, ~~all automatic fire sprinklers required by this code shall be in place and operable prior to continuing construction on any part of the building exceeding three stories above grade plane. C~~ combustible framing members shall be protected by exterior and interior finishes or coverings ~~permitted by~~ ~~this code~~ <u>in accordance with Chapter 7 and Sections 803 and 804</u> before the total height of the building can exceed 3 stories above grade plane and before a certificate of occupancy is issued for any part of the building.

Commenter's Reason: The management of fire risks in Type V structures using combustible framing material requires complex fire-stopping strategies and construction. According to the findings of a study of fire safety in high-density, high rise buildings conducted by the London Planning and Housing Committee (*Fire Safety in London: Fire risks in London's tall and timber framed buildings, December 2010),* "Fire risks in timber framed buildings are greatest during the construction phase when the fire resistant elements such as internal fire separating walls, protective linings and claddings and fire stopping in cavities are incomplete. Only once the buildings are complete are all the necessary fire measures in place."

The study also recommends that, "Given the risks of fire during construction, and the likely spread and intensity of fires at that stage, timber frame buildings are not safe for occupation where there is still construction on site. Government should issue guidance to local authorities that, as a matter of strict safety policy, they do not permit the partial occupation of timber framed developments until the whole development is complete and signed off as complying with the approved building regulations."

The committee disapproved the original proposal. This public comment recognizes the risks inherent in the use of combustible materials in mid-rise structures and seeks to protect the safety of occupants in partially completed Type V buildings. It also addresses the issues associated with the sprinkler provisions being difficult to enforce in the original proposal.

G137-12

Final Action: AS AM AMPC____ D

G138-12

510.8

<u>Proposed Change as Submitted</u>

Proponent: Jason Thompson, P.E., National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards

Revise as follows:

510.8 Group B ~~or~~ <u>and</u> M <u>buildings</u> with Group S-2 open parking garage <u>above</u>. Group B ~~or~~ <u>and</u> M occupancies located ~~not higher than the first *story above grade plane*~~ <u>below a Group S-2 open parking garage of a lesser type of construction</u> shall be considered as a separate and distinct building <u>from the Group S-2 open parking garage</u> for the purpose of determining the type of construction where all of the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 2 hours.
2. The occupancies in the building below the *horizontal assembly* are limited to Groups B and M.
3. The occupancy above the *horizontal assembly* is limited to a Group S-2 *open parking garage*.
4. <u>The building below the horizontal assembly is of Type IA construction.</u>

   <u>Exception:</u> The building below the *horizontal assembly* ~~is~~ <u>shall be permitted to be</u> of Type I<u>B</u> or II construction<u>,</u> but not less than the type of construction required for the Group S-2 *open parking garage* above<u>, where the building below is not greater than one story in height above grade plane</u>.

5. through 7. *(no change)*

Reason: Section 510.8 of the IBC has requirements that allow buildings with certain occupancies to be constructed with mixed construction types by using what is commonly referred to as pedestal construction where a building of a lesser type of construction is permitted to be built on top of a building of Type I or II construction and the different types of construction are allowed to be considered separate buildings. This method of construction is allowed provided specific criteria are met including the installation of a 2 hour horizontal assembly that acts as a de facto "fire wall" separating the two buildings from vertical fire exposure (Item 1) and by limiting the total building height to the maximum height permitted in Table 503 for the lesser construction type (Item 6). However, the present code limits the height of the Type I or II portion of the building below the 2 hour horizontal assembly to a single story above grade plane.

This code change proposes to delete the one story limitation where the lower building portion of the pedestal construction is of Type IA construction. This will allow the Type IA building serving as the base of the pedestal construction to be multiple stories in height while still maintaining the total building height limit in Item 6 of Section 510.8 which is based on the construction type of the lesser type of construction built on top of the Type IA pedestal. Type IA is the most stringent construction type in the IBC from a fire resistance and noncombustibility point of view. According to Table 503, except for Group H-1 and H-2 occupancies, all other occupancies in buildings of Type IA construction are permitted to be of unlimited height and area due to the inherent fire safety provided by the most fire resistive construction type. This makes good sense since the more stories of Type IA construction allowed above the grade plane, the less stories of potentially combustible construction and less fire resistance there will be in the building above.

This code change to Section 510.8 is very similar to another code change we have proposed to Section 510.2 Horizontal Building Separation Allowance for pedestal buildings with high fire resistive construction for the lower building of the pedestal.

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

510.8-G-THOMPSON.doc

Public Hearing Results

Committee Action: Approved as Modified

Modify as follows:

510.8 Group B <u>or</u> ~~and~~ M buildings with Group S-2 open parking garage above. Group B <u>or</u> ~~and~~ M occupancies located below a Group S-2 open parking garage of a lesser type of construction shall be considered as a separate and distinct building from the Group S-2 open parking garage for the purpose of determining the type of construction where all of the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 2 hours.
2. The occupancies in the building below the *horizontal assembly* are limited to Groups B and M.
3. The occupancy above the *horizontal assembly* is limited to a Group S-2 *open parking garage*.
4. The building below the horizontal assembly is of Type IA construction.

   Exception: The building below the *horizontal assembly* is shall be permitted to be of Type IB or II construction, but not less than the type of construction required for the Group S-2 *open parking garage* above, where the building below is not greater than one story in height above grade plane.

5. through 7. *(no change)*

Committee Reason: This proposal was approved based upon the action taken on G133-12. The proposal allows 2 stories where type IA is used but limits to 1 story when Type IB or II construction is used. The modification simply replaces "and" with "or" so it does not appear that you need both a Group B and a Group M occupancy to use this allowance.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Jonathan Humble, AIA, NCARB, LEED BD&C, American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

510.8 Group B or **M buildings with Group S-2 open parking garage above.** Group B or M occupancies located below a Group S-2 open parking garage of a lesser type of construction shall be considered as a separate and distinct building from the Group S-2 open parking garage for the purpose of determining the type of construction where all of the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 2 hours.
2. The occupancies in the building below the *horizontal assembly* are limited to Groups B and M.
3. The occupancy above the *horizontal assembly* is limited to a Group S-2 *open parking garage*.
4. The building below the horizontal assembly is ~~of Type IA construction~~ <u>constructed to comply with one of the following:</u>
   <u>4.1. Type I construction, or</u>
   <u>4.2. Type II construction, but not less than the type of construction required for the Group S-2 *open parking garage* above, where the building below is not greater than one story above grade plane.</u>

   ~~**Exception:** The building below the *horizontal assembly* is shall be permitted to be of Type IB or II construction, but not less than the type of construction required for the Group S-2 *open parking garage* above, where the building below is not greater than one story in height above grade plane.~~

Commenters Reason: This proposed modification returns the original intent of Section 510.8, which was submitted by the American Iron and Steel Institute at the 2005 code hearings (G138-04/05). The original proposal recognized market trends in building construction, that of populating the street scape with business or mercantile occupancies in lieu of a parking structure only thus making is more attractive and inviting for the jurisdiction. Further, the upper levels of S-2 open parking garage poses no significant risk to the first floor uses. The independent exits, fire rated occupancy separation also minimizes the risk of the B or M occupancies to the S-2 parking garage above.

We propose further modifications as follows:

<u>Allow Type IB construction for more than one story:</u> The limitations proposed in G138-12 are more restrictive, and did not substantiate the need for the reduction to Type IB construction. Since the separation between the B or M and S2 Open Parking garage is a minimum of two (2) hours fire resistance rating, there is no reason to limit a Type IB construction, which is also is two (2) fire resistance rated construction, to a single story.

Further, as part of the scoping requirements the S2 Open Parking Garage is to be "…of a lesser type of construction…", therefore the concern that Type IB will be of a lesser construction is cannot be substantiated.

Limit Type II construction to one story:
We have no objection to limiting the Type II constructions to the one story limitation.

Delete the exception:
There is no need for an exception in this case. The original language (IBC-2012) listed the construction types as options as a sub-provision. Therefore we feel it would be more appropriate to be consistent by listing the two basic constructions as options as originally published in the IBC from 2006 through 2012.

G138-12

Final Action: AS AM AMPC____ D

G139-12
Table 601

Proposed Change as Submitted

Proponent: Tony Crimi, A.C. Consulting Solutions Inc., (tcrimi@sympatico.ca), representing North American Insulation Manufacturers Association (NAIMA)

Revise as follows:

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of ~~structural~~ secondary members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members. Fire protection is still required for structural members forming part of the *primary structural frame.*

(Portions of Table and footnotes not shown remain unchanged)

Reason: Table 601 Fire Resistance Rating Requirements for Building Elements specifies the hourly fire resistive requirements for building elements such as structural framing, floor and roof construction, and walls and partitions. Note b of Table 601 applies to the construction of the roof and related secondary members in all types of construction. It allows these secondary elements to be exempted from being protected construction when all parts of the roof construction are more than 20 feet (6096 mm) above any floor below. Previous editions of the IBC more clearly differentiated between structural members and the structural frame. The 2003 and 2006 IBC specified that the structural frame is considered to be the columns and the girders, beams, trusses, and spandrels having direct connections to the columns and bracing members designed to carry gravity loads. The members of floor or roof panels which have no connection to the columns were intended to be considered secondary members and not part of the structural frame.

The proposed addition clarifies that this exception applies to the structural members, but does not apply to all parts of the structural frame. This distinction is frequently misinterpreted in the field and many times the structural frame is also allowed to be eliminated. The 2009 IBC Commentary clearly confirms that this only applies to the secondary members of the structure and not to primary structural frame located within the roof or at this roof level, as shown in Figure 601(1) of the 2009 International Building Code, Code and Commentary, Volume 1, page 6-3. This alternative is applicable for all occupancy classifications except Groups F-1, H, M and S-1.

Figure 601(2) of the 2009 International Building Code, Code and Commentary, Volume 1, page 6-4.shows an example where a mezzanine reduces the clearance to the roof to less than 20 feet (6096 mm) for a portion of the total roof. The Code Commentary clearly illustrates that designs similar to Figure 601(2) do not comply with note b, and elimination of fire-resistance is not allowed for any of the roof in these cases.

According to the 2012 IBC, by definition, the primary structural frame includes the columns; structural members having direct connections to the columns, including girders, beams, trusses and spandrels; members of the floor construction and roof construction having direct connections to the columns; and bracing members that are essential to the vertical stability of the primary structural frame under gravity loading shall be considered part of the primary structural frame whether or not the bracing member carries gravity loads.

Cost Impact: This proposal does not increase the cost of construction.

T601-G-CRIMI.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal was disapproved as it is the intent of the footnote to allow all structural members to be unprotected. This proposal would only exempt the secondary members.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Dave Dratnol, Isolatek International, requests Approval as Submitted.

Commenter's Reason: Primary Structural Frames are the main load-carrying structural steel components. They represent an assemblage of rafters and columns that support the secondary framing members and transfer loads directly to the foundation. According to the 2012 IBC, by definition, the primary structural frame includes the columns; structural members having direct connections to the columns, including girders, beams, trusses and spandrels; members of the floor construction and roof construction having direct connections to the columns; and bracing members that are essential to the vertical stability of the primary structural frame under gravity loading shall be considered part of the primary structural frame whether or not the bracing member carries gravity loads.

On the other hand, Secondary Framing Members are the structural members which carry loads to the primary framing members. They consist of eave members, roof purlins, wind struts, wind bracing, wall girts and other miscellaneous structural framing and are either welded built-up sections, cold-formed light gage shapes, and/or hot-rolled shapes. Secondary Framing: Members carry loads from the building surface to the main framing

The proposed addition clarifies that the exception in Note b of Table 601 applies to the construction of the roof and related secondary members applies to the structural members, but does not apply to all parts of the structural frame. This distinction is frequently misinterpreted in the field and the structural frame is also allowed to be unprotected. The columns supporting the roof systems are clearly part of the primary structural frame. The exception applies only to cases where "... the roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below." The columns, and all of the primary structural frame members will never, by definition, be in this condition.

`The 2009 IBC Commentary clearly confirms that this only applies to the secondary members of the structure and not to primary structural frame located within the roof or at this roof level, as shown in Figure 601(1) of the 2009 International Building Code, Code and Commentary, Volume 1, page 6-3. This alternative is applicable for all occupancy classifications except Groups F-1, H, M and S-1.

Figure 601(2) of the 2009 International Building Code, Code and Commentary, Volume 1, page 6-4.shows an example where a mezzanine reduces the clearance to the roof to less than 20 feet (6096 mm) for a portion of the total roof. The Code Commentary clearly illustrates that designs similar to Figure 601(2) do not comply with note b, and elimination of fire-resistance is not allowed for any of the roof in these cases.

G139-12

Final Action: AS AM AMPC____ D

G140-12
Table 601

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering, (al.godwin@aon.com)

Revise as follows:

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A~~[d]~~	B	A~~[d]~~	B	HT	A~~[d]~~	B
Primary structural frame[g] (see Section 202)	3[a]	2[a]	1	0	1	0	HT	1	0
Bearing walls Exterior[f, g] Interior	 3 3[a]	 2 2[a]	 1 1	 0 0	 2 1	 2 0	 2 1/HT	 1 1	 0 0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interior[e]	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction and associated secondary members (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and associated secondary members (see Section 202)	1½[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	HT	1[b,c]	0

For SI: 1 foot = 304.8 mm.

~~d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.~~

(Portions of text not shown remain unchanged)

Reason: In order to take advantage of this footnote, the sprinkler system must be "not otherwise required." The question is "required by what section?"

Obviously, it is known that if you take extra square footage or extra height and stories, the 1-hour tradeoff is not permitted.

And, it can be assumed that if the sprinkler system is installed to comply with the Fire Area provisions of Section 903, the system is required.

However, take note of Section 901.2 which states "Any fire protection system for which an exception or reduction to the provisions of this code has been granted shall be considered to be a required system." Thus, if any of the following items are applied, the system is a required system:

Flame spread reduction
Extra travel distance
Extra common path of egress travel
Corridor fire rating reduction
Dead end corridor extensions
Open stairs in sprinklered two story buildings
Etc.

The IBC commentary, Section 901.2, states:

"For example, a typical small office building may not require an automatic sprinkler system solely due to its Group B occupancy classification; however, if an exit access corridor fire-resistance-rating reduction is taken in accordance with Table 1018.1 for buildings equipped throughout with an NFPA 13 sprinkler system, that sprinkler system would be considered a required system."

When looking at Table 503, how many buildings that are large enough to be a Type VA, IIIA or IIA and are not already required to be sprinklered by another provision of the code. Group B occupancies are the most obvious exempted occupancy.

And, if there is a building that is a VA, IIIA or IIA without being sprinklered, who is going to sprinkler a building and not take a sprinkler reduction as listed above.

Allowing this footnote to continue to exist opens the door to misuse. Sprinkler exceptions and reductions are going to be taken along with the 1-hour reduction, in violation of the provision. If not now, perhaps 5 years from now when the jurisdiction forgets that a 1-hour reduction was granted.

There is no need to allow this footnote to continue to exist.

Cost Impact: This code change proposal will not increase the cost of construction since those projects that are taking one-hour reduction along with non-allowed trade-offs are non-compliant anyway.

T601-G-GODWIN.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved as it removes an unnecessary level of complication in the code that restricts the use of sprinkler tradeoffs throughout the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., City of San Diego, representing City of San Diego Development Services Department, requests Disapproval.

Commenter's Reason: The General Committee approved this code change submitted by AON Fire Protection. We are submitting this public comment to urge disapproval of the code change.

Footnote d to Table 601 existed in many legacy codes and served as the basis of approval for the type of construction of certain small or moderately sized buildings typically residential multifamily buildings three stories in height and certain group B office buildings. The proponent's reason for the change is that the IBC requires fire sprinkler protection for most new buildings and therefore the footnote is not necessary. Furthermore the proponent's statement reason indicates a concern over misapplication of the footnote with the table. We would suggest it would be more appropriate to correct the code rather than to delete this requirement.

An issue has been raised about record keeping preventing future changes of occupancy, alterations and additions from using the sprinklers when required throughout the building even though they had been used for the sprinkler substitution.

BC Section 111.2 requires that the Building Official identify the type of construction on the certificate of occupancy as well as "Any special stipulations and conditions of the building permit".

Some speakers in support of the code change indicated the lack of records in their jurisdictions to keep track of this limitation. We have had systems in place for more than 30 years and do identify the reasons fire sprinklers are required both on the approved plans and the permit.

We spoke during the code development hearing of the need to retain this code change to allow limited enlargements to existing buildings without requiring an addition causing the entire building to be upgraded to one-hour construction, for example enclosing an occupied roof deck adjacent to a unit or the addition of a laundry room to a building or perhaps covered parking to office building.

G140-12

Final Action: AS AM AMPC____ D

G141-12
602.4, Table 602.4

Proposed Change as Submitted

Proponent: Sam Francis, American Wood Council (sfrancis@awc.org)

Revise as follows:

602.4 Type IV. Type IV construction (Heavy Timber, HT) is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces. The details of Type IV construction shall comply with the provisions of this section. *Fire-retardant-treated wood* framing complying with Section 2303.2 shall be permitted within exterior wall assemblies with a 2-hour rating or less. Minimum solid sawn nominal dimensions are required for structures built using Type IV construction (HT). For glued laminated members and Structural Composite Lumber (SCL) members, the equivalent net finished width and depths corresponding to the minimum nominal width and depths of solid sawn lumber are required as specified in Table 602.4.

TABLE 602.4
WOOD MEMBER SIZE EQUIVALENCIES

MINIMUM NOMINAL SOLID SAWN SIZE		MINIMUM GLUED-LAMINATED NET SIZE		MINIMUM STRUCTURAL COMPOSITE LUMBER NET SIZE	
Width, inch	Depth, inch	Width, inch	Depth, inch	Width, inch	Depth, inch
8	8	6¾	8¼	7	7½
6	10	5	10½	5¼	9½
6	8	5	8¼	5¼	7½
6	6	5	6	5¼	5½
4	6	3	6⅞	3½	5½

Reason: Along with large solid-sawn and glued-laminated timbers, Structural Composite Lumber (SCL) can be produced in sizes necessary to qualify for Heavy Timber construction. Net dimensions of typical SCL members are similar to the net dimensions of nominal solid sawn timbers; however, the minimum width dimensions are slightly less than solid sawn timber widths and slightly greater than the glued-laminated timber net widths. In order to estimate equivalent cross-sectional dimensions, the initial section properties of the solid-sawn and glued-laminated timbers were compared with initial section properties of SCL. Starting with common SCL net widths between solid-sawn and glued-laminated timber net widths, minimum net depths were estimated for each nominal heavy timber size to provide similar net section properties. The resulting net dimensions were then incorporated into Table 602.4.

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

602.4 #1-G-FRANCIS

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the need for more fire test data on the performance of composite lumber.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Sam Francis, American Wood Council, requests Approval as Submitted.

Commenter's Reason: The American Wood Council urges the membership to approve this proposal AS SUBMITTED.

Much of the discussion of this proposal focused on the "lack of fire test data" for the product. Lost in the discussion is the fundamental principle of heavy timber performance: its protection from loss of strength by the development of a char layer during pyrolysis. Structural Composite Lumber (SCL) is of large section similar to sections of heavy timber (HT). SCL becomes insulated in the same manner as HT during pyrolysis. Therefore, it should be sufficient to demonstrate that wood species have the same **char rate** when manufactured into SCL as they have when manufactured into HT. To that end, the data for individual species are available at the website: http://www.awc.org/Code-Officials/2012-IBC-Challenges.

One of the other concerns was that adhesive might contribute to, or alter, the char rate of wood. The standard for SCL includes the requirement that the adhesives used to manufacture SCL meet the same as elevated temperature performance requirements as adhesives used to manufacture glued laminated timber. Glued laminated timber is included in the Heavy Timber definition.

USDA Forest Products Laboratory Research Paper FPL-RP- 633 reviewed the adhesive's impact on the char rate of another family of large-section composite wood products, Structural Composite Lumber (SCL). The following is an extract of their conclusion:

"In this study, we tested 14 structural composite lumber products to determine the char rate when exposed to the fire exposure of the standard fire resistance test. Products tested included LSL, LVL, and PSL. Products of five different species were tested. Based on the small vertical-furnace tests, we concluded that the char rates for composite lumber products were comparable to those of solid-sawn lumber and within the range previously found for different species of solid-sawn lumber."

The full text of this report is available via the website link above.

The char rate of wood is the characteristic which gives heavy timber is performance when exposed to fire. The char rate of Structural Composite Lumber has been shown to be within the range of that of solid sawn lumber. Therefore, it is appropriate to include comparable sizes of SCL in the heavy timber section.

G141-12

Final Action: AS AM AMPC____ D

G142-12, PART I

PART 1 – IBC GENERAL

602.4, 602.4.1 (NEW), 602.4.2 (NEW), 602.4.4, 602.4.6.2 (NEW), 602.4.5, 602.4.6, 602.4.8.1, 602.4.8.2 (NEW)

Proposed Change as Submitted

Proponent: Sam Francis, American Wood Council (sfrancis@awc.org)

THIS IS A 2 PART CODE CHANGE. THE FIRST PART WILL BE HEARD BY THE IBC GENERAL COMMITTEE AND THE SECOND BY THE IBC STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

PART I – IBC GENERAL

Revise as follows:

602.4 Type IV. Type IV construction (Heavy Timber, HT) is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces. The details of Type IV construction shall comply with the provisions of this section. ~~Fire retardant treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies with a 2-hour rating or less.~~ Exterior walls complying with Section 602.4.1 or 602.4.2 shall also be permitted. Minimum solid sawn nominal dimensions are required for structures built using Type IV construction (HT). For glued-laminated members the equivalent net finished width and depths corresponding to the minimum nominal width and depths of solid sawn lumber are required as specified in Table 602.4. *Cross laminated timber* (CLT) dimensions used in this section are actual dimensions.

602.4.1 *Fire-retardant-treated wood* framing complying with Section 2303.2 shall be permitted within exterior wall assemblies with a 2-hour rating or less.

602.4.2 *Cross-laminated timber* complying with Section 2303.1.4 shall be permitted within exterior wall assemblies with a 2-hour rating or less, provided the exterior surface of the cross-laminated timber is protected *by (1) fire retardant treated wood* sheathing complying with 2303.2 and not less than 15/32 inch thick; or (2) *gypsum board* not less than ½ inch thick; or (3) a noncombustible material.

~~602.4.1~~ **602.4.3 Columns.** Wood columns shall be sawn or glued laminated and shall be not less than 8 inches (203 mm), nominal, in any dimension where supporting floor loads and not less than 6 inches (152 mm) nominal in width and not less than 8 inches (203 mm) nominal in depth where supporting roof and ceiling loads only. Columns shall be continuous or superimposed and connected in an approved manner.

~~602.4.2~~ **602.4.4 Floor framing**. Wood beams and girders shall be of sawn, or glued-laminated *timber* and shall be not less than 6 inches (152 mm) nominal in width and not less than 10 inches (254 mm) nominal in depth. Framed sawn, glued-laminated *timber* arches, which spring from the floor line and support floor loads, shall be not less than 8 inches (203 mm) nominal in any dimension. Framed timber trusses supporting floor loads shall have members of not less than 8 inches (203 mm) nominal in any dimension.

~~602.4.3~~ **602.4.5 Roof framing**. Wood-frame or glued-laminated arches for roof construction, which spring from the floor line or from grade and do not support floor loads, shall have members not less than 6 inches (152 mm) nominal in width and have not less than 8 inches (203 mm) nominal in depth for the lower half of the height and not less than 6 inches (152 mm) nominal in depth for the upper half. Framed or glued-laminated arches for roof construction that spring from the top of walls or wall abutments, framed timber trusses and other roof framing, which do not support floor loads, shall have members not less than 4 inches (102 mm) nominal in width and not less than 6 inches (152 mm) nominal in depth. Spaced members shall be permitted to be composed of two or more pieces not less than 3 inches (76 mm) nominal in thickness where blocked solidly throughout their intervening spaces or where spaces are tightly closed by a continuous wood cover plate of not less than 2 inches (51 mm) nominal in thickness secured to the underside of the members. Splice plates shall be not less than 3 inches (76 mm) nominal in thickness. Where protected by approved automatic sprinklers under the roof deck, framing members shall be not less than 3 inches (76 mm) nominal in width.

~~602.4.4~~ 602.4.6 Floors. Floors shall be without concealed spaces. Wood floors shall be constructed in accordance with 602.4.6.1 or 602.4.6.2.

602.4.6.1 Sawn or glued-laminated planks. ~~of~~ ~~s~~Sawn or glued-laminated planks, splined or tongue-and-groove, of not less than 3 inches (76 mm) nominal in thickness covered with 1-inch (25 mm) nominal dimension tongue-and-groove flooring, laid crosswise or diagonally, or 0.5-inch (12.7 mm) particleboard or planks not less than 4 inches (102 mm) nominal in width set on edge close together and well spiked and covered with 1-inch (25 mm) nominal dimension flooring or 15/32-inch (12 mm) wood structural panel or 0.5-inch (12.7 mm) particleboard. The lumber shall be laid so that no continuous line of joints will occur except at points of support. Floors shall not extend closer than 0.5 inch (12.7 mm) to walls. Such 0.5-inch (12.7 mm) space shall be covered by a molding fastened to the wall and so arranged that it will not obstruct the swelling or shrinkage movements of the floor. Corbelling of masonry walls under the floor shall be permitted to be used in place of molding.

602.4.6.2 CLT. *Cross laminated timber* shall be not less than 4 inches (102 mm) in thickness. It shall be continuous from support to support and mechanically fastened to one another. *Cross laminated timber* shall be permitted to be connected to walls without a shrinkage gap providing swelling or shrinking is considered in the design. Corbelling of masonry walls under the floor shall be permitted to be used.

~~602.4.5~~ 602.4.7 Roofs. Roofs shall be without concealed spaces and wood roof decks shall be sawn or glued laminated, splined or tongue-and-groove plank, not less than 2 inches (51 mm) nominal in thickness~~,~~; 11/8-inch-thick (32 mm) wood structural panel (exterior glue)~~, or of~~; planks not less than 3 inches (76 mm) nominal in width, set on edge close together and laid as required for floors~~.~~; or of cross laminated timber. Other types of decking shall be permitted to be used if providing equivalent fire resistance and structural properties

Cross laminated timber roofs shall be not less than 3 inch nominal in thickness and shall be continuous from support to support and mechanically fastened to one another.

~~602.4.6~~ 602.4.8 Partitions and Walls. Partitions and walls shall comply with 602.4.8.1 or 602.4.8.2.

602.4.8.1 Interior Walls and Partitions. Interior walls and partitions shall be of solid wood construction formed by not less than two layers of 1-inch (25 mm) matched boards or laminated construction 4 inches (102 mm) thick, or of 1-hour fire-resistance-rated construction.

602.4.8.2 Exterior walls. All exterior walls shall be of one of the following:

1. Noncombustible materials; or
2. Not less than 6 inches in thickness and constructed of one of the following:
   2.1 *Fire retardant treated wood* in accordance with 2303.2 and complying with 602.4.1 or
   2.2. *Cross laminated timber* complying with 602.4.2.

~~602.4.7~~ 602.4.9 Exterior Structural Members. Where a horizontal separation of 20 feet (6096 mm) or more is provided, wood columns and arches conforming to heavy timber sizes shall be permitted to be used externally.

Reason: Cross-laminated timber (CLT) is a new technology developed in Europe. It is generally analogous to large section members currently associated with heavy timber in the current code. Its fire performance is most like that of glued-laminated beams, or glu-lams, in traditional Type IV (heavy timber) construction. Therefore it is proposed that the CLT be included in Type IV.

To properly accomplish this, this proposal adds a definition of CLT, adds a consensus-developed product standard and then modifies the text of Type IV to accommodate CLT.

In Item #1, the existing language is maintained but FRTW, currently allowed in walls of Type IV, is pulled out into a subset of nontraditional material permitted to be used in Type IV. CLT is then added as the second subset. This makes it clear that this mode of construction performs like Heavy Timber but is constructed with different techniques. Walls are more like "tilt-up slabs" than HT beams but their fire performance is very similar to HT. Floors are more like slabs but again, their fire performance is similar to HT.

No changes are needed to the sections on columns, floor framing or roof framing because CLT is neither used as a "column" nor a "framing material". Cross-laminated timber is a large, thick panel composed of crosswise layers of dimension lumber bound with a structural adhesive.

In Section 602.4.4-Floors, the existing language is pulled down into a subparagraph and is unchanged. CLT floors are slightly different than HT so it is put into a second subparagraph with its own requirements. Among the differences is thickness (CLT=4 inches; HT=3 inches topped with a sheathing). Finally, the section is renumbered to accommodate the inserted subsections on general requirements.

In Section 602.4.5-Roofs, the existing language is pulled down, unchanged, into a subparagraph. CLT is again included as a subparagraph. Again the numbering is changed.

In Section 602.4.6-floors, CLT is added as an explicitly permitted form of floor decking. Traditional HT floor decks are 3" or 4" thick planks with various sheathings. Unlike the traditional plank decking, the CLT alternate has no joints to protect. Therefore no sheathing is required on top of the CLT. The structure of the section does not, however, prohibit the use of sheathing on top of a CLT floor deck.

In Section 602.4.7-roofs, CLT is added as an explicitly permitted form of roof decking.

In Section 602.4.8-walls, CLT is added as an acceptable wall system. For interior walls, it is already compliant as an element of solid wood construction meeting the traditional minimum dimensions. This section was modified to break out exterior walls separately so as to correlate with the base paragraph, 602.4 and its CLT subsection, 602.4.2. This eliminates any confusion which might arise between the two sections. By separating the interior and exterior walls, the new minimum wall thickness requirement associated with CLT may be interpreted to apply to all exterior wall construction, including traditional construction. However, it is observed that all common forms of exterior wall construction of Type IV would easily comply with this requirement.

The remaining items are necessary to include the product standard for CLT and a definition for the product. These items form the basis for the inclusion in Chapter 6 and give clarity to this new type of wood construction.

More information on the cross-laminated timber product can be found at our website, www.AWC.org.

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

Analysis: A review of the standard proposed for inclusion in the code, ANSI/APA PRG 320-2011 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

602.4 #2-G-FRANCIS

Public Hearing Results

Part I of this proposal was heard by the IBC General Code Development Committee.

For staff analysis of the content of ANSI/APA PRG 320-2011 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

PART I – IBC GENERAL
Committee Action: Disapproved

Committee Reason: The proposal was disapproved based upon the need for fire test data on the performance of cross laminated lumber.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Sam Francis, American Wood Council, requests Approval as Submitted.

Commenter's Reason: The American Wood Council urges the membership to approve Part 1 of this proposal As Submitted.

Testimony during the Code Development hearing on this proposal focused on the "lack of fire test data" of Cross Laminated Timber (CLT). This was also the reason given by the Code Development Committee in recommending disapproval, so recent fire test data on CLT is being provided to the membership for their consideration. Fire test data is one important consideration in approving this change. A fundamental attribute of heavy timber building fire performance is the time it takes for large sections to lose strength during fire exposure. The char layer created during pyrolysis of the wood protects and insulates the underlying fiber and allows the heavy timber to retain its structural load carrying capacity. Cross Laminated Timber (CLT) has similar characteristics as heavy timber, including large section properties. CLT is insulated in the same manner as HT during pyrolysis. Therefore, it should be sufficient to demonstrate that wood species have the same **char rate** when manufactured into CLT as they have when manufactured into heavy timber. To that end, the data for individual species are available at the webpage: http://www.awc.org/Code-Officials/2012-IBC-Challenges. Other information regarding CLT is also posted to the website.

One of the other concerns expressed during the hearings was that adhesive might contribute to, or alter, the char rate of wood. The new standard for CLT, which has been recommended for approval by the ICC Structural Committee in S250-12, includes the requirement that the adhesives used to manufacture CLT meet the same elevated temperature performance requirements as adhesives used to manufacture structural composite lumber (SCL) and glued laminated timber. Glued laminated timber is included in the Heavy Timber definition.

Glued laminated timbers have historically been accepted as having similar char rates to solid sawn heavy timber. The basis for that conclusion has been a number of tests performed by various agencies showing the char rates to be similar and, therefore, affording the same protection for fire exposure within the member. Examples of this information are also available at the webpage provided above.

Finally, recent testing by FPInnovations in Canada has determined that CLT has similar char rates to solid sawn heavy timber. That research paper, entitled “Preliminary CLT Fire Resistance Testing Report” is also available at the webpage provide above. The average char rate for the seven CLT tests in which char rate was measured was determined to be 1.5 in./hr, the same average char rate as for solid wood and glued laminated timber.

G142, Part I-12

Final Action: AS AM AMPC____ D

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

PART II – IBC STRUCTURAL
202, 2303.1.4 (NEW), Chapter 35

Part II of this code change was heard by the IBC Structural code development committee.

PART II- IBC STRUCTURAL

Add new text as follows:

2303.1.4 Structural glued cross laminated timber. Cross-laminated timbers shall be manufactured and identified as required in ANSI/APA PRG 320-2011.

Add new standard to Chapter 35 as follows:

ANSI or APA
ANSI/APA PRG 320-2011 Standard for Performance-Rated Cross-Laminated Timber

Add new definition as follows:

CROSS-LAMINATED TIMBER. A prefabricated engineered wood product consisting of at least three layers of solid-sawn lumber or *structural composite lumber* where the adjacent layers are cross-oriented and bonded with structural adhesive to form a solid wood element.

PART II – IBC-STRUCTURAL
Committee Action: **Disapproved**

Committee Reason: This code change was disapproved in favor of S250-12.

Assembly Action: **None**

G145-12
603.1

Proposed Change as Submitted

Proponent: David Scott, Target (David.Scott@target.com)

Revise as follows:

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. through 25. *(no change)*
26. Wall construction of freezers and coolers of less than 1000 sq. ft. in size, lined on both sides with non combustible materials and the building is protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1

Reason: Item 6 allows for combustible materials such as doors, door frames, window sashes and frames. Item 11 allows partitions of wood panels or similar light construction up to 6 feet in height. In addition, freezer and cooler walls would need to meet finish requirements of Section 803 and 2603.

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

603.1-G-SCOTT.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The scale of this proposed exception is much larger than what is typically allowed by the exceptions. Also, the materials allowed to construct the interior of the walls were not clearly addressed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David Scott, Target Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1 through 25. *(no change)*

26. Wood framing within the ~~wall~~ construction of freezers and coolers with a floor area of less than 1000 square feet (92.9 m^2) ~~in size~~, lined on both sides with noncombustible materials and the building is ~~protected throughout~~ provided with an automatic sprinkler system in accordance with Section 903.3.1.1.

Commenter's Reason: The committee comments indicated it was not clearly identified what materials were intended or allowed in the wall construction. We have added Wood Framing to the language of the proposal to clarify the material usage within the wall construction of these panels. This also helps define or reduce the scale of the proposal, which was also a concern of the committee.

Also note that foam plastics that would be used within the construction of such panels would be controlled under Section 2603.

G145-12

Final Action: AS AM AMPC____ D

G146-12
1203.2

Proposed Change as Submitted

Proponent: Michael D. Fischer, Kellen Company, representing Asphalt Roofing Manufacturers Association

Revise as follows:

1203.2 Attic spaces. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilation openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. An airspace of not less than 1 inch (25 mm) shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/150th of the area of the space ventilated.

Exceptions:

1. The net free cross-ventilation area shall be permitted to be reduced to 1/300 provided ~~that not less than 50 percent and not more than 80 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents with the balance of the required *ventilation* provided by eave or cornice vents.~~ Both of the following conditions are met:
   1.1. In Climate Zones 6, 7 and 8, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
   1.2 At least 40 percent and not more than 50 percent of the required venting area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the *ventilation* provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.
2. ~~The net free cross-ventilation area shall be permitted to be reduced to 1/300 where a Class I or II vapor barrier is installed on the warm-in-winter side of the ceiling.~~
~~3~~2. ~~*Attic*~~ Ventilation of attic spaces under low slope roof assemblies shall not be required when determined not necessary by the *building official* due to atmospheric or climatic conditions.

Reason: There have been numerous changes to the attic ventilation requirements of the IBC and IRC during the past few code cycles. This proposal is offered to provide consistency with the ventilation requirements between the IBC and IRC and provide clarity regarding the placement of attic ventilators. Additionally, the added exception for local conditions was submitted to manage low-slope design issues; this proposal limits the use of that exception to such roof assemblies.

Cost Impact: This proposal will not raise the cost of construction.

1203.2-G-LSTIBUREK.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There was concern that the revision to item 3 was not properly justified based upon the fact that it was new section in the 2012 code. G147-12 provides the necessary revisions to be consistent with the IRC for attic ventilation.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Michael D. Fischer, Kellen Company, Asphalt Roofing Manufacturers' Association, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1203.2 Attic spaces. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilation openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. An air space of not less than 1 inch (25 mm) shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/150th of the area of the space ventilated. Ventilators shall be installed in accordance with manufacturer's installation instructions.

Exceptions:

1. The net free cross-ventilation area shall be permitted to be reduced to 1/300 provided both of the following conditions are met:
   1.1. In Climate Zones 6, 7 and 8, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
   1.2 At least 40 percent and not more than 50 percent of the required venting area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the *ventilation* provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.

~~2. Ventilation of attic spaces under low slope roof assemblies shall not be required when determined not necessary by the *building official* due to atmospheric or climatic conditions.~~

Commenter's Reason: Proposal G149, approved (with modification) by the committee, introduces new comprehensive provisions for unvented attics. These provisions include the application of insulation for moisture and condensation control, proper installation of vapor retarders, specific provisions for roof covering installation, and other climate specific requirements. The existing provision that allows a waiver of attic ventilation is now in conflict with these new provisions for unvented attic spaces. Without the removal of this text, there are three compliance paths:

1) Comply with the attic ventilation requirements in 1203.2,
2) Comply with the new requirements for unvented attic assemblies, or
3) Do nothing whatsoever, provided the code official will sign off on the project.

This last option would require the code official to waive the requirements for the control of moisture and condensation control on the basis of the code official's knowledge of meteorology. The provision does not allow the code official to evaluate the proposed materials, assemblies and installation methods, but simply to waive the requirement-regardless of construction-across the board based solely on the weather.

The new unvented attic provisions require airspaces above the deck when the roof covering is wood shingles or shakes. By disregarding the unvented attic provisions via a carte blanche waiver of ventilation requirements, the code official risks failure of the roof covering

Moisture control in attics is an issue in southern as well as northern climate zones. The recent trend to more reflective roof covering has resulted in an increase in reported moisture problems in roof assemblies. Cool roofs result in lower roof assembly temperatures, which reduce the normal drying cycles that can mitigate moisture intrusion from minor roof leaks. Numerous studies demonstrate the need to control condensation in roof assemblies where reflected roof systems are installed. Applicable research is available at:

Richard E. Norris, "Hygrothermal Analysis: The New Design Standard", *RCI Interface*, July, 2012.
Helene Hardy-Pierce, "Unintended Consequences! Keeping Alert to Protect Single-Ply Roofs," *RCI Interface*, February 2012.
Christian Bludau, Daniel Zirkelback, and Hartwig M. Kunzel, "Condensation Problems in Cool Roofs," *RCI Interface,* August 2009
Phil Dregger, "'Cool' Roofs Cause Condensation – Fact or Fiction?", *Western Roofing,* January-February 2012.
Iain Fairnington, "Reducing Condensation in the Roof Space," *RCI Interface*, September 2001.
http://www.ravcoalition.org/research.html

Analysis: This proposal is similar to G147-12 that was Approved as Modified. Consideration of the coordination of the proposals should be made.

G146-12

Final Action: AS AM AMPC____ D

G147-12
1203.2

Proposed Change as Submitted

Proponent: Joseph Lstiburek, Building Science Corporation, representing self

Revise as follows:

1203.2 Attic spaces. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilation openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. An airspace of not less than 1 inch (25 mm) shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/150th of the area of the space ventilated.

Exceptions:

1. The net free cross-ventilation area shall be permitted to be reduced to 1/300 provided ~~that not less than 50 percent and not more than 80 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents with the balance of the required *ventilation* provided by eave or cornice vents.~~ Both of the following conditions are met:
   1.1. In Climate Zones 6, 7 and 8, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
   1.2 At least 40 percent and not more than 50 percent of the required venting area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the *ventilation* provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.

~~2. The net free cross-ventilation area shall be permitted to be reduced to 1/300 where a Class I or II vapor barrier is installed on the warm-in-winter side of the ceiling.~~

~~3~~2. *Attic* ventilation shall not be required when determined not necessary by the *building official* due to atmospheric or climatic conditions.

Reason: This proposed language aligns the IBC with IRC R806.2. The current IBC vapor retarder language is incorrect as it violates the applicable physics in hot climates and needs to be changed. Finally, the current language regarding a 50 percent and 80 percent split between upper and lower vents violates the applicable physics and can lead to attic ventilation make up air being drawn from the building rather than from the eave or cornice vents.

Cost Impact: This proposal will not raise the cost of construction.

1203.2-G-LSTIBUREK.doc

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1203.2 Attic spaces. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilation openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. An airspace of not less than 1 inch (25 mm) shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/150th of the area of the space ventilated.

Exceptions:

1. The net free cross ventilation area shall be permitted to be reduced to 1/300 provided both of the following conditions are met:
   1.1. In Climate Zones 6, 7 and 8 <u>in accordance with the *International Energy Conservation Code*</u>, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
   1.2 At least 40 percent and not more than 50 percent of the required venting area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the *ventilation* provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.
2. *Attic* ventilation shall not be required when determined not necessary by the *building official* due to atmospheric or climatic conditions.

Committee Reason: This particular proposal aligns the IBC with the IRC. The modification was simply to indicate how the climate zones are determined as the IBC does not address climate zones.

Assembly Action: None

<u>Individual Consideration Agenda</u>

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

Public Comment:

Brenda A. Thompson, Clark County Development Services, Clark County Nevada, Sustainable/Energy/High Performance Code Action Committee, request Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1203.2 Attic spaces. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilation openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. An airspace of not less than 1 inch (25 mm) shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/150th of the area of the space ventilated.

Exceptions:

1. The net free cross ventilation area shall be permitted to be reduced to 1/300 provided both of the following conditions are met:
   1.1. In Climate Zones 6, 7 and 8 ~~in accordance with the *International Energy Conservation Code*~~, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
   1.2 At least 40 percent and not more than 50 percent of the required venting area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the *ventilation* provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.
2. *Attic* ventilation shall not be required when determined not necessary by the *building official* due to atmospheric or climatic conditions.

Add New Definition to Chapter 2:

<u>**CLIMATE ZONE.** A geographical region that have been assigned climatic criteria as specified in Chapters 3CE and 3RE of *the International Energy Conservation Code.*</u>

Commenter's Reason: This public comment is submitted by the ICC Sustainability Energy and High Performance Building Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the SEHPCAC has held 2 open meetings and over 15 workgroup calls which included members of the SEHPCAC as well as any interested party to discuss and debate proposed changes and public comments. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx.

There are increasing numbers of proposals in which the term 'climate zone' is used in the proposed code test. Just this year at least 8 proposals heard in Dallas included the term. Three of the proposals were approved or approved as modified. Specifically G147 and G149, were approved as modified in order to provide a reference to the IECC to help the code user know where climate zones are 'defined'. The issue is that 'climate zones' are established in the IECC, but there is no definition.

The goal of this public comment and that submitted to G149 is to establish a definition of climate zone in the IBC to simplify individual references to climate zones. In Cycle B, the SEHPCAC will be submitting a code change to the IECC to add a definition of Climate Zone. In Cycle C, the SEHPCAC will submit a code change to the IgCC to add a definition of Climate zone. This will allow all future references to climate zone to be simple and not have to say "as established in the International Energy Conservation Code.

G147-12

Final Action: AS AM AMPC____ D

G149-12
202, 1203.2, 1203.3 (New), Table 1203.2 (New)

Proposed Change as Submitted

Proponent: Joseph Lstiburek, Building Science Corporation, representing self (joe@buildingscinece.com)

Revise as follows:

1203.2 ~~Attic spaces.~~ Ventilation required. *(No change to body of text)*

1203.3 Unvented attic and unvented enclosed rafter assemblies. Unvented *attic* assemblies (spaces between the ceiling joists of the top *story* and the roof rafters) and unvented enclosed rafter assemblies (spaces between ceilings that are applied directly to the underside of roof framing members/rafters and the structural roof sheathing at the top of the roof framing members/rafters) shall be permitted where all the following conditions are met:

1. The unvented attic space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side (*attic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed rafter assembly.
3. Where wood shingles or shakes are used, a minimum 1/4 inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.
4. In climate zones 5, 6, 7 and 8, any air-impermeable insulation shall be a Class II vapor retarder, or shall have a Class III vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Either items 5.1 5.2 or 5.3 shall be met, depending on the air permeablity of the insulation directly under the structural roof sheathing.
    - 5.1. Air-impermeable insulation only. Insulation shall be applied in direct contact with the underside of the structural roof sheathing.
    - 5.2. Air-permeable insulation only. In addition to the *air-permeable insulation* installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing as specified in Table 1203.3 for condensation control.
    - 5.3. Air-impermeable and air-permeable insulation. The *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing as specified in Table 1203.3 for condensation control. The air-permeable insulation shall be installed directly under the *air-impermeable insulation*.
    - 5.4. Where preformed insulation board is used as the *air-impermeable insulation* layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.
6. This section does not apply to special use structures or enclosures such as swimming pool enclosures, data processing centers, hospitals, art galleries, or enclosures in climate zones 5 or higher that are humidified beyond 35 percent during the three coldest months.

TABLE 1203.3
INSULATION FOR CONDENSATION CONTROL

CLIMATE ZONE	MINIMUM RIGID BOARD ON AIR-IMPERMEABLE INSULATION R-VALUE[a,b]
2B and 3B tile roof only	0 (none required)
1, 2A, 2B, 3A, 3B, 3C	R-5
4C	R-10
4A, 4B	R-15
5	R-20
6	R-25

CLIMATE ZONE	MINIMUM RIGID BOARD ON AIR-IMPERMEABLE INSULATION R-VALUE[a,b]
7	R-30
8	R-35

a. Contributes to, but does not supersede thermal resistance requirements for attic and roof assemblies in Section C402.2.1 of the *International Energy Conservation Code*.

b. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45 degrees F (7 degrees C). For calculation purposes, an interior air temperature of 68 degrees F (20 degrees C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

Add new definition as follows:

AIR-IMPERMEABLE INSULATION. An insulation having an air permeance equal to or less than 0.02 l/s-m^2 at 75 pa pressure differential tested according to ASTM E 2178 or E 283.

Reason: Unvented roof assemblies - both attic and cathedral ceiling - are a proven technology. They give the designer significant flexibility in locating mechanical equipment and ductwork inside of conditioned spaces thereby saving energy. They significantly improve the airtightness of the building enclosure thereby saving energy. They reduce wind uplift forces and reduce the risk of wildfire damage. They eliminate the problems associated with wind driven rain entering roof vents during hurricanes. The language in this proposed section is modeled on the existing language in the IRC Section 806.5. The "air-impermeable insulation" definition is the same as in the IRC.

Cost Impact: This proposal will not raise the cost of construction.

1203.3 (NEW)-G-LSTIBUREK.doc

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1203.3 Unvented attic and unvented enclosed rafter assemblies. Unvented *attic* assemblies (spaces between the ceiling joists of the top *story* and the roof rafters) and unvented enclosed rafter assemblies (spaces between ceilings that are applied directly to the underside of roof framing members/rafters and the structural roof sheathing at the top of the roof framing members/rafters) shall be permitted where all the following conditions are met:

1. The unvented attic space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side (*attic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed rafter assembly.
3. Where wood shingles or shakes are used, a minimum 1/4 inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.
4. In climate zones 5, 6, 7 and 8 in accordance with the *International Energy Conservation Code*, any air-impermeable insulation shall be a Class II vapor retarder, or shall have a ~~Class III~~ Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Either items 5.1 5.2 or 5.3 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.
   5.1. Air-impermeable insulation only. Insulation shall be applied in direct contact with the underside of the structural roof sheathing.
   5.2. Air-permeable insulation only. In addition to the *air-permeable insulation* installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing as specified in Table 1203.3 for condensation control.
   5.3. Air-impermeable and air-permeable insulation. The *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing as specified in Table 1203.3 for condensation control. The air-permeable insulation shall be installed directly under the *air-impermeable insulation*.
   5.4. Where preformed insulation board is used as the *air-impermeable insulation* layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.
6. This section does not apply to special use structures or enclosures such as swimming pool enclosures, data processing centers, hospitals, art galleries, or enclosures in climate zones 5 or higher that are humidified beyond 35 percent during the three coldest months.

(Portions of proposal not shown remain unchanged)

Committee Reason: The proposal makes the IBC consistent with the IRC for unvented attic and unvented rafter assemblies. The modification is consistent with the modification to G147-12 to clarify how to determine climate zones. Note the revision from class III to Class II was an errata but shown as part of the modification for convenience.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Joseph Lstiburek, Building Science Corporation and Steven R. Winkel, The Preview Group representing the American Institute of Architects, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1203.2 Attic spaces. Ventilation required. *(No change to body of text)*

1203.3 Unvented attic and unvented enclosed rafter assemblies. Unvented attics ~~assemblies (spaces between the ceiling joists of the top story and roof rafters)~~ and unvented enclosed roof framing ~~rafter~~ assemblies created by ~~(spaces between~~ ceilings ~~that are~~ applied directly to the underside of the roof framing members and structural roof sheathing applied directly to the top of the roof framing members ~~/rafters~~, shall be permitted where all the following conditions are met:

1. The unvented attic space is completely within the building thermal envelope.
2. No interior Class I vapor retarders are installed on the ceiling side (attic floor) of the unvented attic assembly or on the ceiling side of the unvented enclosed roof framing ~~rafter~~ assembly.
3. Where wood shingles or shakes are used, a minimum 1/4 inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.
4. In climate zones 5, 6, 7 and 8 in accordance with the *International Energy Conservation Code*, any air-impermeable insulation shall be a Class II vapor retarder, or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall be located in accordance with the following:

   5.1 ~~Either~~ Items ~~5.1 5.2 or 5.3~~ 5.1.1, 5.1.2 , 5.1.3, or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.

   5.1.1 Where only ~~A~~ air-impermeable insulation ~~only~~ is provided, the air-impermeable ~~I~~ insulation shall be applied in direct contact with the underside of the structural roof sheathing.

   5.1.2. Where ~~A~~ air-permeable insulation is provided inside the building thermal envelope, it shall be installed per Section 5.1. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the R values in ~~as specified in~~ Table 1203.3 for condensation control.

   5.1.3. Where both ~~A~~ air-impermeable and air-permeable insulation are provided~~. T~~ the air-impermeable insulation shall be applied in direct contact with the underside of the structural roof sheathing per Section 5.1.1 and shall be in accordance with the R values in ~~as specified in~~ Table 1203.3 for condensation control. The air-permeable insulation shall be installed directly under the air-impermeable insulation.

   5.1.4 Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45 degrees F (7 degrees C). For calculation purposes, an interior air temperature of 68 degrees F (20 degrees C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

   5.2~~4~~ Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

~~6.~~**Exceptions:**

1. Section 1203.3 ~~This section~~ does not apply to special use structures or enclosures such as swimming pool enclosures, data processing centers, hospitals, art galleries.
2. Section 1203.3 does not apply to enclosures in climate zones 5 through 8 ~~or higher~~ that are humidified beyond 35 percent during the three coldest months.

TABLE 1203.3
INSULATION FOR CONDENSATION CONTROL

CLIMATE ZONE	MINIMUM R-VALUE OF ~~RIGID BOARD ON~~ AIR-IMPERMEABLE INSULATION ~~R-VALUE~~ [a,b]
2B and 3B tile roof only	0 (none required)
1, 2A, 2B, 3A, 3B, 3C	R-5
4C	R-10
4A, 4B	R-15
5	R-20
6	R-25
7	R-30
8	R-35

a. Contributes to, but does not supersede thermal resistance requirements for attic and roof assemblies in Section C402.2.1 of the *International Energy Conservation Code*.

~~b. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45 degrees F (7 degrees C). For calculation purposes, an interior air temperature of 68 degrees F (20 degrees C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.~~

Add new definition as follows:

AIR-IMPERMEABLE INSULATION. An insulation having an air permeance equal to or less than 0.02 l/s-m^2 at 75 pa pressure differential tested according to ASTM E 2178 or E 283.

ATTIC. The space between the ceiling beams of the top story and the roof rafters.

Commenter's Reason: The proposed revisions are for readability and clarity only. There are no technical revisions proposed that differ from the revised version which was readily approved by the General Committee with only minor modifications. The language in the proposed section is modeled on the existing language and definitions in the IRC, with revisions to make them more readily enforceable for buildings built using the IBC. The footnote is moved into the body of Section 5.1 to make it easier to find and to clarify that it is an alternate means of compliance to the items listed above it.

Public Comment 2:

Brenda A. Thompson, Clark County Development Services, Clark County Nevada, Sustainable/Energy/High Performance Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1203.3 Unvented attic and unvented enclosed rafter assemblies. Unvented *attic* assemblies (spaces between the ceiling joists of the top *story* and the roof rafters) and unvented enclosed rafter assemblies (spaces between ceilings that are applied directly to the underside of roof framing members/rafters and the structural roof sheathing at the top of the roof framing members/rafters) shall be permitted where all the following conditions are met:

4. In climate zones 5, 6, 7 and 8 ~~in accordance with the *International Energy Conservation Code*~~, any air-impermeable insulation shall be a Class II vapor retarder, or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.

Add New Definition to Chapter 2:

CLIMATE ZONE. A geographical region that have been assigned climatic criteria as specified in Chapters 3CE and 3RE of *the International Energy Conservation Code.*

(Portions of the proposal not shown remain unchanged)

Commenter's Reason: This public comment is submitted by the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the SEHPCAC has held 2 open meetings and over 15 workgroup calls which included members of the SEHPCAC as well as any interested party to discuss and debate proposed changes and public comments. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx.

There are increasing numbers of proposals in which the term 'climate zone' is used in the proposed code test. Just this year at least 8 proposals heard in Dallas included the term. Three of the proposals were approved or approved as modified. Specifically G147 and G149, were approved as modified in order to provide a reference to the IECC to help the code user know where climate zones are 'defined'. The issue is that 'climate zones' are established in the IECC, but there is no definition.

The goal of this public comment and that submitted to G147 is to establish a definition of climate zone in the IBC to simplify individual references to climate zones. In Cycle B, the SEHPCAC will be submitting a code change to the IECC to add a definition of Climate Zone. In Cycle C, the SEHPCAC will submit a code change to the IgCC to add a definition of Climate zone.   This will allow all future references to climate zone to be simple and not have to say “as established in the International Energy Conservation Code.

G149-12
Final Action: AS AM AMPC____ D

G165-12
3002.4

Proposed Change as Submitted

Proponent: Steve Willis, County of Lancaster, South Carolina, representing Lancaster County Emergency Medical Services (swillis@lancastercountysc.net)

Revise as follows:

3002.4 Elevator car to accommodate ambulance stretcher. Where elevators are provided in buildings ~~four~~ two or more stories above grade plane or ~~four~~ two or more stories below grade plane, at least one elevator shall be provided for fire department emergency access to all floors. The elevator car shall be of such a size and arrangement to accommodate a 24-inch by 84-inch (610 mm by 1930 mm) ambulance stretcher in the horizontal, open position and shall be identified by the international symbol for emergency medical services (star of life). The symbol shall not be less than 3 inches (76 mm) high and shall be placed inside on both sides of the hoistway door frame.

Reason: Motorized/ mechanized gurneys are the norm these days. Along with medical gear, oxygen cylinders, etc. the use of stairs greatly extends the time it takes to reach/ remove a patient and can easily lead to injury of the paramedic. A suitable elevator allows the gurney and patient to be transported safely and quickly.

If additional information is needed from EMS for committee consideration, we will be happy to provide such.

Cost Impact: I would presume there would be some slight cost increase in construction for buildings of three stories or less; however, if planning on the proper size elevator from the beginning, this might not be the case.

3002.4-G-WILLIS

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was felt to be too excessive and would discourage the installation of elevators. This would be especially difficult on smaller buildings. A suggestion was made to potentially provide a minimum square footage before this provision was applicable.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Tim Annis and Adria Paesani, Davis Fire Department and Fountain Valley Fire Department, representing California Fire Chief's Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3002.4 Elevator car to accommodate ambulance stretcher. Where elevators are provided in buildings two or more stories above grade plane or two or more stories below grade plane, at least one elevator shall be provided for fire department emergency access to all floors. The elevator car shall be of such a size and arrangement to accommodate a 24-inch by 84-inch (610 mm by 1930 mm) ambulance stretcher in the horizontal, open position and shall be identified by the international symbol for emergency medical services (star of life). The symbol shall not be less than 3 inches (76 mm) high and shall be placed inside on both sides of the hoistway door frame.

Exception: Elevators shall not be required to accommodate stretchers under any of the following conditions:

1. Elevators in structures used only by maintenance and operating personnel.
2. Elevators in Group I-3 occupancies.
3. Elevators in buildings or structures where each landing is at a level of exit discharge or is accessible by ramp.
4. Where approved by the fire code official elevators in two-story buildings or structures containing stairways that will accommodate movement of a stretcher.
5. Where approved by the fire code official elevators in buildings or structures less than 4 stories.

Commenter's Reason: While some members of the Code Committee appreciated the issues first responders deal with when transporting a patient down multiple stories of a building, they were concerned that the lack of exceptions allowing for code official flexibility of enforcement could discourage the installation of elevators. By adding the exceptions, this allows the authority having jurisdiction a means to evaluate adequate elevator size for a patient to receive necessary care while being transported safely and quickly. The elevator size is based on the responding agency's resources and building design allowing the code official discretion in what an adequate sized elevator is for their own jurisdiction.

G165-12
Final Action: AS AM AMPC____ D

G168-12, Part I
PART 1 – INTERNATIONAL BUILDING CODE
Table 1607.1, 3004.2, 3006.1 through 3006.5, 3007.2, 3007.3.1, 3007.7.3, 3008.3.1, 3008.7.3, 3008.8, 3008.9.1

Proposed Change as Submitted

Proponent: Brian Black, BDSBlack Codes, Inc., representing National Elevator Industry Inc. (bdblack@neii.org)

THIS IS A 2 PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART I – INTERNATIONAL BUILDING CODE - GENERAL

Revise as follows:

3004.2 Location of vents. Vents shall be located at the top of the hoistway and shall open either directly to the outer air or through noncombustible ducts to the outer air. Noncombustible ducts shall be permitted to pass through ~~the~~ elevator machine rooms and control rooms, provided that portions of the ducts located outside the hoistway, ~~or~~ machine room, or control room are enclosed by construction having not less than the *fire-resistance rating* required for the hoistway. Holes in the machine room and control room floors for the passage of ropes, cables or other moving elevator equipment shall be limited as not to provide greater than 2 inches (51 mm) of clearance on all sides.

3006.1 Access. An *approved* means of access shall be provided to elevator machine rooms, control rooms, control spaces, and ~~overhead~~ machinery spaces.

3006.2 Venting. Elevator machine rooms, and machinery spaces that contain the driving machine, and control rooms or control spaces that contain the operation or motion controller, ~~solid state equipment~~ for elevator operation shall be provided with an independent *ventilation* or air-conditioning system to protect against the overheating of the electrical equipment. The system shall be capable of maintaining temperatures within the range established for the elevator equipment.

3006.3 Pressurization. The elevator machine room, control rooms, or control space with openings into ~~serving~~ a pressurized elevator hoistway shall be pressurized upon activation of a *heat or smoke detector* located in the elevator machine room, control room, or control space.

3006.4 Machine rooms, control rooms ~~and~~ machinery spaces, and control spaces. Elevator machine rooms, control rooms, control spaces, and machinery outside of but attached to a hoistway that have openings into the hoistway spaces shall be enclosed with *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The *fire-resistance rating* shall be not less than the required rating of the hoistway enclosure served by the machinery. Openings in the *fire barriers* shall be protected with assemblies having a *fire protection rating* not less than that required for the hoistway enclosure doors.

Exceptions:

1. Where machine rooms, ~~and~~ machinery spaces, control rooms and control spaces do not abut and have no openings to the hoistway enclosure they serve the *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, shall be permitted to be reduced to a 1-hour *fire resistance rating*.
2. In buildings four *stories* or less above *grade plane* where machine room, ~~and~~ machinery spaces, control rooms and control spaces do not abut and have no openings to the hoistway

enclosure they serve, the machine rooms, ~~and~~ machinery spaces, control rooms and control spaces are not required to be fire-resistance rated.

3006.5 Shunt trip. Where elevator hoistways, ~~or~~ elevator machine rooms, control rooms and control spaces containing elevator ~~control~~ equipment are protected with automatic sprinklers, a means installed in accordance with NFPA 72, Section 6.16.4, Elevator Shutdown, shall be provided to disconnect automatically the main line power supply to the affected elevator prior to the application of water. This means shall not be self-resetting. The activation of sprinklers outside the hoistway, ~~or~~ machine room, machinery space, control room, or control spaces shall not disconnect the main line power supply.

3007.2 Phase I Emergency recall operation. Actuation of any building fire alarm initiating device shall initiate Phase I emergency recall operation on all fire service access elevators in accordance with the requirements in ASME A17.1/CSA B44. All other elevators shall remain in normal service unless Phase I emergency recall operation is manually initiated by a separate, required three-position key-operated “Fire Recall” switch or automatically initiated by the associated elevator lobby, hoistway, ~~or~~ elevator machine room, machinery space containing a motor controller or electric driving machine, control space, or control room *smoke detectors*. In addition, if the building also contains occupant evacuation elevators in accordance with Section 3008, an independent, three-position, key-operated “Fire Recall” switch conforming to the applicable requirements in ASME A17.1/CSA B44 shall be provided at the designated level for each fire service access elevator.

3007.3.1 Prohibited locations. Automatic sprinklers shall not be installed in elevator machine rooms, ~~elevator machine~~ machinery spaces, control rooms, control spaces, and elevator hoistways of fire service access elevators.

3007.7.3 Lobby doorways. Other than ~~the~~ door to the hoistway, each doorway to a fire service access elevator lobby shall be provided with a 3/4-hour *fire door assembly* complying with Section 716.5. The *fire door assembly* shall also comply with the smoke and draft control door assembly requirements of Section 716.5.3.1 with the UL 1784 test conducted without the artificial bottom seal.

3008.3.1 Prohibited locations. Automatic sprinklers shall not be installed in elevator machine rooms, ~~and elevator machine~~ machinery spaces, control rooms, control spaces, and elevator hoistways of for occupant evacuation elevators.

3008.7.3 Lobby doorways. Other than ~~the~~ doors to the hoistway, and elevator machine rooms, machinery spaces, control rooms, and control spaces within the lobby enclosure smoke barrier, each doorway to an occupant evacuation elevator lobby shall be provided with a 3/4-hour *fire door assembly* complying with Section 716.5. The *fire door assembly* shall also comply with the smoke and draft control assembly requirements of Section 716.5.3.1 with the UL 1784 test conducted without the artificial bottom seal.

3008.8 Elevator system monitoring. The occupant evacuation elevators shall be continuously monitored at the *fire command center* or a central control point *approved* by the fire department and arranged to display all of the following information:

1. Floor location of each elevator car.
2. Direction of travel of each elevator car.
3. Status of each elevator car with respect to whether it is occupied.
4. Status of normal power to the elevator equipment, elevator machinery and electrical apparatus ~~controller~~ cooling equipment where provided, ~~and~~ elevator machine room, control room and control space *ventilation* and cooling equipment.
5. Status of standby or emergency power system that provides backup power to the elevator equipment, elevator machinery and electrical ~~controller~~ cooling equipment where provided, ~~and~~ elevator machine room, control room and control space *ventilation* and cooling equipment.

6. Activation of any fire alarm initiating device in any elevator lobby, elevator machine room, ~~or~~ machine space containing a motor controller or electric driving machine, control space, control room, or elevator hoistway.

3008.9.1 Protection of wiring or cables. Wires or cables that are located outside of the elevator hoistway, ~~and~~ machine room, control room and control space and that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, *ventilation* and fire-detecting systems to fire service access elevators shall be protected by construction having a *fire-resistance rating* of not less than 2 hours, or shall be circuit integrity cable having a *fire resistance rating* of not less than 2 hours.

Exception: Wiring and cables to control signals are not required to be protected provided that wiring and cables do not serve Phase II emergency in-car operation.

Revise as follows:

1607.3 Uniform live loads. The live loads used in the design of buildings and other structures shall be the maximum loads expected by the intended use or occupancy but shall in no case be less than the minimum uniformly distributed live loads given in Table 1607.1.

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

OCCUPANCY OR USE	UNIFORM (psf)	Concentrated (lbs)
11. Elevator machine room and control room grating (on area of 2 inches by 2 inches)	--	300

(Portions of table not shown remain unchanged)

Reason: The ASME A17.1 *Safety Code for Elevators and Escalators* underwent a substantial revision in 2005 to incorporate requirements for Machine Room-Less elevators (MRLs). These provisions are in ASME A17.1-2007/CSA B44-07 with A17.1a-2008/CSA B44a-08 Addenda that is referenced in Chapter 35 of the 2012 IBC.
ASME A17.1 has definitions for elevator rooms and spaces that may contain various elevator apparatus, and has terminology for certain elevator electrical apparatus. Key concepts include:

- A room outside the hoistway with an elevator machine is a ***machine room***;
- A room or space outside the hoistway with a motor controller and not a machine is a ***control room*** or ***control space***;
- Where a machine and motor controller are located inside the hoistway, the hoistway is a ***machinery space***;
- Machinery and control spaces may have doors;
- Elevator controllers include the operation controller and motion controller that may be separated from the location of the elevator machine and be located in separate elevator rooms and spaces;
- Machine rooms and controls rooms are full body spaces with doors that may have room sprinklers and fire detection apparatus; control and machinery spaces typically would not;
- Machine rooms and control rooms typically require room ventilation and cooling, machinery and control spaces typically do not;
- Machinery spaces inside the hoistway are covered by the code's hoistway requirements;.
- Elevator machines and electrical apparatus in spaces other than the hoistway or rooms may require standby power for apparatus cooling equipment.

Thus, MRL design has resulted in elevators machines and controllers being located in rooms or spaces other than the traditional machine rooms regulated by the IBC. This code change simply harmonizes the current IBC text with the nomenclature now used in ASME A17.1/CSA B44 to ensure that the same level of protection is provided to MRLs as is provided for traditional elevators with machine rooms.

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

3004.2-G-BLACK.doc

Public Hearing Results

Both parts of this proposal were heard by the IBC General Code Development Committee.

PART I – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: Current terminology was felt appropriate therefore these revisions appeared unnecessary. There was also some concern as to how this change would correlate with G176-12 and G182-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3004.2 Location of vents. Vents shall be located at the top of the hoistway and shall open either directly to the outer air or through noncombustible ducts to the outer air. Noncombustible ducts shall be permitted to pass through ~~the~~ elevator machine room<u>s and control rooms</u>, provided that portions of the ducts located outside the hoistway<u>,</u> ~~or~~ machine room<u>, or control room</u> are enclosed by construction having not less than the *fire-resistance rating* required for the hoistway. Holes in the machine room<u> and control room</u> floors for the passage of ropes, cables or other moving elevator equipment shall be limited as not to provide greater than 2 inches (51 mm) of clearance on all sides.

Commenter's Reason: The original proposal was to make numerous editorial changes to the code to ensure that its requirements for "machine rooms" reflect the introduction of Machine Room Less (MRL) elevators in the referenced ASME A17.1-2007/CSA B44-07. Because this package was Disapproved in the hearings I am submitting each proposed change separately.

The ASME A17.1 *Safety Code for Elevators and Escalators* underwent a substantial revision in 2005 to incorporate requirements for Machine Room-Less elevators (MRLs). These provisions are in ASME A17.1-2007/CSA B44-07 with A17.1a-2008/CSA B44a-08 Addenda that is referenced in Chapter 35 of the 2012 IBC.

ASME A17.1 has definitions for elevator rooms and spaces that may contain various elevator apparatus, and has terminology for certain elevator electrical apparatus. Key concepts include:

- A room outside the hoistway with an elevator machine is a ***machine room***;
- A room or space outside the hoistway with a motor controller and not a machine is a ***control room*** or ***control space***;
- Where a machine and motor controller are located inside the hoistway, the hoistway is a ***machinery space***;
- Machinery and control spaces may have doors;
- Elevator controllers include the operation controller and motion controller that may be separated from the location of the elevator machine and be located in separate elevator rooms and spaces;
- Machine rooms and controls rooms are full body spaces with doors that may have room sprinklers and fire detection apparatus; control and machinery spaces typically would not;
- Machine rooms and control rooms typically require room ventilation and cooling, machinery and control spaces typically do not;
- Machinery spaces inside the hoistway are covered by the code's hoistway requirements;.
- Elevator machines and electrical apparatus in spaces other than the hoistway or rooms may require standby power for apparatus cooling equipment.

Thus, MRL design has resulted in elevators machines and controllers being located in rooms or spaces other than the traditional machine rooms regulated by the IBC. Noncombustible ducts should be permitted in control rooms that do not contain a machine, and holes in a control room floor should be regulated the same as holes located in a machine room floor.

Public Comment 2:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3006.1 Access. An *approved* means of access shall be provided to elevator machine rooms, control rooms, control spaces, and ~~overhead~~ machinery spaces.

Commenter's Reason: See Public Comment #1.

Public Comment 3:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3006.2 Venting. Elevator machine rooms, and machinery spaces that contain the driving machine, and control rooms or control spaces that contain the operation or motion controller, ~~solid state equipment~~ for elevator operation shall be provided with an independent *ventilation* or air-conditioning system to protect against the overheating of the electrical equipment. The system shall be capable of maintaining temperatures within the range established for the elevator equipment.

Commenter's Reason: See Public Comment #1.

Public Comment 4:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3006.3 Pressurization. The elevator machine room, control rooms, or control space with openings into ~~serving~~ a pressurized elevator hoistway shall be pressurized upon activation of a *heat or smoke detector* located in the elevator machine room, control room, or control space.

Commenter's Reason: See Public Comment #1.

Public Comment 5:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3006.4 Machine rooms, control rooms, ~~and~~ machinery spaces, and control spaces. Elevator machine rooms, control rooms, control spaces, and machinery spaces outside of but attached to a hoistway that have openings into the hoistway shall be enclosed with *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The *fire-resistance rating* shall be not less than the required rating of the hoistway enclosure served by the machinery. Openings in the *fire barriers* shall be protected with assemblies having a *fire protection rating* not less than that required for the hoistway enclosure doors.

Exceptions:

1. Where machine rooms, ~~and~~ machinery spaces, control rooms and control spaces do not abut and have no openings to the hoistway enclosure they serve the *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, shall be permitted to be reduced to a 1-hour *fire-resistance rating*.
2. In buildings four *stories* or less above *grade plane* where machine rooms, ~~and~~ machinery spaces, control rooms and control spaces do not abut and have no openings to the hoistway enclosure they serve, the machine rooms, ~~and~~ machinery spaces, control rooms and control spaces are not required to be fire-resistance rated.

Commenter's Reason: See Public Comment #1.

Public Comment 6:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3006.5 Shunt trip. Where elevator hoistways, ~~or~~ elevator machine rooms, control rooms or control spaces containing elevator ~~control~~ equipment are protected with automatic sprinklers, a means installed in accordance with NFPA 72, Section 6.16.4, Elevator Shutdown, shall be provided to disconnect automatically the main line power supply to the affected elevator prior to the application of water. This means shall not be self-resetting. The activation of sprinklers outside the hoistway, ~~or~~ machine room, machinery space, control room, or control space shall not disconnect the main line power supply.

Commenter's Reason: See Public Comment #1.

Public Comment 7:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3007.2 Phase I Emergency recall operation. Actuation of any building fire alarm-initiating device shall initiate Phase I emergency recall operation on all fire service access elevators in accordance with the requirements in ASME A17.1/CSA B44. All other elevators shall remain in normal service unless Phase I emergency recall operation is manually initiated by a separate, required three-position, key-operated "Fire Recall" switch or automatically initiated by the associated elevator lobby, hoistway, ~~or~~ elevator machine room, machinery space containing a motor controller or electric driving machine, control space, or control room *smoke detectors*. In addition, if the building also contains occupant evacuation elevators in accordance with Section 3008, an independent, three-position, key-operated "Fire Recall" switch conforming to the applicable requirements in ASME A17.1/CSA B44 shall be provided at the designated level for each fire service access elevator.

Commenter's Reason: See Public Comment #1.

Public Comment 8:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3007.3.1 Prohibited locations. Automatic sprinklers shall not be installed in elevator machine rooms, ~~elevator~~ machinery spaces, control rooms, control spaces, and elevator hoistways of fire service access elevators.

Commenter's Reason: See Public Comment #1.

Public Comment 9:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3008.3.1 Prohibited locations. Automatic sprinklers shall not be installed in elevator machine rooms, ~~and elevator~~ machinery spaces, control rooms, control spaces, and elevator hoistways of ~~for~~ occupant evacuation elevators.

Commenter's Reason: See Public Comment #1.

Public Comment 10:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3008.7.3 Lobby doorways. Other than ~~the~~ doors to the hoistway, and elevator machine rooms, machinery spaces, control rooms, and control spaces within the lobby enclosure smoke barrier, each doorway to an occupant evacuation elevator lobby shall be provided with a 3/4-hour *fire door assembly* complying with Section 716.5. The *fire door assembly* shall also comply with the smoke and draft control assembly requirements of Section 716.5.3.1 with the UL 1784 test conducted without the artificial bottom seal.

Commenter's Reason: See Public Comment #1.

Public Comment 11:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3008.8 Elevator system monitoring. The occupant evacuation elevators shall be continuously monitored at the *fire command center* or a central control point *approved* by the fire department and arranged to display all of the following information:

1. Floor location of each elevator car.
2. Direction of travel of each elevator car.
3. Status of each elevator car with respect to whether it is occupied.
4. Status of normal power to the elevator equipment, elevator machinery and electrical apparatus ~~controller~~ cooling equipment where provided, ~~and~~ elevator machine room, control room and control space *ventilation* and cooling equipment.
5. Status of standby or emergency power system that provides backup power to the elevator equipment, elevator machinery and electrical ~~controller~~ cooling equipment where provided, ~~and~~ elevator machine room, control room and control space *ventilation* and cooling equipment.
6. Activation of any fire alarm initiating device in any elevator lobby, elevator machine room, ~~or~~ machinery space containing a motor controller or electric driving machine, control space, control room or elevator hoistway.

Commenter's Reason: See Public Comment #1.

Public Comment 12:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3008.9.1 Protection of wiring or cables. Wires or cables that are located outside of the elevator hoistway, ~~and~~ machine room, control room and control space and that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, *ventilation* and fire-detecting systems to fire service access elevators shall be protected by construction having a *fire-resistance rating* of not less than 2 hours, or shall be circuit integrity cable having a *fire resistance rating* of not less than 2 hours.

> **Exception:** Wiring and cables to control signals are not required to be protected provided that wiring and cables do not serve Phase II emergency in-car operation.

Commenter's Reason: See Public Comment #1.

Public Comment 13:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1607.3 Uniform live loads. The live loads used in the design of buildings and other structures shall be the maximum loads expected by the intended use or occupancy but shall in no case be less than the minimum uniformly distributed live loads given in Table 1607.1.

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

OCCUPANCY OR USE	UNIFORM (psf)	Concentrated (lbs.)
11. Elevator machine room and control room grating (on area of 2 inches by 2 inches)	--	300

Commenter's Reason: See Public Comment #1.

Analysis: The original proponent of G168-12 Part I has submitted 11 public comments. While each public comment is indicated as a replacement of the original proposal, there is no change in the proposed wording between any public comment and the original proposal. The net effect of the 11 public comments is to allow the membership to vote on each piece of G168, Part I, individually. Any and all public comments approved by the membership will amend the specific section or sections of the code in each specific comment. Approval of any one public comment will not override the approval of changes found in another public comment.

G168-12
Final Action: AS AM AMPC____ D

G168-12, Part II

PART II – INTERNATIONAL FIRE CODE
IFC 903.3.1.1.1, 907.2.13.1.1, 911.1.5 (IBC [F] 903.3.1.1.1, [F] 907.2.13.1.1, [F] 911.1.5)

Proposed Change as Submitted

THIS IS A 2 PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART II – INTERNATIONAL FIRE CODE

Revise as follows:

IFC 903.3.1.1 (IBC [F] 903.3.1.1) NFPA 13 sprinkler systems. Where the provisions of this code require that a building or portion thereof be equipped throughout with an *automatic sprinkler system* in accordance with this section, sprinklers shall be installed throughout in accordance with NFPA 13 except as provided in Section 903.3.1.1.1.

IFC 903.3.1.1.1 (IBC [F] 903.3.1.1.1) Exempt locations. Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an *approved* automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from any room merely because it is damp, of fire-resistance-rated construction or contains electrical equipment.

1. Any room where the application of water, or flame and water, constitutes a serious life or fire hazard.
2. Any room or space where sprinklers are considered undesirable because of the nature of the contents, when *approved* by the fire code official.
3. Generator and transformer rooms separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a *fire-resistance rating* of not less than 2 hours.
4. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.
5. Fire service access elevator machine rooms and machinery spaces.
6. Machine rooms<u>,</u> ~~and~~ machinery spaces<u>, control rooms and control spaces</u> associated with occupant evacuation elevators designed in accordance with Section 3008.

IFC 907.2.13.1.1 (IBC [F] 907.2.13.1.1) Area smoke detection. Area smoke detectors shall be provided in accordance with this section. Smoke detectors shall be connected to an automatic fire alarm system. The activation of any detector required by this section shall activate the emergency voice/alarm communication system in accordance with Section 907.5.2.2. In addition to smoke detectors required by Sections 907.2.1 through 907.2.10, smoke detectors shall be located as follows:

1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room which is not provided with sprinkler protection.
2. In each elevator machine room<u>, machinery space, control room and control space</u> and in elevator lobbies.

IFC 911.1.5 (IBC [F] 911.1.5) Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

1. through 12. *(no change)*

13. An *approved* Building Information Card that contains, but is not limited to, the following information:
    13.1 *(no change)*

13.2 *(no change)*
13.3 *(no change)*
13.4. *Exit stair* information that includes: number of *exit stairs* in building, each *exit stair* designation and floors served, location where each *exit stair* discharges, *exit stairs* that are pressurized, *exit stairs* provided with emergency lighting, each *exit stair* that allows reentry, *exit stairs* providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve, location of elevator machine room~~s~~, control rooms, control spaces, location of sky lobby, location of freight elevator banks;
13.5 *(no change)*
13.6 *(no change)*
13.7 *(no change)*
14. through 18. *(no change)*

Reason: The ASME A17.1 *Safety Code for Elevators and Escalators* underwent a substantial revision in 2005 to incorporate requirements for Machine Room-Less elevators (MRLs). These provisions are in ASME A17.1-2007/CSA B44-07 with A17.1a-2008/CSA B44a-08 Addenda that is referenced in Chapter 35 of the 2012 IBC.
ASME A17.1 has definitions for elevator rooms and spaces that may contain various elevator apparatus, and has terminology for certain elevator electrical apparatus. Key concepts include:

- A room outside the hoistway with an elevator machine is a ***machine room***;
- A room or space outside the hoistway with a motor controller and not a machine is a ***control room*** or ***control space***;
- Where a machine and motor controller are located inside the hoistway, the hoistway is a ***machinery space***;
- Machinery and control spaces may have doors;
- Elevator controllers include the operation controller and motion controller that may be separated from the location of the elevator machine and be located in separate elevator rooms and spaces;
- Machine rooms and controls rooms are full body spaces with doors that may have room sprinklers and fire detection apparatus; control and machinery spaces typically would not;
- Machine rooms and control rooms typically require room ventilation and cooling, machinery and control spaces typically do not;
- Machinery spaces inside the hoistway are covered by the code's hoistway requirements;.
- Elevator machines and electrical apparatus in spaces other than the hoistway or rooms may require standby power for apparatus cooling equipment.

Thus, MRL design has resulted in elevators machines and controllers being located in rooms or spaces other than the traditional machine rooms regulated by the IBC. This code change simply harmonizes the current IBC text with the nomenclature now used in ASME A17.1/CSA B44 to ensure that the same level of protection is provided to MRLs as is provided for traditional elevators with machine rooms.

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

3004.2-G-BLACK.doc

Public Hearing Results

PART II – IFC
Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the action taken on G168-12 part I.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

903.3.1.1.1 Exempt locations. Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an *approved* automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from any room merely because it is damp, of fire-resistance-rated construction or contains electrical equipment.

1 through 5 – (*No change*)

6. Machine rooms, ~~and~~ machinery spaces, control rooms and control spaces associated with occupant evacuation elevators designed in accordance with Section 3008.

Commenter's Reason: The original proposal was to make numerous editorial changes to the code to ensure that its requirements for "machine rooms" reflect the introduction of Machine Room Less (MRL) elevators in the referenced ASME A17.1-2007/CSA B44-07. Because this package was Disapproved in the hearings I am submitting each proposed change separately.

The ASME A17.1 *Safety Code for Elevators and Escalators* underwent a substantial revision in 2005 to incorporate requirements for Machine Room-Less elevators (MRLs). These provisions are in ASME A17.1-2007/CSA B44-07 with A17.1a-2008/CSA B44a-08 Addenda that is referenced in Chapter 35 of the 2012 IBC.

ASME A17.1 has definitions for elevator rooms and spaces that may contain various elevator apparatus, and has terminology for certain elevator electrical apparatus. Key concepts include:

- A room outside the hoistway with an elevator machine is a ***machine room***;
- A room or space outside the hoistway with a motor controller and not a machine is a ***control room*** or ***control space***;
- Where a machine and motor controller are located inside the hoistway, the hoistway is a ***machinery space***;
- Machinery and control spaces may have doors;
- Elevator controllers include the operation controller and motion controller that may be separated from the location of the elevator machine and be located in separate elevator rooms and spaces;
- Machine rooms and controls rooms are full body spaces with doors that may have room sprinklers and fire detection apparatus; control and machinery spaces typically would not;
- Machine rooms and control rooms typically require room ventilation and cooling, machinery and control spaces typically do not;
- Machinery spaces inside the hoistway are covered by the code's hoistway requirements;.
- Elevator machines and electrical apparatus in spaces other than the hoistway or rooms may require standby power for apparatus cooling equipment.

Thus, MRL design has resulted in elevators machines and controllers being located in rooms or spaces other than the traditional machine rooms regulated by the IBC. This code change ensures that sprinklers are not included in control rooms or control spaces for MRLs used for occupant evacuation. This reflects the identical protection of controllers located in machine rooms required by the current code.

Public Comment 2:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

907.2.13.1.1 Area smoke detection. Area smoke detectors shall be provided in accordance with this section. Smoke detectors shall be connected to an automatic fire alarm system. The activation of any detector required by this section shall activate the emergency voice/alarm communication system in accordance with Section 907.5.2.2. In addition to smoke detectors required by Sections 907.2.1 through 907.2.10, smoke detectors shall be located as follows:

1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room which is not provided with sprinkler protection.
2. In each elevator machine room, machinery space, control room and control space and in elevator lobbies.

Commenter's Reason: See Public Comment #1

Public Comment 3:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

911.1.5 Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

1. through 12. *(no change)*

13. An *approved* Building Information Card that contains, but is not limited to, the following information:
    - 13.1 *(no change)*
    - 13.2 *(no change)*
    - 13.3 *(no change)*
    - 13.4. *Exit stair* information that includes: number of *exit stairs* in building, each *exit stair* designation and floors served, location where each *exit stair* discharges, *exit stairs* that are pressurized, *exit stairs* provided with emergency lighting, each *exit stair* that allows reentry, *exit stairs* providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve, location of elevator machine room~~s~~, control rooms, control spaces, location of sky lobby, location of freight elevator banks;
    - 13.5 *(no change)*
    - 13.6 *(no change)*
    - 13.7 *(no change)*

14. through 18. *(no change)*

Commenter's Reason: See Public Comment #1

Analysis: The original proponent of G168-12 Part II has submitted 3 public comments. While each public comment is indicated as a replacement of the original proposal, there is no change in the proposed wording between any public comment and the original proposal. The net effect of the 3 public comments is to allow the membership to vote on each piece of G168, Part II, individually. Any and all public comments approved by the membership will amend the specific section or sections of the code in each specific comment. Approval of any one public comment will not override the approval of changes found in another public comment.

G168-12

Final Action: AS AM AMPC____ D

G173-12
3007.2

Proposed Change as Submitted

Proponent: Brian Black, BDBlack Codes, Inc., representing National Elevator Industry Inc. (bdblack@neii.org)

Delete without substitution:

~~**3007.2 Phase I Emergency recall operation.** Actuation of any building fire alarm-initiating device shall initiate Phase I emergency recall operation on all fire service access elevators in accordance with the requirements in ASME A17.1/CSA B44. All other elevators shall remain in normal service unless Phase I emergency recall operation is manually initiated by a separate, required three-position, key-operated "Fire Recall" switch or automatically initiated by the associated elevator lobby, hoistway or elevator machine room *smoke detectors*. In addition, if the building also contains occupant evacuation elevators in accordance with Section 3008, an independent, three-position, key-operated "Fire Recall" switch conforming to the applicable requirements in ASME A17.1/CSA B44 shall be provided at the designated level for each fire service access elevator.~~

Reason: The first sentence makes no sense because ASME A17.1/CSA B44 requires Phase I emergency recall operation <u>only</u> when a fire alarm initiating device is activated in an elevator lobby, hoistway, or associated elevator machine room, machinery space containing a motor controller or electric driving machine, control space, or control room. The activation of any alarm initiating device in a building activating Phase I on any elevator does not comply with ASME A17.1/CSA B44.

Just as important, this activation of Phase I in a building equipped with Occupant Evacuation Elevators complying with Section 3008 would unnecessarily compromise the evacuation capacity of the elevator system for no good reason. The firefighters responding to a building fire can capture the fire service access elevators when they get there if it is needed.

With the deletion of the first sentence, none of the rest of this section is necessary as these functions are already addressed in ASME A17.1/CSA B44 or the Occupant Evacuation Elevator requirements of Section 3008.

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

3007.2-G-BLACK

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it was felt that the detailed provisions should remain in the IBC. There was a concern with dependence upon a standard that is not yet published.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc.; Dave Frable, U.S. General Services Administration, Public Buildings Service; requests Approval as Submitted.

Commenter's Reason (Black): The first sentence makes no sense because ASME A17.1/CSA B44 requires Phase I emergency recall operation <u>only</u> when a fire alarm initiating device is activated in an elevator lobby, hoistway, or associated elevator machine room, machinery space containing a motor controller or electric driving machine, control space, or control room. The activation of any alarm initiating device in a building activating Phase I on any elevator does not comply with ASME A17.1/CSA B44.

Just as important, this activation of Phase I in a building equipped with Occupant Evacuation Elevators complying with Section 3008 would unnecessarily compromise the evacuation capacity of the elevator system for no good reason. The firefighters responding to a building fire can capture the fire service access elevators when they get there if it is needed.

With the deletion of the first sentence, none of the rest of this section is necessary as these functions are already addressed in ASME A17.1/CSA B44 or the Occupant Evacuation Elevator requirements of Section 3008.

The committee disapproved this proposal as it was felt – based on misinformed testimony - that the detailed provisions should remain in the IBC. Opponents spoke to a need to "keep this safety requirement in **our** code", when in fact this requirement severely <u>decreases</u> safety by taking all Fire Service Access Elevators out of service at the exact moment that building occupants have been trained to go to the lobby to use Occupant Evacuation Elevators to vacate the building. In buildings without Occupation Evacuation Elevators, there is no safety reason to recall Fire Service Access Elevators when, for example, someone burns popcorn in the office microwave.

The fact that the existing text decreases safety in certain buildings is bad enough, but the tenor of the testimony and committee deliberations on this item was of greater concern.

Some suggested that once a requirement that ***appears*** to provide safety is put in the code it should not be deleted, even when it is shown to not provide the safety intended. But we as code developers sometimes make mistakes, and if we do not allow ourselves to correct those mistakes in future codes the whole code development process becomes futile.

Even more disconcerting were comments suggesting that "we" should not trust other committees (in this case, the American Society of Mechanical Engineers A17 Standards Committee and Canadian Standards Association B44 Executive Committee) to develop safety requirements that can just be added to the I-Codes. This is absurd. The IBC has referenced ASME A17.1 since 2000 (as did the legacy codes in earlier decades), recognizing the expertise of those that developed the A17 codes and validity of their codes and standards. The IBC relies on the expertise of consensus bodies that develop the safety requirements for fire alarm systems (NFPA 72), sprinklers (NFPA 13), *etc*. Indeed, there are very few standards referenced in Chapter 35 of the code that do not relate to safety. Building codes cannot and should not attempt to replicate the work of consensus bodies that bring a level of expertise to their subjects that none of us in an ICC hearing can provide.

Finally, the committee also expressed a concern with dependence upon a standard that is not yet published. This proposal is relevant to how Phase I emergency recall operates in the referenced ASME A17.1a-2008/CSA B44a-08 and two or three earlier editions of the Safety Code for Elevators and Escalators. It does not rely on ASME A17.1-2013/CSA B44-13.

Commenter's Reason (Frable): As the original proponent of this section, I would support the deletion of this section since the original intent was to ensure that the designated fire service access elevator cars would be automatically recalled and waiting for fire department at the designated level prior to their arrival to the building. Unfortunately, I have been informed by members of the fire service that this requirement may cause some unintentional confusion and possible delays for firefighters responding to a building that have fire service access elevators automatically recalled by any fire alarm initiating device in lieu of just the specific fire alarm initiating devices activated in an elevator lobby, hoistway, or associated elevator machine room, machinery space containing a motor controller or electric driving machine, control space, or control room. The confusion and delays stem from the fact the firefighters will not be sure initially if the recalled fire service access elevators are safe to use and will now have to evaluate if in fact the environment affecting the operation of the fire fighter access elevators has been compromised causing the elevators to be recalled. In addition, any unwanted fire alarm condition in the building will result in the subject fire service access elevators being recalled.

G173-12

Final Action: AS AM AMPC____ D

G174-12, PART I
PART 1 – IBC GENERAL
3007.7, 3007.7.1, 3007.7.5 (NEW), 3007.7.6 (NEW)

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering, (al.godwin@aon.com)

THIS IS A 3 PART CODE CHANGE. PARTS I AND II WILL BE HEARD BY THE IBC GENERAL COMMITTEE AND PART III WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTEE.

PART I - IBC GENERAL

Revise as follows:

3007.7 Fire service access elevator lobby. The fire service access elevator shall open into a fire service access elevator lobby in accordance with Sections 3007.7.1 through ~~3007.7.5~~ 3007.7.7.

> ~~**Exception:** Where a fire service access elevator has two entrances onto a floor, the second entrance shall be permitted to open into an elevator lobby in accordance with Section 708.14.1.~~

The fire service access elevator lobby shall be permitted to be one of the following:

1. A private lobby from the fire service access elevator in which the elevator is dedicated to this use only.
2. A private lobby on the side or rear of a public or freight elevator which has two entrances onto a floor. The second entrance shall be permitted to open into an elevator lobby in accordance with Section 713.14.1.
3. The public or freight elevator lobby when constructed in accordance with this Section. The lobby exceptions of Section 713.14.1 shall not be applicable except as specified in Section 3007.7.2.

3007.7.1 Access. The fire service access elevator lobby shall have direct access to an enclosure for an *interior exit stairway*.

> **Exception:** Direct access shall be permitted through an *exit passageway*, used only as an *exit* in accordance with Section 1023 that directly connects the lobby to the *interior stairway*, is not also used as a corridor, and has no other entry doors except those that are used as a *means of egress*.

3007.7.5 Connections with corridors and other rooms. Corridors shall be permitted to pass through the fire service access elevator lobby when the connecting walls and doors are constructed in accordance with this section.

> **Exception:** In Group I-2 occupancies and ambulatory healthcare facilities, connecting doors for a corridor passing through the lobby need not have latching hardware when in compliance with Section 709.5.

Other rooms or spaces, other than those associated with fire service uses, shall not have doors directly connected to the fire service access elevator lobby.

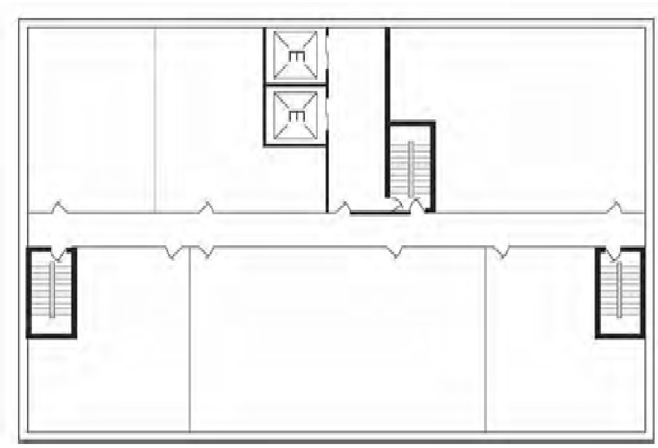
3007.7.6 Storage and furniture. Fire service access elevator lobbies shall be maintained free of storage and furniture.

(Renumber subsequent sections)

Reason: Part I: During the last code cycle, code change FS45-09/10 was submitted to restrict exiting through a passenger elevator lobby. It was withdrawn after public comments were submitted against it claiming that it was an exiting issue and not a fire safety issue.

This proposal is being submitted as a fire safety issue for clarification as to the fire safety construction of fire service access elevator lobbies and occupant evacuation elevator lobbies. While passenger elevator lobbies may end up as part of the discussion, the first point of clarification is for fire service access elevator lobbies.

When originally submitted, the exception to Section 3007.7 gave the impression that the fire service access elevator lobby was a private dedicated elevator lobby. When G49-09/10 passed, requiring "two" fire service access elevators, it virtually guaranteed that the public lobby would be used as the fire service access lobby. This was further confirmed when G164-09/10 was passed using the following drawing:



With multiple lobby changes happening (fire service access elevator lobbies, occupant evacuation lobbies, which are now tied to passenger lobbies) it is time the sections were correlated. And, how does section 709.5, allowing the removal of hardware fit into all of this?

There are commentary notes about public elevator lobbies that may or may not be applicable when used as the fire service access lobby. Thus, this submittal is to generate discussion as to what is or is not applicable.

Specific sections are explained as follows:

Section 3007.7, options 1 thru 3. These now appears to be the design options available.

Section 3007.7.1. Now that two elevators are required, it is likely that the main elevator lobby in the center of the building will be the option of choice as shown in G164-09/10. As such, it may not be feasible to install an extra stair in the center of the building, or bring over one of the original stairs and still meet code for dead end corridors. Therefore, direct connection from the lobby to the stair with the use of an exit passageway seems to be an appropriate option.

Section 3007.7.5. The commentary allows corridors to pass through a lobby and it allows other rooms to have direct access to and/or through the lobby. The commentary states:

"Egress through elevator lobbies from corridors on both sides is also allowed.

Two questions arise. One, can a space have its only exit access path through an elevator lobby? The answer is yes, if it meets all the other egress requirements. Second, can an exit enclosure open into and elevator lobby? The answer is yes. An elevator lobby is a normally occupied space in the same manner that a corridor is a normally occupied space."

If the above mentioned commentary notes are not deemed appropriate for passenger lobbies, then an amendment to Section 713.14.1 may be needed to correct the commentary.

However, as long as applicable, the following might also apply to the Fire Service Access lobby:

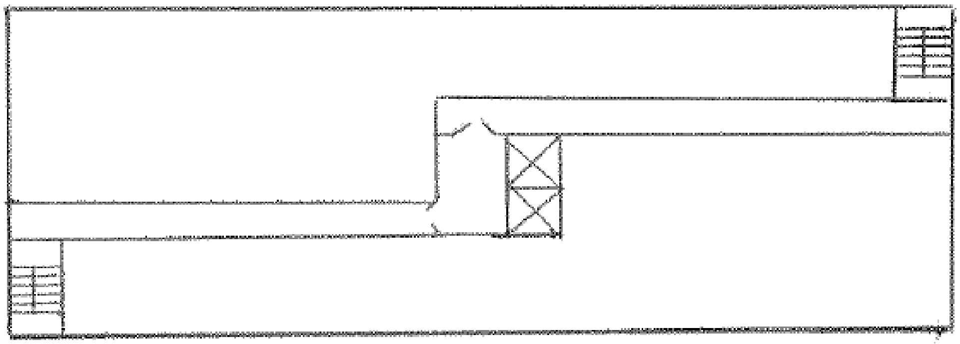
Allowing the corridor to pass through a fire service access lobby, when properly protected, would not seem to add any extra hazard than crossing across the front of a lobby as shown in G164 above. The exception for Group I-2's and ambulatory health care needs to be evaluated.

However, is does not seem appropriate to have extra rooms directly connected to the fire service access lobby, even if separated, that would exit through the lobby and perhaps into the directly connected interior stair.

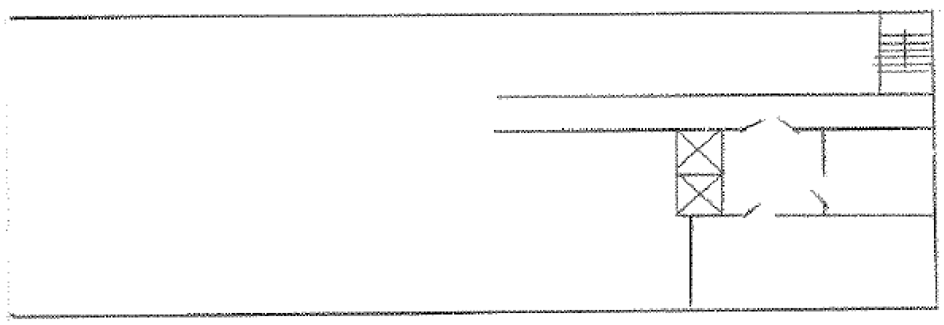
Section 3007.7.6. This is from IFC Section 607.3.

Some examples are as follows:

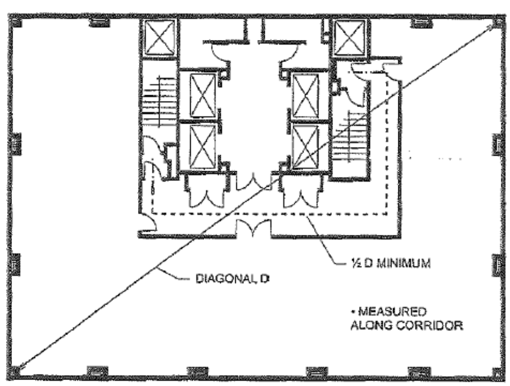
1. Corridor passes through passenger elevator lobby. If provided with access to a stair and proper construction, could this be a Fire Service Access Elevator Lobby and/or an Occupant Evacuation Elevator Lobby?



2. Rooms connect to and exit through elevator lobby. If provided with access to a stair and correct construction, could this be a Fire Service Access Elevator Lobby and/or an Occupant Evacuation Elevator Lobby?



Even the commentary has an example of what appear to be restrooms off an elevator lobby as follows:



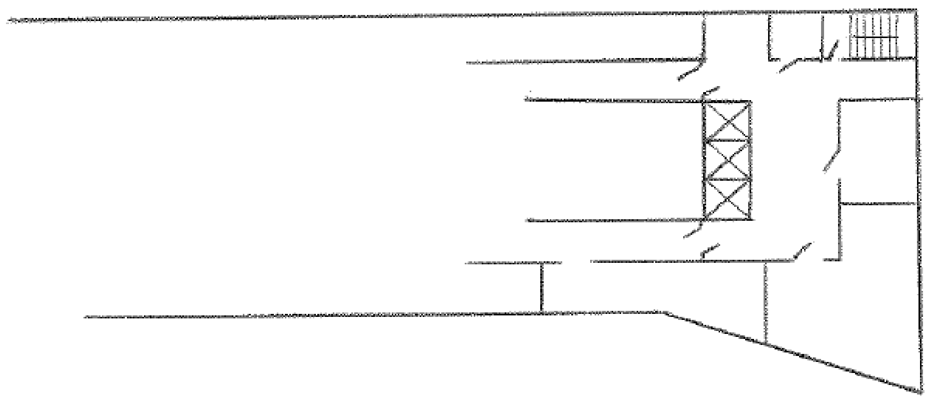
EXAMPLE:

DIAGONAL DIMENSION = 134'-0"
MIN. SEPARATION OF EXITS = 134' ÷ 2 = 67'-0"

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Figure 1015.2.1(2)
REMOTENESS OF EXITS INTERCONNECTING BY A 1-HOUR FIRE-RESISTANCE-RATED CORRIDOR

3. The following is an example of corridors passing through a lobby, along with rooms with direct connection to lobby, serving as passenger elevator lobby Fire Service Access lobby and/or Occupant Evacuation Elevator lobby. This is an actual design submitted for review.



When this discussion concludes, there should be a clear definition of what is required for lobby protection.

Cost Impact: This code change proposal will increase the cost of construction if the intent was to allow such penetrations of all lobbies and this restricts such penetrations.

3007.7-G-GODWIN.doc

Public Hearing Results

Part I and II of this proposal were heard by the IBC General Committee and Part III of this code change was heard by the IBC Fire Safety code development committee.

PART I – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The concepts being addressed are necessary but suggested the proponent work with the proponent of G175-12 dealing with similar issues. The language in the exception to Section 3007.7.1 as proposed seems redundant to other sections of the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., City of San Diego, City of San Diego Development Services Department, request Approval as Modified by this Public Comment.

Replace the proposal as follows:

3007.7.3 Lobby doorways. Other than the door to the hoistway, each doorway to a fire service access elevator lobby shall be provided with a 3/4-hour *fire door assembly* complying with Section 716.5. The *fire door assembly* shall also comply with the smoke and draft control door assembly requirements of Section 716.5.3.1 with the UL 1784 test conducted without the artificial bottom seal.

<u>**3007.7.3.1 Vision panel.** A vision panel shall be installed in each fire door assembly protecting the lobby doorway. The vision panel shall consist of fire protection-rated glazing and shall be located to furnish clear vision of the fire service access elevator lobby. Each vision panel shall be located no less than 43 inches (1090 mm) above the floor; the vision panel shall have a height of not less than 12 in (305 mm) and an area not less than 144 (92903 mm²).</u>

Commenter's Reason: The General Committee approved G175-12 that addresses what can be used as a fire service access elevator lobby. E110-12 addresses whether egress can be allowed through these elevator lobbies. We propose to focus only on the doors into the fire service access elevator lobby since Section 1018.6 permits corridors to pass through lobbies. This requirement is similar to the vision panel required for occupant evacuation elevator lobbies required in Section 3008.7.3.1 and is intended to inform occupants that the elevator lobby is available for egress and whether fire fighting personnel are in the process of staging.

Additionally, the vision panel affords the opportunity for firefighting personnel to view occupants in the corridor if necessary. The mounting height is necessary to conform to ICC A117.1 Section 404.2.10. There should be a minimum dimension to allow for viewing through the window. In some cases fire service access elevators serve as service elevators during non-emergency operations and do not have corridors passing through them so it is important to include specific requirements reasonably necessary for uniform enforcement. This code change is necessary to complete the action approved in E110-12 and G175-12 allowing the corridor to pass through the fire service access elevator lobby and how to construct and configure the lobby when the corridor passes through it. We request that the membership approve the proposed modification to the committee's action.

G174-12

Final Action: AS AM AMPC____ D

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

Part II – IBC GENERAL
3008.7, 3008.7.1, 3008.7.5 (NEW)

3008.7 Occupant evacuation elevator lobby. The occupant evacuation elevators shall open into an elevator lobby in accordance with Sections 3008.7.1 through ~~3008.7.7~~ 3008.7.8.

3008.7.1 Access. The occupant evacuation elevator lobby shall have direct access to an *interior exit stairway* or *ramp*.

> **Exception:** Direct access shall be permitted to be through the use of an *exit passageway*, used only as an *exit* in accordance with Section 1023 that directly connects the lobby to the *interior stairway*, is not also used as a corridor, and has no other entry doors except those that are used as a *means of egress*

3008.7.5 Connections with corridors and other rooms. Corridors shall be permitted to pass through the occupant evacuation elevator lobby when the connecting walls and doors are constructed in accordance with this section.

> **Exception:** In Group I-2 occupancies and ambulatory healthcare facilities, connecting doors for a corridor passing through the lobby need not have latching hardware when in compliance with Section 709.5.

Other rooms or spaces, other than those associated with fire service uses, shall not have doors directly connected to the occupant evacuation elevator lobby.

(Renumber subsequent sections)

Reason: Part II is actually a place holder. Depending on how the discussions proceed on Part I, amendments may be needed on Part II. By listing this section in the code change, it will allow them to be made.

My personal opinion is that the elevator lobby should be a separated alcove off of the side with only a corridor going across the entry way as shown in the drawing under Part I above. However, the commentary allows corridors to pass through a lobby and it allows other rooms to have direct access to and/or through the lobby. The commentary states:

"Egress through elevator lobbies from corridors on both sides is also allowed.

Two questions arise. One, can a space have its only exit access path through an elevator lobby? The answer is yes, if it meets all the other egress requirements. Second, can an exit enclosure open into and elevator lobby? The answer is yes. An elevator lobby is a normally occupied space in the same manner that a corridor is a normally occupied space."

In order to specifically achieve the alcove as shown in the drawing above, it would seem that extra wording is required.

PART III – IBC FIRE SAFETY
713.14.1.2 (NEW)

Revise as follows:

713.14.1.2 Connections with corridors and other rooms. When a lobby or smoke partitions of Exception 5 in Section 713,14,1, is constructed, corridors shall be permitted to pass through the elevator lobby when the connecting walls and doors are constructed in accordance with this section.

> **Exception:** In Group I-2 occupancies and ambulatory health care facilities, connecting doors for a corridor passing through the lobby need not have latching hardware when in compliance with Section 709.5.

Other rooms or spaces shall be permitted to have doors directly connected to the lobby.

Reasons: Part III is actually a place holder. Depending on how the discussions proceed on Part I, amendments may be needed on Part III. By listing this section in the code change, it will allow them to be made.

My personal opinion is that the elevator lobby should be a separated alcove off of the side with only a corridor going across the entry way as shown in the drawing under Part I below. However, the commentary allows corridors to pass through a lobby and it allows other rooms to have direct access to and/or through the lobby. The commentary states:

"Egress through elevator lobbies from corridors on both sides is also allowed.

Two questions arise. One, can a space have its only exit access path through an elevator lobby? The answer is yes, if it meets all the other egress requirements. Second, can an exit enclosure open into and elevator lobby? The answer is yes. An elevator lobby is a normally occupied space in the same manner that a corridor is a normally occupied space."

In order to specifically achieve the alcove as shown in the drawing above, it would seem that extra wording is required.

Public Hearing Results

Part I and II of this proposal were heard by the IBC General Committee and Part III of this code change was heard by the IBC Fire Safety code development committee.

PART II – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the previous action on G174-12 Part I.

Assembly Action: **None**

PART III – IBC Fire Safety
Committee Action: **Disapproved**

Committee Reason: The committee felt that allowing egress through the lobby was not substantiated by the proponent. Further, it appears that this change is dependent on G174 Part I; therefore the committee suggests bringing this change back in the public comment phase to coordinate the change with actions taken on Part I.

Assembly Action: **None**

G179-12
3007.9

Proposed Change as Submitted

Proponent: Brian Black, BDBlack Codes, Inc., representing National Elevator Industry Inc. (bdblack@neii.org)

Revise as follows:

3007.9 Electrical power. The following features serving each fire service access elevator shall be supplied by both normal power and Type 60/Class 2/Level 1 standby power:

1. Elevator equipment.
2. Elevator hoistway lighting.
3. ~~Elevator machine room~~ Ventilation and cooling equipment for elevator machine/control rooms, and machinery/control spaces.
4. Elevator ~~controller cooling equipment~~ car lighting.

Reason: Editorial changes in item 3 reflect current terminology in ASME A17.1/CSA B44. Standby power is necessary for elevator car lighting as specified in item 4 to ensure that firefighters are not trapped in a pitch-black elevator in case the building power is interrupted.

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

Staff note: The proposal reflect the errata printed in the Report of Hearings.

3007.9-G-BLACK

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved due to concern that the terminology revision related to provisions within an updated standard that is not yet published.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Submitted.

Commenter's Reason: The proposal was disapproved by the committee due to a concern that the terminology revision related to provisions within an updated standard that is not yet published.

In fact, the terminology is from the current reference standard ASME A17.1a-2008/CSA B44a-08 and earlier editions of the *Safety Code for Elevators and Escalators*. This proposal does not rely on the 2013 edition of that code.

The editorial changes in item 2 reflect current terminology in ASME A17.1/CSA B44. Standby power is necessary for elevator car lighting as specified in item 3 to ensure that firefighters are not trapped in a pitch-black elevator in case the building power is interrupted.

G179-12
Final Action: AS AM AMPC____ D

G180-12
3008.2, 3008.2.1

Proposed Change as Submitted

Proponent: Brian Black, BDBlack Codes, Inc., representing National Elevator Industry Inc. (bdblack@neii.org)

Revise as follows:

~~**3008.2 Phase I Emergency recall operation**. An independent, three-position, key-operated "Fire Recall" switch complying with ASME A17.1/CSA B44 shall be provided at the designated level for each occupant evacuation elevator.~~

~~3008.2.1~~ **3008.2 Operation.** The occupant evacuation elevators shall be used for occupant self-evacuation ~~only in the normal elevator operating mode prior to Phase I Emergency Recall Operation~~ in accordance with the occupant evacuation operation requirements in ASME A17.1/CSA B44 and the building's fire safety and evacuation plan.

(Renumber subsequent sections)

Reason: Requirements for *Occupant Evacuation Operation* have been approved for publication in the 2013 edition of ASME A17.1/CSA B44 *Safety Code for Elevators and Escalators*. With this development and corresponding changes to the NFPA 72 *Fire Alarm and Signaling Code*, the comprehensive ICC/ASME/NFPA package to establish occupant evacuation elevator requirements is complete, and provisions that were temporarily "parked" in the IBC can be removed as they are addressed by ASME A17.1/CSA B44.

ASME A17.1-2013CSA B44-13 will amend that code's Firefighters' Emergency Operations requirements to require a "GROUP FIRE RECALL" three-position switch in the designated level lobby with a corresponding two-position switch in the fire command center that can recall all of the elevators in that group. In addition, each elevator in that group will have a three-position key operated switch for CAR FIRE RECALL in the designated level elevator lobby. This configuration will allow firefighters to recall all of the elevators in a group if warranted, but only recall a few of the elevators for firefighter service as needed, allowing the remaining elevators to operate as occupant evacuation elevators. This was the purpose of the key operated switches required by Section 3008.2, thus making the IBC requirement unnecessary.

DRAFT FOR ASME A17.1-2013/CSA B44-13i

2.27.10 Occupant Evacuation Operation

Where elevators are provided for occupant evacuation, Occupant Evacuation Operation (OEO) shall be provided to function prior to Firefighters' Emergency Operation and shall conform to 2.27.10.1 through 2.27.10.6. See also Nonmandatory Appendix T.

2.27.10.1 The requirements of 2.27.3.1 shall be modified as follows:

2.27.10.1.1 The three-position switch in the lobby (2.27.3.1.1) and two-position switch in the fire command center (2.27.3.1.2) shall be labeled "GROUP FIRE RECALL" and indicate the elevator group that they control.

2.27.10.1.2 An additional three-position key-operated individual "CAR FIRE RECALL" switch per elevator, that will not change position without a deliberate action by the user, shall be located in the lobby at the elevator discharge level adjacent to the elevator it controls. Each switch shall be labeled "CAR ___ FIRE RECALL" (with the car identification, as specified in 2.29.1, inserted), and its positions marked "RESET", "OFF" and "ON" (in that order) in letters a minimum of 5 mm (0.25 in.) high. Text shall be black on a yellow background. Each switch shall control the associated elevator in conformance with 2.27.3.1.6, but shall not control the other elevators controlled by the "GROUP FIRE RECALL" switch (see 2.27.10.1.1).

2.27.10.1.3 Each individual "CAR FIRE RECALL" switch shall terminate Occupant Evacuation Operation for the elevator it controls when placed in the "ON" position. Each "GROUP FIRE RECALL" switch shall terminate Occupant Evacuation Operation for the elevators it controls when placed in the "ON" position.

2.27.10.1.4 Each individual "CAR FIRE RECALL" switch shall be provided with an illuminated visual signal to indicate when Phase I Emergency Recall Operation is in effect for that car (see 2.27.3.1.5).

2.27.10.1.5 To remove an individual elevator from Phase I Emergency Recall Operation, the individual "CAR FIRE RECALL" switch shall be rotated first to the "RESET," and then to the "OFF" position, provided that

(1) the “GROUP FIRE RECALL SWITCH” and the additional two-position “GROUP FIRE RECALL” switch, where provided, are in the “OFF” position

(2) no fire alarm initiating device is activated (see 2.27.3.2).

2.27.10.1.6 A car with its individual “CAR FIRE RECALL” switch in the “ON” position shall not be removed from Phase I Emergency Recall Operation when the “GROUP FIRE RECALL” switch is rotated to the “RESET” position and then to the “OFF” position.

2.27.10.1.7 The Designated Level shall be the same floor as the Elevator Discharge Level. At the elevator discharge level, only the door(s) serving the lobby where the “GROUP FIRE RECALL” switch is located shall open.

2.27.10.2 The sign required by 2.27.9 shall not be installed. A variable message sign, as defined in A117.1, shall be installed for each elevator group on each landing served. It shall be located not less than 2130 mm (84 in) and not more than 3000 mm (120 in) above the floor and in a central visible location within the elevator lobby. Message text shall be a minimum of 50 mm (2 in) high and conform to A117.1 or Appendix E requirement E-20, whichever is applicable (see Section 9 and E-1). The variable message signs shall be powered by the same power supply as the elevator, including emergency or standby power. Where not prohibited by the Building Code, when the elevators are not on Occupant Evacuation Operation or Firefighters’ Emergency Operation, the variable message signs shall be permitted to display other elevator system status messages. Note: sample text: “Elevators in normal operation”.

2.27.10.3 Where hoistway pressurization is provided, a car on Phase I Emergency Recall, after completing the requirements of 2.27.3.1.6, shall conform to the following:

a) A car shall close its doors after 15 seconds.

b) Door reopening devices, door force limiting devices, kinetic energy limiting devices, and the door open button shall remain active.

c) At least one operating device normally used to call a car to the landing (*e.g*. hall call button, keypad) shall be located in the elevator lobby at the elevator discharge level. Actuating this device shall cause all recalled cars to open their doors for 30 to 45 seconds, then reclose.

2.27.10.4 A position indicator shall be provided at the elevator discharge level above or adjacent to the entrance for each car. The position indicator shall be powered by the same power supply as the elevator, including emergency or standby power.

2.27.10.5 Fire Alarm System Interface

2.27.10.5.1 Upon activation of an automatic fire alarm initiating device in the building in any area which does not initiate Phase I recall in this group, the fire alarm system shall provide signals to the elevator system in conformance with NFPA 72 indicating the floors to be evacuated. The floors to be evacuated shall be a contiguous block of floors, consisting of at least the floor with an active alarm, two floors above and two floors below. The elevator system shall initiate Occupant Evacuation Operation in accordance with 2.27.10.6 for the indicated floors. If activation of an automatic fire alarm initiating device which does not initiate Phase I recall in this group occurs on an additional floor(s) at any time while Occupant Evacuation Operation in accordance with 2.27.10.6 is in effect, the evacuation zone shall be expanded to include all floors with an active alarm, all floors between the highest and lowest floor with an active alarm plus two floors above the highest floor with an active alarm and two floors below the lowest floor with an active alarm. If the active alarm is on the elevator discharge level, automatic initiation of Occupant Evacuation Operation in accordance with 2.27.10.6 shall not be permitted. Manual initiation by authorized or emergency personnel shall be permitted.

Note (2.27.10.5.1): An active alarm refers to the condition caused by the “activation of an automatic fire alarm initiating device” as used in this requirement.

2.27.10.5.2 A means to initiate total building evacuation, labeled “ELEVATOR TOTAL BUILDING EVACUATION” shall be provided at the fire command center location and installed in accordance with NFPA 72. When this means is actuated, the fire alarm system shall provide a signal to the elevator system indicating that all floors are to be evacuated.

2.27.10.6 When any of the signals provided in 2.27.10.5 actuate, the elevators shall conform to 2.27.10.6.1 through 2.27.10.6.10 in order to move occupants from the floors affected by the fire to the elevator discharge level.

2.27.10.6.1 The variable message signs required by 2.27.10.2 shall indicate one of the following messages:

(a) On all floors being evacuated, they shall indicate that the elevators are available for evacuation and the estimated time duration in minutes for the next elevator to arrive.
Note: Sample text: “Elevators and stairs available for evacuation. Next car in about 2 minutes”.

(b) On all floors not being evacuated, they shall indicate that elevator service is not available.
Note: Sample text: “Elevators temporarily dedicated to other floors”.

(c) On the elevator discharge level, they shall indicate that the cars are in evacuation mode and that passengers should not use elevators.
Note (2.27.10.6.1): Sample text: “Elevators dedicated to evacuation. Do not enter elevator”.

(d) If no elevators are available for Occupant Evacuation Operation (Fire service, inspection, shut off, etc.), they shall indicate that elevator service is not available. On all floors being evacuated they shall also indicate that occupants should use the stairs.

Note: Sample text for floors being evacuated: “Elevators out of service. Use stairs to evacuate”. Sample text for other floors: “Elevators out of service”.

2.27.10.6.2 Automatic visual signal or variable message sign, and voice notification in each car shall indicate that the car is being used to evacuate the building. In the event that the car stops to pick up passengers at a floor other than the elevator discharge level, the signals shall instruct the passengers to remain in the car. Upon or prior to arrival at the elevator discharge level, passengers shall be notified that they have arrived at the exit floor and to exit quickly. Message text shall be a minimum of 25 mm (1 in) high and conform to A117.1 or Appendix E requirement E-20, whichever is applicable (see Section 9 and E-1). Voice notification shall be at least 10 dBA above ambient but not more than 80 dBA measured 1525 mm (60 in) above the floor, at the center of the car.

2.27.10.6.3 All landing calls outside of the contiguous block of floors being evacuated shall be canceled and disabled. Building security systems which limit service to these floors shall be overridden. Any landing call within the contiguous block of floors shall call an elevator(s) to that landing. Landing calls entered at the floor with an active alarm shall be given higher priority than the calls at the floors above and below it. If a subsequent active alarm is received from a different floor, the evacuation priority shall be assigned in the sequence received. Once passengers have entered an elevator, it shall proceed only towards the elevator discharge level. When total building evacuation is in effect and no calls are entered at an affected floor, priority shall be based on distance from the elevator discharge level, with the furthest floor served getting highest priority.

2.27.10.6.4 Car calls for all floors, except for the elevator discharge level, shall be canceled and disabled. A car call for the elevator discharge level shall be automatically entered when any landing call is answered.

2.27.10.6.5 Cars which are unoccupied when Occupant Evacuation Operation is actuated shall move without delay to a floor which is being evacuated, and park with their doors closed until a landing call is registered. If the car is in motion away from the floors being evacuated, it shall stop at or before the next available floor, without opening the doors, reverse direction and move to a floor which is being evacuated.

2.27.10.6.6 Cars which are occupied when Occupant Evacuation Operation is actuated shall proceed without delay to the elevator discharge level. If a reversal of travel direction is needed, it shall be done at or before the next available floor without opening the doors. After opening and closing the doors at the elevator discharge level, they shall proceed without delay to a floor which is being evacuated and park with their doors closed until a landing call is registered.

2.27.10.6.7 When a car answers a landing call at a floor being evacuated, a car call for the elevator discharge level shall be automatically registered. The system shall accept a new landing call as soon as the doors have opened to permit loading at that floor, or sooner. If a new landing call is registered at this floor, it shall be assigned to another car, and not canceled until that car arrives. Actuation of the landing call device shall not prevent a loaded car from closing its doors and leaving the floor.

2.27.10.6.8 While passengers are entering the car at a floor being evacuated, when the load reaches no greater than 80% of car capacity, the door re-opening device(s) shall be disabled and the doors shall initiate closing at reduced kinetic energy in accordance with 2.13.4.2.1(c). If the doors stall while closing, they shall re-open fully, then close. An audible signal shall sound until the doors are closed. If the load exceeds 100% of capacity the doors shall re-open and remain open and a voice notification and visual signal shall indicate that the car is overloaded.

2.27.10.6.9 Once the block of floors being evacuated has been evacuated, as indicated by a 60 second period in which no landing calls are registered, one car shall park with its doors closed at the lowest floor of the block of floors ready to answer subsequent landing calls within the block of floors; the rest shall park with doors closed at the elevator discharge level. A car parked at the elevator discharge level shall replace the car at the lowest floor of the block, which has answered a landing call.

2.27.10.6.10 Occupant Evacuation Operation shall be terminated when the fire alarm system is reset or the signals provided in 2.27.3.2 are actuated (see 2.27.10.1.3).

i Approved 2011 by the ASME A17 Standards Committee for ASME A17.1-2013/CSA B44-13; subject to ANSI and ASME Board Approval. Provided for informational purposes and does not indicate endorsement by ASME or its Committees of proposed changes to the ICC *International Building Code*.

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

3008.2-G-BLACK.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There was concern that more justification was necessary for this proposal. The proposal appears to make technical changes to the current requirements and there was some level of concern with the dependence on ASME A17.1. It is encouraged that this proposal be brought back via public comment.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Submitted.

Commenter's Reason: Requirements for *Occupant Evacuation Operation* (attached) have been approved for publication in the 2013 edition of ASME A17.1/CSA B44 *Safety Code for Elevators and Escalators*. With this development and corresponding changes to the NFPA 72 *Fire Alarm and Signaling Code*, the comprehensive ICC/ASME/NFPA package to establish occupant evacuation elevator requirements is complete, and provisions that were temporarily "parked" in the IBC can be removed as they are addressed by ASME A17.1/CSA B44.

This proposal was disapproved based on its dependence on the 2013 edition of ASME A17.1 that is not yet published. While *NEII*® is generally in agreement with this principle, there are two significant problems in this case:

1. Commenters and the committee assumed that because the IBC Occupant Evacuation Elevator requirements in Section 3008 do not conflict with the current ASME A17.1-2010/CSA B44-10, retaining the current IBC language will not be a problem, and any conflicts with the newer A17.1/CSA B44 can be resolved in the 2018 IBC. While this argument may be true for most codes and standards referenced in the I-Codes, it is incorrect in this case.

In many jurisdictions in the United States (*e.g*., Wisconsin) the building code, fire code and elevator code are enacted by different pieces of legislation and regulated by entirely different state or municipal rules and agencies. Because of this, one department enforces the building code, another the elevator code, and neither official is obligated or legally able to recognize the requirements of the other. Some jurisdictions have legislated "auto-adopt" provisions in their elevator laws that will result in applying the 2013 of the *Safety Code for Elevators and Escalators* shortly after its publication. In other words, the 2013 elevator code will apply in many states and cities in little more than a year, irrespective of the code edition reference in the IBC.

The result is that the building official will require one set of key switches, the Chief Elevator Inspector will require another. Neither will have priority over the other, and the building owner will be continuously in violation of one law or the other. This conflict will exist for seven or more years if this proposal is not approved.

2. The American Society of Mechanical Engineers has stopped publishing yearly addenda to their codes. Had it kept its yearly addenda, an ASME A17.1b-2012/CSA B44b-12 that included the new requirement for Occupant Evacuation Operation would be published by now and available for referencing. At the same time the ICC elongated its code development process such that elevator requirements for the 2015 IBC had to be developed in 2011, four years before the anticipated publication of the IBC. This will significantly undermine efforts to harmonize the ASME, ICC and NFPA codes (a function of the ASME A17 Code Coordination Committee staffed by ICC, ASME, NFPA and *NEII*® representatives). Most importantly, this unprecedented delay will have the effect of decreasing the level of safety the IBC could otherwise provide to users of Occupant Evacuation Elevators.

ASME A17.1-2013CSA B44-13 will amend that code's Firefighters' Emergency Operations requirements to require a "GROUP FIRE RECALL" three-position switch in the designated level lobby with a corresponding two-position switch in the fire command center that can recall all of the elevators in that group. In addition, each elevator in that group will have a three-position key operated switch for CAR FIRE RECALL in the designated level elevator lobby. This configuration will allow firefighters to recall all of the elevators in a group if warranted, but only recall a few of the elevators for firefighter service as needed, allowing the remaining elevators to operate as occupant evacuation elevators. This was the purpose of the key operated switches required by Section 3008.2, thus making the IBC requirement unnecessary.

The proposal was also disapproved based upon the need for further technical justification.

ASME A17.1/CSA B44 expands the existing IBC requirement by providing numerous options to firefighters who may want to place only specific elevator in Phase I Emergency Recall Operation. GROUP FIRE RECALL switched in both the elevator lobby and the fire command center will save valuable time in catastrophic situations where having to recall numerous elevators one at a time using their individual stitches may not be desired or feasible.

G180-12

Final Action: AS AM AMPC____ D

G181-12
3008.2.2

Proposed Change as Submitted

Proponent: Brian Black, BDBlack Codes, Inc., representing National Elevator Industry Inc. (bdblack@neii.org)

Delete without substitution as follows:

~~**3008.2.2 Activation.** Occupant evacuation elevator systems shall be activated by any of the following:~~

1. ~~The operation of an *automatic sprinkler system* complying with Section 3008.3;~~
2. ~~*Smoke detectors* required by another provision of the code;~~
3. ~~*Approved* manual controls.~~

Reason: Requirements for *Occupant Evacuation Operation* have been approved for publication in the 2013 edition of ASME A17.1/CSA B44 *Safety Code for Elevators and Escalators*. With this development and corresponding changes to the NFPA 72 *Fire Alarm and Signaling Code*, the comprehensive ICC/ASME/NFPA package to establish occupant evacuation elevator requirements is complete, and provisions that were temporarily "parked" in the IBC can be removed as they are addressed by ASME A17.1/CSA B44.

ASME A17.1-2013/CSA B44-13 will include a section on Fire Alarm System Interface that requires that the activation of any building fire alarm initiating device not associated with Phase I elevator recall will provide signals to the elevator system controller(s) to indicate which building floors will be evacuated under the ASME Occupant Evacuation Operation criteria. These floors will be a contiguous block of floors consisting of the floor with the active alarm, two floors above, and two floors below. It will also accommodate enlarging the evacuation zone should other floors have an initiated fire alarm initiating device and will allow for full building evacuation when initiated by firefighters.

The ASME A17.1/CSA B44 requirements are more comprehensive than those in Section 3008.2.2 and the IBC requirements should be deleted in deference to the ASME provisions.

DRAFT FOR ASME A17.1-2013/CSA B44-13i

2.27.10 Occupant Evacuation Operation

Where elevators are provided for occupant evacuation, Occupant Evacuation Operation (OEO) shall be provided to function prior to Firefighters' Emergency Operation and shall conform to 2.27.10.1 through 2.27.10.6. See also Nonmandatory Appendix T.

2.27.10.1 The requirements of 2.27.3.1 shall be modified as follows:

2.27.10.1.1 The three-position switch in the lobby (2.27.3.1.1) and two-position switch in the fire command center (2.27.3.1.2) shall be labeled "GROUP FIRE RECALL" and indicate the elevator group that they control.

2.27.10.1.2 An additional three-position key-operated individual "CAR FIRE RECALL" switch per elevator, that will not change position without a deliberate action by the user, shall be located in the lobby at the elevator discharge level adjacent to the elevator it controls. Each switch shall be labeled "CAR ___ FIRE RECALL" (with the car identification, as specified in 2.29.1, inserted), and its positions marked "RESET", "OFF" and "ON" (in that order) in letters a minimum of 5 mm (0.25 in.) high. Text shall be black on a yellow background. Each switch shall control the associated elevator in conformance with 2.27.3.1.6, but shall not control the other elevators controlled by the "GROUP FIRE RECALL" switch (see 2.27.10.1.1).

2.27.10.1.3 Each individual "CAR FIRE RECALL" switch shall terminate Occupant Evacuation Operation for the elevator it controls when placed in the "ON" position. Each "GROUP FIRE RECALL" switch shall terminate Occupant Evacuation Operation for the elevators it controls when placed in the "ON" position.

2.27.10.1.4 Each individual "CAR FIRE RECALL" switch shall be provided with an illuminated visual signal to indicate when Phase I Emergency Recall Operation is in effect for that car (see 2.27.3.1.5).

2.27.10.1.5 To remove an individual elevator from Phase I Emergency Recall Operation, the individual "CAR FIRE RECALL" switch shall be rotated first to the "RESET," and then to the "OFF" position, provided that

(1) the "GROUP FIRE RECALL SWITCH" and the additional two-position "GROUP FIRE RECALL" switch, where provided, are in the "OFF" position

(2) no fire alarm initiating device is activated (see 2.27.3.2).

2.27.10.1.6 A car with its individual "CAR FIRE RECALL" switch in the "ON" position shall not be removed from Phase I Emergency Recall Operation when the "GROUP FIRE RECALL" switch is rotated to the "RESET" position and then to the "OFF" position.

2.27.10.1.7 The Designated Level shall be the same floor as the Elevator Discharge Level. At the elevator discharge level, only the door(s) serving the lobby where the "GROUP FIRE RECALL" switch is located shall open.

2.27.10.2 The sign required by 2.27.9 shall not be installed. A variable message sign, as defined in A117.1, shall be installed for each elevator group on each landing served. It shall be located not less than 2130 mm (84 in) and not more than 3000 mm (120 in) above the floor and in a central visible location within the elevator lobby. Message text shall be a minimum of 50 mm (2 in) high and conform to A117.1 or Appendix E requirement E-20, whichever is applicable (see Section 9 and E-1). The variable message signs shall be powered by the same power supply as the elevator, including emergency or standby power. Where not prohibited by the Building Code, when the elevators are not on Occupant Evacuation Operation or Firefighters' Emergency Operation, the variable message signs shall be permitted to display other elevator system status messages. Note: sample text: "Elevators in normal operation".

2.27.10.3 Where hoistway pressurization is provided, a car on Phase I Emergency Recall, after completing the requirements of 2.27.3.1.6, shall conform to the following:

a) A car shall close its doors after 15 seconds.

b) Door reopening devices, door force limiting devices, kinetic energy limiting devices, and the door open button shall remain active.

c) At least one operating device normally used to call a car to the landing (*e.g*. hall call button, keypad) shall be located in the elevator lobby at the elevator discharge level. Actuating this device shall cause all recalled cars to open their doors for 30 to 45 seconds, then reclose.

2.27.10.4 A position indicator shall be provided at the elevator discharge level above or adjacent to the entrance for each car. The position indicator shall be powered by the same power supply as the elevator, including emergency or standby power.

2.27.10.5 Fire Alarm System Interface

2.27.10.5.1 Upon activation of an automatic fire alarm initiating device in the building in any area which does not initiate Phase I recall in this group, the fire alarm system shall provide signals to the elevator system in conformance with NFPA 72 indicating the floors to be evacuated. The floors to be evacuated shall be a contiguous block of floors, consisting of at least the floor with an active alarm, two floors above and two floors below. The elevator system shall initiate Occupant Evacuation Operation in accordance with 2.27.10.6 for the indicated floors. If activation of an automatic fire alarm initiating device which does not initiate Phase I recall in this group occurs on an additional floor(s) at any time while Occupant Evacuation Operation in accordance with 2.27.10.6 is in effect, the evacuation zone shall be expanded to include all floors with an active alarm, all floors between the highest and lowest floor with an active alarm plus two floors above the highest floor with an active alarm and two floors below the lowest floor with an active alarm. If the active alarm is on the elevator discharge level, automatic initiation of Occupant Evacuation Operation in accordance with 2.27.10.6 shall not be permitted. Manual initiation by authorized or emergency personnel shall be permitted.

Note (2.27.10.5.1): An active alarm refers to the condition caused by the "activation of an automatic fire alarm initiating device" as used in this requirement.

2.27.10.5.2 A means to initiate total building evacuation, labeled "ELEVATOR TOTAL BUILDING EVACUATION" shall be provided at the fire command center location and installed in accordance with NFPA 72. When this means is actuated, the fire alarm system shall provide a signal to the elevator system indicating that all floors are to be evacuated.

2.27.10.6 When any of the signals provided in 2.27.10.5 actuate, the elevators shall conform to 2.27.10.6.1 through 2.27.10.6.10 in order to move occupants from the floors affected by the fire to the elevator discharge level.

2.27.10.6.1 The variable message signs required by 2.27.10.2 shall indicate one of the following messages:

(a) On all floors being evacuated, they shall indicate that the elevators are available for evacuation and the estimated time duration in minutes for the next elevator to arrive.
Note: Sample text: "Elevators and stairs available for evacuation. Next car in about 2 minutes".

(b) On all floors not being evacuated, they shall indicate that elevator service is not available.
Note: Sample text: "Elevators temporarily dedicated to other floors".

(c) On the elevator discharge level, they shall indicate that the cars are in evacuation mode and that passengers should not use elevators.
Note (2.27.10.6.1): Sample text: "Elevators dedicated to evacuation. Do not enter elevator".

(d) If no elevators are available for Occupant Evacuation Operation (Fire service, inspection, shut off, etc.), they shall indicate that elevator service is not available. On all floors being evacuated they shall also indicate that occupants should use the stairs.

Note: Sample text for floors being evacuated: “Elevators out of service. Use stairs to evacuate”. Sample text for other floors: “Elevators out of service”.

2.27.10.6.2 Automatic visual signal or variable message sign, and voice notification in each car shall indicate that the car is being used to evacuate the building. In the event that the car stops to pick up passengers at a floor other than the elevator discharge level, the signals shall instruct the passengers to remain in the car. Upon or prior to arrival at the elevator discharge level, passengers shall be notified that they have arrived at the exit floor and to exit quickly. Message text shall be a minimum of 25 mm (1 in) high and conform to A117.1 or Appendix E requirement E-20, whichever is applicable (see Section 9 and E-1). Voice notification shall be at least 10 dBA above ambient but not more than 80 dBA measured 1525 mm (60 in) above the floor, at the center of the car.

2.27.10.6.3 All landing calls outside of the contiguous block of floors being evacuated shall be canceled and disabled. Building security systems which limit service to these floors shall be overridden. Any landing call within the contiguous block of floors shall call an elevator(s) to that landing. Landing calls entered at the floor with an active alarm shall be given higher priority than the calls at the floors above and below it. If a subsequent active alarm is received from a different floor, the evacuation priority shall be assigned in the sequence received. Once passengers have entered an elevator, it shall proceed only towards the elevator discharge level. When total building evacuation is in effect and no calls are entered at an affected floor, priority shall be based on distance from the elevator discharge level, with the furthest floor served getting highest priority.

2.27.10.6.4 Car calls for all floors, except for the elevator discharge level, shall be canceled and disabled. A car call for the elevator discharge level shall be automatically entered when any landing call is answered.

2.27.10.6.5 Cars which are unoccupied when Occupant Evacuation Operation is actuated shall move without delay to a floor which is being evacuated, and park with their doors closed until a landing call is registered. If the car is in motion away from the floors being evacuated, it shall stop at or before the next available floor, without opening the doors, reverse direction and move to a floor which is being evacuated.

2.27.10.6.6 Cars which are occupied when Occupant Evacuation Operation is actuated shall proceed without delay to the elevator discharge level. If a reversal of travel direction is needed, it shall be done at or before the next available floor without opening the doors. After opening and closing the doors at the elevator discharge level, they shall proceed without delay to a floor which is being evacuated and park with their doors closed until a landing call is registered.

2.27.10.6.7 When a car answers a landing call at a floor being evacuated, a car call for the elevator discharge level shall be automatically registered. The system shall accept a new landing call as soon as the doors have opened to permit loading at that floor, or sooner. If a new landing call is registered at this floor, it shall be assigned to another car, and not canceled until that car arrives. Actuation of the landing call device shall not prevent a loaded car from closing its doors and leaving the floor.

2.27.10.6.8 While passengers are entering the car at a floor being evacuated, when the load reaches no greater than 80% of car capacity, the door re-opening device(s) shall be disabled and the doors shall initiate closing at reduced kinetic energy in accordance with 2.13.4.2.1(c). If the doors stall while closing, they shall re-open fully, then close. An audible signal shall sound until the doors are closed. If the load exceeds 100% of capacity the doors shall re-open and remain open and a voice notification and visual signal shall indicate that the car is overloaded.

2.27.10.6.9 Once the block of floors being evacuated has been evacuated, as indicated by a 60 second period in which no landing calls are registered, one car shall park with its doors closed at the lowest floor of the block of floors ready to answer subsequent landing calls within the block of floors; the rest shall park with doors closed at the elevator discharge level. A car parked at the elevator discharge level shall replace the car at the lowest floor of the block, which has answered a landing call.

2.27.10.6.10 Occupant Evacuation Operation shall be terminated when the fire alarm system is reset or the signals provided in 2.27.3.2 are actuated (see 2.27.10.1.3).

i Approved 2011 by the ASME A17 Standards Committee for ASME A17.1-2013/CSA B44-13; subject to ANSI and ASME Board Approval. Provided for informational purposes and does not indicate endorsement by ASME or its Committees of proposed changes to the ICC *International Building Code*.

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

3008.2.2-G-BLACK

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal was disapproved based upon the need for further technical justification and the dependence on the 2013 edition of ASME A17.1 that is not yet published.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Brian Black, BD Black & Associates, representing National Elevator Industry, Inc. requests Approved as Submitted.

Commenter's Reason: This proposal was disapproved based on its dependence on the 2013 edition of ASME A17.1 that is not yet published. While *NEII*® is generally in agreement with this principle, there are two significant problems in this case:

1. Commenters and the committee assumed that because the IBC Occupant Evacuation Elevator requirements in Section 3008 do not conflict with the current ASME A17.1-2010/CSA B44-10, retaining the current IBC language will not be a problem, and any conflicts with the newer A17.1/CSA B44 can be resolved in the 2018 IBC. While this argument may be true for most codes and standards referenced in the I-Codes, it is incorrect in this case.

   In many jurisdictions in the United States (*e.g.*, Wisconsin) the building code, fire code and elevator code are enacted by different pieces of legislation and regulated by entirely different state or municipal rules and agencies. Because of this, one department enforces the building code, another the elevator code, and neither official is obligated or legally able to recognize the requirements of the other. Some jurisdictions have legislated "auto-adopt" provisions in their elevator laws that will result in applying the 2013 of the *Safety Code for Elevators and Escalators* shortly after its publication. In other words, the 2013 elevator code will apply in many states and cities in little more than a year, irrespective of the code edition reference in the IBC.

   The result is that the building official will require one Occupant Evacuation activation, the Chief Elevator Inspector will require another. Neither will have priority over the other, and the building owner will be continuously in violation of one law or the other. This conflict will exist for seven or more years if this proposal is not approved.
2. The American Society of Mechanical Engineers has stopped publishing yearly addenda to their codes. Had it kept its yearly addenda, an ASME A17.1b-2012/CSA B44b-12 that included the new requirement for Occupant Evacuation Operation would be published by now and available for referencing. At the same time the ICC elongated its code development process such that elevator requirements for the 2015 IBC had to be developed in 2011, four years before the anticipated publication of the IBC. This will significantly undermine efforts to harmonize the ASME, ICC and NFPA codes (a function of the ASME A17 Code Coordination Committee staffed by ICC, ASME, NFPA and *NEII*® representatives). Most importantly, this unprecedented delay will have the effect of decreasing the level of safety the IBC could otherwise provide to users of Occupant Evacuation Elevators.

   ASME A17.1-2013/CSA B44-13 (attached) will include a section on Fire Alarm System Interface that requires that the activation of any building fire alarm initiating device not associated with Phase I elevator recall will provide signals to the elevator system controller(s) to indicate which building floors will be evacuated under the ASME Occupant Evacuation Operation criteria. These floors will be a contiguous block of floors consisting of the floor with the active alarm, two floors above, and two floors below. It will also accommodate enlarging the evacuation zone should other floors have an initiated fire alarm initiating device and will allow for full building evacuation when initiated by firefighters.

   The ASME A17.1/CSA B44 requirements are more comprehensive than those in Section 3008.2.2 and the IBC requirements should be deleted in deference to the ASME provisions.

G181-12

Final Action: AS AM AMPC____ D

G183-12
3008.7.6

Proposed Change as Submitted

Proponent: Brian Black, BDBlack Codes, Inc., representing National Elevator Industry Inc. (bdblack@neii.org)

Delete without substitution as follows:

~~**3008.7.6 Lobby status indicator.** Each occupant evacuation elevator lobby shall be equipped with a status indicator arranged to display all of the following information:~~

1. ~~An illuminated green light and the message, "Elevators available for occupant evacuation" when the elevators are operating in normal service and the *fire alarm system* is indicating an alarm in the building.~~
2. ~~An illuminated red light and the message, "Elevators out of service, use *exit stairs*" when the elevators are in Phase I emergency recall operation in accordance with the requirements in ASME A17.1/CSA B44.~~
3. ~~No illuminated light or message when the elevators are operating in normal service.~~

Reason: Requirements for *Occupant Evacuation Operation* have been approved for publication in the 2013 edition of ASME A17.1/CSA B44 *Safety Code for Elevators and Escalators*. With this development and corresponding changes to the NFPA 72 *Fire Alarm and Signaling Code*, the comprehensive ICC/ASME/NFPA package to establish occupant evacuation elevator requirements is complete, and provisions that were temporarily "parked" in the IBC can be removed as they are addressed by ASME A17.1/CSA B44.

ASME A17.1-2013/CSA B44-13 will include all of the information specified in Section 3008.7.6, (1) and (2). In addition, it will require approximate waiting times for persons awaiting an evacuation elevator and an indication that exit stairs may also be used.

ASME A17.1-2013/CSA B44-13 will also provide indicators in the signs in lobbies on floors not being evacuated that elevator service is not available. This will ensure that persons who have heard of a fire in the building and who are aware that elevators may be available for evacuation will not waste time waiting for elevators that will not arrive at their floors.

ASME A17.1-2013/CSA B44-13 will require every sign in elevator lobbies where elevators have entered Phase I Firefighter service to indicate that the elevators are out of service and not available.

ASME A17.1-2013/CSA B44-13 differs from the IBC in that it will permit messages such as "Elevators in normal operation" on the lobby status indicator signs when no evacuation is occurring. The ASME A17 Elevators & Fire Task Group believes that this will accustom building occupants to reading the indicators and will also allow for monitoring to ensure that the signs are operable when needed.

Finally, ASME A17.1-2013/CSA B44-13 will specify that all indicator signs comply with the Variable Message Sign requirements of ICC/ANSI A117.1, thus ensuring they are accessible to persons with disabilities.

For these reasons, Section 3008.7.6 should be deleted in deference to the referenced standard.

DRAFT FOR ASME A17.1-2013/CSA B44-13i

2.27.10 Occupant Evacuation Operation

Where elevators are provided for occupant evacuation, Occupant Evacuation Operation (OEO) shall be provided to function prior to Firefighters' Emergency Operation and shall conform to 2.27.10.1 through 2.27.10.6. See also Nonmandatory Appendix T.

2.27.10.1 The requirements of 2.27.3.1 shall be modified as follows:

2.27.10.1.1 The three-position switch in the lobby (2.27.3.1.1) and two-position switch in the fire command center (2.27.3.1.2) shall be labeled "GROUP FIRE RECALL" and indicate the elevator group that they control.

2.27.10.1.2 An additional three-position key-operated individual "CAR FIRE RECALL" switch per elevator, that will not change position without a deliberate action by the user, shall be located in the lobby at the elevator discharge level adjacent to the elevator it controls. Each switch shall be labeled "CAR ___ FIRE RECALL" (with the car identification, as specified in 2.29.1, inserted), and its positions marked "RESET", "OFF" and "ON" (in that order) in letters a minimum of 5 mm (0.25 in.) high. Text shall be black on a yellow background. Each switch shall control the associated elevator in conformance with 2.27.3.1.6, but shall not control the other elevators controlled by the "GROUP FIRE RECALL" switch (see 2.27.10.1.1).

2.27.10.1.3 Each individual "CAR FIRE RECALL" switch shall terminate Occupant Evacuation Operation for the elevator it controls when placed in the "ON" position. Each "GROUP FIRE RECALL" switch shall terminate Occupant Evacuation Operation for the elevators it controls when placed in the "ON" position.

2.27.10.1.4 Each individual "CAR FIRE RECALL" switch shall be provided with an illuminated visual signal to indicate when Phase I Emergency Recall Operation is in effect for that car (see 2.27.3.1.5).

2.27.10.1.5 To remove an individual elevator from Phase I Emergency Recall Operation, the individual "CAR FIRE RECALL" switch shall be rotated first to the "RESET," and then to the "OFF" position, provided that

(1) the "GROUP FIRE RECALL SWITCH" and the additional two-position "GROUP FIRE RECALL" switch, where provided, are in the "OFF" position

(2) no fire alarm initiating device is activated (see 2.27.3.2).

2.27.10.1.6 A car with its individual "CAR FIRE RECALL" switch in the "ON" position shall not be removed from Phase I Emergency Recall Operation when the "GROUP FIRE RECALL" switch is rotated to the "RESET" position and then to the "OFF" position.

2.27.10.1.7 The Designated Level shall be the same floor as the Elevator Discharge Level. At the elevator discharge level, only the door(s) serving the lobby where the "GROUP FIRE RECALL" switch is located shall open.

2.27.10.2 The sign required by 2.27.9 shall not be installed. A variable message sign, as defined in A117.1, shall be installed for each elevator group on each landing served. It shall be located not less than 2130 mm (84 in) and not more than 3000 mm (120 in) above the floor and in a central visible location within the elevator lobby. Message text shall be a minimum of 50 mm (2 in) high and conform to A117.1 or Appendix E requirement E-20, whichever is applicable (see Section 9 and E-1). The variable message signs shall be powered by the same power supply as the elevator, including emergency or standby power. Where not prohibited by the Building Code, when the elevators are not on Occupant Evacuation Operation or Firefighters' Emergency Operation, the variable message signs shall be permitted to display other elevator system status messages. Note: sample text: "Elevators in normal operation".

2.27.10.3 Where hoistway pressurization is provided, a car on Phase I Emergency Recall, after completing the requirements of 2.27.3.1.6, shall conform to the following:

a) A car shall close its doors after 15 seconds.

b) Door reopening devices, door force limiting devices, kinetic energy limiting devices, and the door open button shall remain active.

c) At least one operating device normally used to call a car to the landing (*e.g*. hall call button, keypad) shall be located in the elevator lobby at the elevator discharge level. Actuating this device shall cause all recalled cars to open their doors for 30 to 45 seconds, then reclose.

2.27.10.4 A position indicator shall be provided at the elevator discharge level above or adjacent to the entrance for each car. The position indicator shall be powered by the same power supply as the elevator, including emergency or standby power.

2.27.10.5 Fire Alarm System Interface

2.27.10.5.1 Upon activation of an automatic fire alarm initiating device in the building in any area which does not initiate Phase I recall in this group, the fire alarm system shall provide signals to the elevator system in conformance with NFPA 72 indicating the floors to be evacuated. The floors to be evacuated shall be a contiguous block of floors, consisting of at least the floor with an active alarm, two floors above and two floors below. The elevator system shall initiate Occupant Evacuation Operation in accordance with 2.27.10.6 for the indicated floors. If activation of an automatic fire alarm initiating device which does not initiate Phase I recall in this group occurs on an additional floor(s) at any time while Occupant Evacuation Operation in accordance with 2.27.10.6 is in effect, the evacuation zone shall be expanded to include all floors with an active alarm, all floors between the highest and lowest floor with an active alarm plus two floors above the highest floor with an active alarm and two floors below the lowest floor with an active alarm. If the active alarm is on the elevator discharge level, automatic initiation of Occupant Evacuation Operation in accordance with 2.27.10.6 shall not be permitted. Manual initiation by authorized or emergency personnel shall be permitted.

Note (2.27.10.5.1): An active alarm refers to the condition caused by the "activation of an automatic fire alarm initiating device" as used in this requirement.

2.27.10.5.2 A means to initiate total building evacuation, labeled "ELEVATOR TOTAL BUILDING EVACUATION" shall be provided at the fire command center location and installed in accordance with NFPA 72. When this means is actuated, the fire alarm system shall provide a signal to the elevator system indicating that all floors are to be evacuated.

2.27.10.6 When any of the signals provided in 2.27.10.5 actuate, the elevators shall conform to 2.27.10.6.1 through 2.27.10.6.10 in order to move occupants from the floors affected by the fire to the elevator discharge level.

2.27.10.6.1 The variable message signs required by 2.27.10.2 shall indicate one of the following messages:

(a) On all floors being evacuated, they shall indicate that the elevators are available for evacuation and the estimated time duration in minutes for the next elevator to arrive.
Note: Sample text: "Elevators and stairs available for evacuation. Next car in about 2 minutes".

(b) On all floors not being evacuated, they shall indicate that elevator service is not available.
Note: Sample text: "Elevators temporarily dedicated to other floors".

(c) On the elevator discharge level, they shall indicate that the cars are in evacuation mode and that passengers should not use elevators.
Note (2.27.10.6.1): Sample text: "Elevators dedicated to evacuation. Do not enter elevator".

(d) If no elevators are available for Occupant Evacuation Operation (Fire service, inspection, shut off, etc.), they shall indicate that elevator service is not available. On all floors being evacuated they shall also indicate that occupants should use the stairs.

Note: Sample text for floors being evacuated: "Elevators out of service. Use stairs to evacuate". Sample text for other floors: "Elevators out of service".

2.27.10.6.2 Automatic visual signal or variable message sign, and voice notification in each car shall indicate that the car is being used to evacuate the building. In the event that the car stops to pick up passengers at a floor other than the elevator discharge level, the signals shall instruct the passengers to remain in the car. Upon or prior to arrival at the elevator discharge level, passengers shall be notified that they have arrived at the exit floor and to exit quickly. Message text shall be a minimum of 25 mm (1 in) high and conform to A117.1 or Appendix E requirement E-20, whichever is applicable (see Section 9 and E-1). Voice notification shall be at least 10 dBA above ambient but not more than 80 dBA measured 1525 mm (60 in) above the floor, at the center of the car.

2.27.10.6.3 All landing calls outside of the contiguous block of floors being evacuated shall be canceled and disabled. Building security systems which limit service to these floors shall be overridden. Any landing call within the contiguous block of floors shall call an elevator(s) to that landing. Landing calls entered at the floor with an active alarm shall be given higher priority than the calls at the floors above and below it. If a subsequent active alarm is received from a different floor, the evacuation priority shall be assigned in the sequence received. Once passengers have entered an elevator, it shall proceed only towards the elevator discharge level. When total building evacuation is in effect and no calls are entered at an affected floor, priority shall be based on distance from the elevator discharge level, with the furthest floor served getting highest priority.

2.27.10.6.4 Car calls for all floors, except for the elevator discharge level, shall be canceled and disabled. A car call for the elevator discharge level shall be automatically entered when any landing call is answered.

2.27.10.6.5 Cars which are unoccupied when Occupant Evacuation Operation is actuated shall move without delay to a floor which is being evacuated, and park with their doors closed until a landing call is registered. If the car is in motion away from the floors being evacuated, it shall stop at or before the next available floor, without opening the doors, reverse direction and move to a floor which is being evacuated.

2.27.10.6.6 Cars which are occupied when Occupant Evacuation Operation is actuated shall proceed without delay to the elevator discharge level. If a reversal of travel direction is needed, it shall be done at or before the next available floor without opening the doors. After opening and closing the doors at the elevator discharge level, they shall proceed without delay to a floor which is being evacuated and park with their doors closed until a landing call is registered.

2.27.10.6.7 When a car answers a landing call at a floor being evacuated, a car call for the elevator discharge level shall be automatically registered. The system shall accept a new landing call as soon as the doors have opened to permit loading at that floor, or sooner. If a new landing call is registered at this floor, it shall be assigned to another car, and not canceled until that car arrives. Actuation of the landing call device shall not prevent a loaded car from closing its doors and leaving the floor.

2.27.10.6.8 While passengers are entering the car at a floor being evacuated, when the load reaches no greater than 80% of car capacity, the door re-opening device(s) shall be disabled and the doors shall initiate closing at reduced kinetic energy in accordance with 2.13.4.2.1(c). If the doors stall while closing, they shall re-open fully, then close. An audible signal shall sound until the doors are closed. If the load exceeds 100% of capacity the doors shall re-open and remain open and a voice notification and visual signal shall indicate that the car is overloaded.

2.27.10.6.9 Once the block of floors being evacuated has been evacuated, as indicated by a 60 second period in which no landing calls are registered, one car shall park with its doors closed at the lowest floor of the block of floors ready to answer subsequent landing calls within the block of floors; the rest shall park with doors closed at the elevator discharge level. A car parked at the elevator discharge level shall replace the car at the lowest floor of the block, which has answered a landing call.

2.27.10.6.10 Occupant Evacuation Operation shall be terminated when the fire alarm system is reset or the signals provided in 2.27.3.2 are actuated (see 2.27.10.1.3).

i Approved 2011 by the ASME A17 Standards Committee for ASME A17.1-2013/CSA B44-13; subject to ANSI and ASME Board Approval. Provided for informational purposes and does not indicate endorsement by ASME or its Committees of proposed changes to the ICC *International Building Code*.

Cost Impact: This code change proposal will not increase construction costs.

3008.7.6-G-BLACK.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it was felt that the status indicators should remain in the code regardless of whether they are currently addressed by the standard. Additionally, the proposal was disapproved based upon previous actions related to the referencing of the 2013 edition of ASME A17.1.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Submitted.

Commenter's Reason: This proposal was disapproved in part based on its dependence on the 2013 edition of ASME A17.1 that is not yet published. While *NEII*® is generally in agreement with this principle, there are two significant problems in this case:

1. Commenters and the committee assumed that because the IBC Occupant Evacuation Elevator requirements in Section 3008 do not conflict with the current ASME A17.1-2010/CSA B44-10, retaining the current IBC language will not be a problem, and any conflicts with the newer A17.1/CSA B44 can be resolved in the 2018 IBC. While this argument may be true for most codes and standards referenced in the I-Codes, it is incorrect in this case.

In many jurisdictions in the United States (*e.g.*, Wisconsin) the building code, fire code and elevator code are enacted by different pieces of legislation and regulated by entirely different state or municipal rules and agencies. Because of this, one department enforces the building code, another the elevator code, and neither official is obligated or legally able to recognize the requirements of the other. Some jurisdictions have legislated "auto-adopt" provisions in their elevator laws that will result in applying the 2013 of the *Safety Code for Elevators and Escalators* shortly after its publication. In other words, the 2013 elevator code will apply in many states and cities in little more than a year, irrespective of the code edition reference in the IBC.

The result is that the building official will require one set of Occupant Evacuation lobby status indicators, the Chief Elevator Inspector will require another. Neither will have priority over the other, and the building owner will be continuously in violation of one law or the other. This conflict will exist for seven or more years if this proposal is not approved.

2. The American Society of Mechanical Engineers has stopped publishing yearly addenda to their codes. Had it kept its yearly addenda, an ASME A17.1b-2012/CSA B44b-12 that included the new requirement for Occupant Evacuation Operation would be published by now and available for referencing. At the same time the ICC elongated its code development process such that elevator requirements for the 2015 IBC had to be developed in 2011, four years before the anticipated publication of the IBC. This will significantly undermine efforts to harmonize the ASME, ICC and NFPA codes (a function of the ASME A17 Code Coordination Committee staffed by ICC, ASME, NFPA and *NEII*® representatives). Most importantly, this unprecedented delay will have the effect of decreasing the level of safety the IBC could otherwise provide to users of Occupant Evacuation Elevators.

The committee also disapproved this proposal because some testified that the status indicators should remain in the code regardless of whether they are addressed by the standard. There was no technical justification for this other than a parochial attitude that these safety provisions should be kept in "our" code, even if the ASME provisions provide a significantly higher level of safety and the IBC provisions conflict with the superior requirements in ASME A17.1/CSA B44. It should also be noted that ICC staff was instrumental in developing the requirements in the ASME code, committing years of work serving on the ASME A17 Elevators & Fire Task Groups that created the IBC/NFPA/ASME Occupant Evacuation package from which this code change was derived.

Requirements for *Occupant Evacuation Operation* have been approved for publication in the 2013 edition of ASME A17.1/CSA B44 *Safety Code for Elevators and Escalators*. With this development and corresponding changes to the NFPA 72 *Fire Alarm and Signaling Code*, the comprehensive ICC/ASME/NFPA package to establish occupant evacuation elevator requirements is complete, and provisions that were temporarily "parked" in the IBC can be removed as they are addressed by ASME A17.1/CSA B44.

ASME A17.1-2013/CSA B44-13 will include all of the information specified in Section 3008.7.6, (1) and (2). In addition, it will require approximate waiting times for persons awaiting an evacuation elevator and an indication that exit stairs may also be used.

ASME A17.1-2013/CSA B44-13 will also provide indicators in the signs in lobbies on floors not being evacuated that elevator service is not available. This will ensure that persons who have heard of a fire in the building and who are aware that elevators may be available for evacuation will not waste time waiting for elevators that will not arrive at their floors.

ASME A17.1-2013/CSA B44-13 will require every sign in elevator lobbies where elevators have entered Phase I Firefighter service to indicate that the elevators are out of service and not available.

ASME A17.1-2013/CSA B44-13 differs from the IBC in that it will permit messages such as "Elevators in normal operation" on the lobby status indicator signs when no evacuation is occurring. The ASME A17 Elevators & Fire Task Group believes that this will accustom building occupants to reading the indicators and will also allow for monitoring to ensure that the signs are operable when needed.

Finally, ASME A17.1-2013/CSA B44-13 will specify that all indicator signs comply with the Variable Message Sign requirements of ICC/ANSI A117.1, thus ensuring they are accessible to persons with disabilities.

For these reasons, Section 3008.7.6 should be deleted in deference to the referenced standard.

G183-12

Final Action: AS AM AMPC____ D

G185-12
3008.9

Proposed Change as Submitted

Proponent: Brian Black, BDBlack Codes, Inc., representing National Elevator Industry Inc. (bdblack@neii.org)

Revise as follows:

3008.9 Electrical power. The following features serving each occupant evacuation elevator shall be supplied by both normal power and Type 60/Class 2/Level 1 standby power:

1. Elevator equipment.
2. ~~Elevator machine room v~~ *Ventilation* and cooling equipment for elevator machine/control rooms, and machinery/control spaces.
3. Elevator ~~controller cooling equipment~~ car lighting.

Reason: Editorial changes in item 2 reflect current terminology in ASME A17.1/CSA B44. Standby power is necessary for elevator car lighting as specified in item 3 to ensure that occupants are not trapped in a pitch-black elevator in case the building power is interrupted.

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

3008.9-G-BLACK.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the action on G179-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Brian Black, BDBlack & Associates, representing National Elevator Industry, Inc., requests Approval as Submitted.

Commenter's Reason: The proposal was disapproved by the committee due to a concern that the terminology revision related to provisions within an updated standard that is not yet published and based on action taken on G179-12.

In fact, the terminology is from the current reference standard ASME A17.1a-2008/CSA B44a-08 and earlier editions of the *Safety Code for Elevators and Escalators*. This proposal does not rely on the 2013 edition of that code.

The numbering in the original proposal as published was incorrect. Instead of being items 1,2 and 3 it was incorrectly labeled 1, 3 and 4 which caused some confusion. This has been corrected.

The editorial changes in item 2 reflect current terminology in ASME A17.1/CSA B44. Standby power is necessary for elevator car lighting as specified in item 3 to ensure that firefighters are not trapped in a pitch-black elevator in case the building power is interrupted.

G185-12

Final Action: AS AM AMPC____ D

G190-12
3103.1.1 (New)

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee (BCAC)

Add new text as follows:

3103.1.1 Conformance. Temporary structures and uses shall conform to the structural strength, fire safety, *means of egress*, accessibility, light, ventilation and sanitary requirements of this code as necessary to ensure public health, safety and general welfare.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The International Code Council's Building Code Action Committee was asked to look at adding structural provisions and requirements for temporary structures. In the current code, the administrative requirements for temporary structures are located in section 108 while the technical requirements are in section 3103. In reviewing the existing code, it was the opinion of the BCAC that the two sections in the current code sufficiently address the requirements. However, the BCAC did determine that section 108.2, "Conformance", was more technical than administrative and that a code user may not be aware of those requirements when looking at section 3103 for the technical requirements. To address this and to avoid potential confusion or oversight, the BCAC proposes moving the technical language of section 108.2 to section 3103.1.1.

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

3103.1.1 (NEW)-G-BAJNAI.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based upon concerns with enforcement issues. Section 108 has provisions to address these situations already.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee (BCAC), requests Approval as Submitted.

Commenter's Reason: Commenter's Reason: This public comment is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 5 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

In disapproving this code change proposal, the code development committee stated that moving the requirements of Section 108.2 to Section 3103.1.1 was unnecessary because the requirements were appropriately located in Section 108.2.

The BCAC disagrees with the code development committee; we would like the proposal *approved as submitted*. We still think our proposal to copy the provisions in Section 108.2 into Section 3103.1.1 makes the most sense, because the conformance requirements are technical in nature, and therefore belong in the technical area of the code that deals with temporary structures.

Also the BCAC argues that since many states generate their own chapter 1 requirements, the conformance requirements for temporary structures would be best served in 3103.1.1.

If successful, the BCAC intends to propose deleting Section 108.2 during the Group B hearings when all provisions in Chapter 1 will be considered.

G190-12

Final Action: AS AM AMPC____ D

G192-12
3105.4

Proposed Change as Submitted

Proponent: Lee J. Kranz, City of Bellevue, WA, representing Washington Association of Building Officials Technical Code Development (lkranz@bellevuewa.gov)

Revise as follows:

3105.4 <u>Awning and</u> canopy materials. <u>Awnings and</u> c*anopies* shall be ~~constructed of a rigid framework~~ <u>provided</u> with an *approved* covering that meets the fire propagation performance criteria of NFPA 701 or has a *flame spread index* not greater than 25 when tested in accordance with ASTM E 84 or UL 723.

Reason: The code does not currently provide a means for building officials to regulate the fire propagation performance and flame spread requirements for materials covering awnings afforded for canopies. This is resolved by adding "awnings" to this section. The words "constructed of a rigid framework…" is deleted as it is already included in the definitions of awning and canopy.

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

3105.4-G-KRANZ.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The provisions of Section 3105.4 were not intended to apply to awnings. This would possibly require compliance with NFPA 701 for awnings installed on one and two family dwellings. Compliance with NFPA 701 in general for awnings was felt to be unnecessary.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Lee J. Kranz, City of Bellevue Washington representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3105.4 Awning and canopy materials. Awnings and canopies shall be provided with an approved covering that meets the fire propagation performance criteria of NFPA 701 or has a flame spread index not greater than 25 when tested in accordance with ASTM E 84 or UL 723.

> <u>**Exception:** The fire propagation performance and flame spread index requirements shall not apply to awnings installed on detached one and two family dwellings.</u>

Commenter's Reason: Awnings, like canopies, may be installed on residential or commercial buildings. Awnings are typically light-weight frame structures, supported wholly or partially by the building to which they are attached and are typically covered with a membrane or fabric covering, therefore are more likely to pose a potential risk by dripping molten plastic or vinyl on building occupants leaving a building during a fire event. They may also pose a risk to fire fighters entering a building to extinguish a fire if the awning has been subjected to fire. Currently, the code does not provide a way for building officials to regulate the fire propagation performance and flame spread requirements for awning covering materials. This was resolved by adding "Awnings" to Section 3105.4. The General Committee suggested that it was never intended to regulate awning covering materials for one and two family dwellings so an exception is now included to resolve that issue. The definitions for *awnings* and *canopies* are very similar and either may be installed on commercial or residential buildings. The primary difference between the two lies in how they are supported.

G192-12

Final Action: AS AM AMPC____ D

G193-12, PART I

PART I – INTERNATIONAL BUILDING CODE
202, 303.4 (IFC 202), 303.5 (IFC 202), 507.6, 507.7, Table 1004.1.2 (IFC [B] Table 1004.1.2), 1808.7.3, 2406.4.5, 2609.4, 3109, 3102.8.3, G801.5

Proposed Change as Submitted

Proponents: Kris Bridges, CBO, Chair, ICC Swimming Pool Code Drafting Committee (SPCDC) & Jennifer Hatfield, J. Hatfield & Associates, PL, representing the Association of Pool & Spa Professionals

THIS IS A 4 PART CODE CHANGE.PART All PARTS WILL BE HEARD BY THE IBC GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC GENERAL CODE DEVELOPMENT COMMITTEE.

PART I – IBC GENERAL

Delete Section 3109 in its entirety and substitute as follows:

SECTION 3109
AQUATIC VESSELS

3109.1 General. The design and construction of aquatic vessels shall comply with the *International Swimming Pool and Spa Code*. The application of this section shall be limited in scope in accordance with Section 101.2.

Revise as follows:

303.4 Assembly Group A-3. Assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A including, but not limited to:

Amusement arcades
Art galleries
Bowling alleys
Community halls
Courtrooms
Dance halls (not including food or drink consumption)
Exhibition halls
Funeral parlors
Gymnasiums (without spectator seating)
Indoor ~~*swimming pools*~~ *aquatic vessels* (without spectator seating)
Indoor tennis courts (without spectator seating)
Lecture halls
Libraries
Museums
Places of religious worship
Pool and billiard parlors
Waiting areas in transportation terminals

303.5 Assembly Group A-4. Assembly uses intended for viewing of indoor sporting events and activities with spectator seating including, but not limited to:
Arenas
Skating rinks
~~*Swimming pools*~~ *Aquatic vessels*
Tennis courts

507.6 Group A-3 buildings of Type II construction. The area of a Group A-3 building no more than one *story above grade plane*, used as a *place of religious worship*, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor ~~*swimming pool*~~ *aquatic vessel* or tennis court of Type II construction, shall not be limited provided all of the following criteria are met:

1. The building shall not have a *stage* other than a *platform*.
2. The building shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
3. The building shall be surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

507.7 Group A-3 buildings of Types III and IV construction. The area of a Group A-3 building of Type III or IV construction, with no more than one *story above grade plane*, and used as a *place of religious worship*, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor ~~*swimming pool*~~ *aquatic vessel* or tennis court, shall not be limited provided all of the following criteria are met:

1. The building shall not have a *stage* other than a *platform*.
2. The building shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
3. The assembly floor shall be located at or within 21inches (533 mm) of street or grade level and all *exits* are provided with ramps complying with Section 1010.1 to the street or grade level.
4. The building shall be surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

TABLE 1004.1.2 (IFC [B] TABLE 1004.1.2)
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Skating rinks~~, swimming pools~~ Rink ~~and pool~~ Decks	 50 gross 15 gross
Aquatic Vessels and Aquatic Recreation Facility	Occupant load factors shall be determined in accordance with the International Swimming Pools & Spa Code (ISPSC)

(Portion of table not shown remains unchanged)

1808.7.3 ~~Pools~~ Aquatic vessels. The setback between ~~pools~~ aquatic vessel s regulated by this code and slopes shall be equal to one-half the building footing setback distance required by this section. That portion of the ~~pool~~ aquatic vessel wall within a horizontal distance of 7 feet (2134 mm) from the top of the slope shall be capable of supporting the water in the ~~pool~~ aquatic vessel without soil support.

2406.4.5 Glazing and wet surfaces. Glazing in walls, enclosures or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor ~~swimming pool~~ aquatic vessels where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface shall be considered a hazardous location. This shall apply to single glazing and all panes in multiple glazing.

Exception: Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the water's edge of a bathtub~~, hot tub, spa, whirlpool, or swimming pool~~ or aquatic vessel.

2609.4 Area limitations. Roof panels shall be limited in area and the aggregate area of panels shall be limited by a percentage of the floor area of the room or space sheltered in accordance with Table 2609.4.

Exceptions:

1. The area limitations of Table 2609.4 shall be permitted to be increased by 100 percent in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Low-hazard occupancy buildings, such as ~~swimming pool~~ aquatic vessel shelters, shall be exempt from the area limitations of Table 2609.4, provided that the buildings do not exceed 5,000 square feet (465 m^2) in area and have a minimum fire separation distance of 10 feet (3048 mm).
3. Greenhouses that are occupied for growing plants on a production or research basis, without public access, shall be exempt from the area limitations of Table 2609.4 provided they have a minimum fire separation distance of 4 feet (1220 mm).
4. Roof coverings over terraces and patios in occupancies in Group R-3 shall be exempt from the area limitations of Table 2609.4 and shall be permitted with light-transmitting plastics.

3102.8.3 Support provisions. A system capable of supporting the membrane in the event of deflation shall be provided for in air-supported and air-inflated structures having an *occupant load* of 50 or more or where covering ~~a swimming pool~~ an aquatic vessel regardless of *occupant load*. The support system shall be capable of maintaining membrane structures used as a roof for Type I construction not less than 20 feet (6096 mm) above floor or seating areas. The support system shall be capable of maintaining other membranes not less than 7 feet (2134 mm) above the floor, seating area or surface of the water.

Add new definition as follows:

SECTION 202
DEFINITIONS

AQUATIC RECREATION FACILITY. A facility that is designed for free-form aquatic play and recreation. The facilities may include, but are not limited to, wave or surf action pools, leisure rivers, sand bottom pools, vortex pools, *activity pools*, *tube rides* and body slides, and interactive play attractions.

AQUATIC VESSEL. Any vessel, permanent or temporary, intended for swimming, bathing, or wading and that is designed and manufactured to be connected to a *circulation system*. Portable vessels 12 inches or less in designed water depth which are drained and filled daily are not considered *aquatic vessels*. For purposes of this code, the term is used to identify all the types of vessels governed by this code, including: swimming pools, aquatic facilities, *spas* and hot tubs, and related equipment. Such vessels are either used in a *residential* application or in a public application.

Delete without substitution:

~~**G801.5 Prefabricated swimming pools.** Prefabricated swimming pools in *floodways* shall meet the requirements of Section G103.5.~~

Reason: 3109. When addressing pool safety provisions found in the new International Swimming Pool & Spa Code, reference to that code ensures consistency and provides additional pool and spa requirements that are important to follow for life safety reasons. By requiring in the IBC that aquatic vessels comply with the ISPSC, proper construction of the aquatic vessel will occur, providing the end user with a safe aquatic environment.

Table 1004.1.2. The new International Swimming Pool & Spa Code (ISPSC) provides occupant load requirements for aquatic recreation facilities (Table 608.1 of the ISPSC) and bather load requirements for public swimming pools (Table 403.1). In order to provide consistency between the I-codes, this proposal provides a new entry into Table 1004.1.2 that references you to the ISPSC requirements that provide a more detailed occupant load requirement based on what type of aquatic vessel and what area of the vessel is being considered.

202. The new International Swimming Pool & Spa Code (ISPSC) utilizes a new definition to encompass all different types of pools, hot tubs, and spas – aquatic vessel. The ISPSC also defines a public pool and an aquatic recreation facility, both of which fall under the IBC purview. This proposal revises the definitions in accordance with the terminology provided in the new ISPSC, in order to provide consistency between I-codes and clarity on what requirements apply to what type of aquatic vessels (see subsequent proposal regarding Table 1004.1.2 of the IBC for example). Further, the current definition excludes wading pools 18 feet deep from any requirements, this new language ensure these types of aquatic vessels are covered.

G801.5. The new International Swimming Pool & Spa Code (ISPSC) does not define prefabricated swimming pools. Rather, it uses the terminology "aquatic vessel" (which is also being suggested for inclusion in the IBC definitions in a separate proposal). Under the new ISPSC, requirements for the design and construction of aquatic vessels installed in flood hazard areas are provided in Section 304. This language should be deleted due to the ISPSC flood hazard area requirements, and due to the fact a prefabricated swimming pool is not defined.

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

T1004.2-E-Hatfield.doc

Public Hearing Results

All 4 parts of this code change were heard by the IBC General Code development committee.

PART I – IBC GENERAL

Committee Action: **Approved as Modified**

Modify proposal as follows:

G801.5 Prefabricated swimming pools. Prefabricated swimming pools in *floodways* shall meet the requirements of Section G103.5.

(This simply retains current language in G801.5. Portions not shown remain unchanged)

Committee Reason: This proposal more appropriately references the pool code for more comprehensive provisions throughout the IBC. The modification simply retains language that corresponds to section 105.2 item 9 that requires a permit for prefabricated pools. The permit requirements need to be modified before the requirements in Section G801.5 can be deleted.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler, City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

SECTION 3109
SWIMMING POOLS AND SPAS

3109.1 General. The design and construction of swimming pools and spas shall comply with the *International Swimming Pool and Spa Code*.

Commenter's Reason: This modification substitutes a simple reference to the International Swimming Pool and Spa Code for the original proposal. This is the only change necessary to incorporate the new Pool and Spa Code into the IBC.

The bulk of the original proposal consists of changes in terminology, largely replacing the term "swimming pool" with "aquatic vessel". We're suggesting that this change not be made. The change in terminology is unnecessary. The name of the referenced code is "International Swimming Pool and Spa Code". The IBC definition of "swimming pool" includes spas, hot tubs, wading pools, and other facilities, consistent with the proposed definition of "aquatic vessel". Furthermore, "aquatic vessel" is an obscure term that isn't commonly understood to mean "swimming pool". The term "vessel" is commonly used to refer to ships, and adding "aquatic" reinforces the impression that an "aquatic vessel" is a boat. Adding a definition to the code solves the technical issue with the use of the term, but it leaves us using an awkward and unusual term to refer to a common object.

The original proposal contains one additional technical change. It replaces the Table 1004.1.2 floor area allowance for pools with a reference to the Pool and Spa Code. Our modification eliminates that change. Determination of occupant loads is a fundamental aspect of the design of means of egress systems, and belongs in the egress chapter of the IBC rather than in a specialty code. If the proponents prefer the numbers used in the Pool and Spa Code, those numbers should be proposed for inclusion in the IBC. Code change proposals related to floor area allowances should be reviewed by the Means of Egress Committee.

G193-12, Part I

Final Action: AS AM AMPC____ D

G193-12, PART II
PART II – INTERNATIONAL MECHANICAL CODE
202, 403.2.1, Table 403.3, 916, Table 916, 1401.1

Proposed Change as Submitted

Proponents: Kris Bridges, CBO, Chair, ICC Swimming Pool Code Drafting Committee (SPCDC) & Jennifer Hatfield, J. Hatfield & Associates, PL, representing the Association of Pool & Spa Professionals

THIS IS A 4 PART CODE CHANGE.PART All PARTS WILL BE HEARD BY THE IBC GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC GENERAL CODE DEVELOPMENT COMMITTEE.

PART II – IMC

Revise as follows:

IMC 403.2.1 Recirculation of air. The outdoor air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling to another or to dissimilar occupancies.
2. Supply air to a ~~swimming pool~~ aquatic vessel and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces.
3. Where mechanical exhaust is required by Note b in Table 403.3, recirculation of air from such spaces shall be prohibited. All air supplied to such spaces shall be exhausted, including any air in excess of that required by Table 403.3.
4. Where mechanical exhaust is required by Note g in Table 403.3, mechanical exhaust is required and recirculation is prohibited where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces.

IMC TABLE 403.3
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE R_a CFM/FT[2a]	DEFAULT OCCUPANT DENSITY #/1000 FT[2a]	EXHAUST AIRFLOW RATE CFM/FT[2a]
Sports and amusement ~~Swimming pools~~ Aquatic vessels (pool and deck area)	--	**0.48**	--	--

IMC SECTION 916
~~POOL AND SPA~~ AQUATIC VESSEL HEATERS

IMC 916.1 General. ~~Pool and spa~~ Aquatic vessel heaters shall be installed in accordance with the manufacturer's installation instructions. Oil-fired ~~pool and spa~~ aquatic vessel heaters shall be tested in accordance with UL 726. Electric p~~ool and spa~~ aquatic vessel heaters shall be tested in accordance with UL 1261.

IMC 1401.1 Scope. This chapter shall govern the design, construction, installation, alteration and repair of systems, equipment and appliances intended to utilize solar energy for space heating or cooling, domestic hot water heating, ~~swimming pool~~ aquatic vessel heating or process heating.

Add new definition as follows: *(Same definition as in IBC)*

IMC SECTION 202
DEFINITIONS

AQUATIC VESSEL. Any vessel, permanent or temporary, intended for swimming, bathing, or wading and that is designed and manufactured to be connected to a *circulation system*. Portable vessels 12 inches or less in designed water depth which are drained and filled daily are not considered *aquatic vessels*. For purposes of this code, the term is used to identify all the types of vessels governed by this code, including: swimming pools, aquatic facilities, *spas* and hot tubs, and related equipment. Such vessels are either used in a *residential* application or in a public application.

Reason: IMC, IFGC, IPC and IPSDC. The new International Swimming Pool & Spa Code (ISPSC) utilizes a new definition to encompass all different types of pools, hot tubs, and spas – aquatic vessel. This proposal utilizes the new terminology found in the ISPSC for consistency between the I-codes.

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

T1004.2-E-Hatfield.doc

Public Hearing Results

PART II – IMC
Committee Action: **Approved as Submitted**

Committee Reason: Based upon action on G193-12 Part I and for correlation with the ISPSC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler, City of Seattle Department of Planning & Development, requests Disapproval.

Commenter's Reason: This modification substitutes a simple reference to the International Swimming Pool and Spa Code for the original proposal. This is the only change necessary to incorporate the new Pool and Spa Code into the IBC and revisions to other I-Codes were felt unnecessary.

The bulk of the original proposal consists of changes in terminology, largely replacing the term "swimming pool" with "aquatic vessel". We're suggesting that this change not be made. The change in terminology is unnecessary. The name of the referenced code is "International Swimming Pool and Spa Code". The IBC definition of "swimming pool" includes spas, hot tubs, wading pools, and other facilities, consistent with the proposed definition of "aquatic vessel". Furthermore, "aquatic vessel" is an obscure term that isn't commonly understood to mean "swimming pool". The term "vessel" is commonly used to refer to ships, and adding "aquatic" reinforces the impression that an "aquatic vessel" is a boat. Adding a definition to the code solves the technical issue with the use of the term, but it leaves us using an awkward and unusual term to refer to a common object.

The original proposal contains one additional technical change. It replaces the Table 1004.1.2 floor area allowance for pools with a reference to the Pool and Spa Code. Our modification eliminates that change. Determination of occupant loads is a fundamental aspect of the design of means of egress systems, and belongs in the egress chapter of the IBC rather than in a specialty code. If the proponents prefer the numbers used in the Pool and Spa Code, those numbers should be proposed for inclusion in the IBC. Code change proposals related to floor area allowances should be reviewed by the Means of Egress Committee.

G193-12, Part II

Final Action: AS AM AMPC____ D

G193-12, PART III
PART III – INTERANTIONAL FUEL GAS CODE
202, 617.1

Proposed Change as Submitted

Proponents: Kris Bridges, CBO, Chair, ICC Swimming Pool Code Drafting Committee (SPCDC) & Jennifer Hatfield, J. Hatfield & Associates, PL, representing the Association of Pool & Spa Professionals

THIS IS A 4 PART CODE CHANGE.PART All PARTS WILL BE HEARD BY THE IBC GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC GENERAL CODE DEVELOPMENT COMMITTEE.

PART III – IFGC

Revise as follows:

IFGC SECTION 617
~~POOL AND SPA~~ AQUATIC VESSEL HEATERS

IFGC 617.1 General. ~~Pool and spa~~ Aquatic vessel heaters shall be tested in accordance with ANSI Z21.56 and shall be installed in accordance with the manufacturer's installation instructions.

Add new definition as follows: *(Same definition as in IBC)*

IFGC SECTION 202
DEFINITIONS

AQUATIC VESSEL. Any vessel, permanent or temporary, intended for swimming, bathing, or wading and that is designed and manufactured to be connected to a *circulation system*. Portable vessels 12 inches or less in designed water depth which are drained and filled daily are not considered *aquatic vessels*. For purposes of this code, the term is used to identify all the types of vessels governed by this code, including: swimming pools, aquatic facilities, *spas* and hot tubs, and related equipment. Such vessels are either used in a *residential* application or in a public application.

Reason: IMC,IFGC, IPC and IPSDC. The new International Swimming Pool & Spa Code (ISPSC) utilizes a new definition to encompass all different types of pools, hot tubs, and spas – aquatic vessel. This proposal utilizes the new terminology found in the ISPSC for consistency between the I-codes.

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

T1004.2-E-Hatfield.doc

Public Hearing Results

PART III – IFGC
Committee Action: **Approved as Submitted**

Committee Reason: Based upon action on G193-12 Part I and for correlation with the ISPSC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler, City of Seattle, representing Department of Planning & Development, requests Disapproval.

Commenter's Reason: This modification substitutes a simple reference to the International Swimming Pool and Spa Code for the original proposal. This is the only change necessary to incorporate the new Pool and Spa Code into the IBC and revisions to other I-Codes were felt unnecessary.

The bulk of the original proposal consists of changes in terminology, largely replacing the term "swimming pool" with "aquatic vessel". We're suggesting that this change not be made. The change in terminology is unnecessary. The name of the referenced code is "International Swimming Pool and Spa Code". The IBC definition of "swimming pool" includes spas, hot tubs, wading pools, and other facilities, consistent with the proposed definition of "aquatic vessel". Furthermore, "aquatic vessel" is an obscure term that isn't commonly understood to mean "swimming pool". The term "vessel" is commonly used to refer to ships, and adding "aquatic" reinforces the impression that an "aquatic vessel" is a boat. Adding a definition to the code solves the technical issue with the use of the term, but it leaves us using an awkward and unusual term to refer to a common object.

The original proposal contains one additional technical change. It replaces the Table 1004.1.2 floor area allowance for pools with a reference to the Pool and Spa Code. Our modification eliminates that change. Determination of occupant loads is a fundamental aspect of the design of means of egress systems, and belongs in the egress chapter of the IBC rather than in a specialty code. If the proponents prefer the numbers used in the Pool and Spa Code, those numbers should be proposed for inclusion in the IBC. Code change proposals related to floor area allowances should be reviewed by the Means of Egress Committee.

G193-12, Part III
Final Action: AS AM AMPC____ D

G193-12, PART IV

PART IV – INTERNATIONAL PLUMBING CODE
IPC 202, 423.1, 612.1, 801.1, 802.1.4; IPSDC 202 401.3.2, Table 406.1, Table 604.1(2), Table 802.7.2, Table 802.8

Proposed Change as Submitted

Proponents: Kris Bridges, CBO, Chair, ICC Swimming Pool Code Drafting Committee (SPCDC) & Jennifer Hatfield, J. Hatfield & Associates, PL, representing the Association of Pool & Spa Professionals

THIS IS A 4 PART CODE CHANGE.PART All PARTS WILL BE HEARD BY THE IBC GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC GENERAL CODE DEVELOPMENT COMMITTEE.

PART IV – IPC/IPSDC

Revise as follows:

IPC 423.1 Water connections. Baptisteries, ornamental and lily pools, aquariums, ornamental fountain basins, ~~swimming pools~~ aquatic vessels, and similar constructions, where provided with water supplies, shall be protected against backflow in accordance with Section 608.

IPC 612.1 Solar systems. The construction, installation, alterations and repair of systems, equipment and appliances intended to utilize solar energy for space heating or cooling, domestic hot water heating, ~~swimming pool~~ aquatic vessel heating or process heating shall be in accordance with the International Mechanical Code.

IPC 801.1 Scope. This chapter shall govern matters concerning indirect waste piping and special wastes. This chapter shall further control matters concerning food-handling establishments, sterilizers, clear-water wastes, ~~swimming pools~~ aquatic vessels, methods of providing air breaks or air gaps, and neutralizing devices for corrosive wastes.

IPC 802.1.4 ~~Swimming pools~~ Aquatic vessels. Where wastewater from ~~swimming pools~~ aquatic vessels, backwash from filters and water from ~~pools~~ aquatic vessel deck drains discharge to the building drainage system, the discharge shall be through an indirect waste pipe by means of an air gap.

Delete and substitute definition as follows: *(Same definition as in IBC)*

IPC SECTION 202
DEFINITIONS

~~**SWIMMING POOL**. Any structure, basin, chamber or tank containing an artificial body of water for swimming, diving or recreational bathing having a depth of 2 feet (610 mm) or more at any point.~~

AQUATIC VESSEL. Any vessel, permanent or temporary, intended for swimming, bathing, or wading and that is designed and manufactured to be connected to a *circulation system*. Portable vessels 12 inches or less in designed water depth which are drained and filled daily are not considered *aquatic vessels*. For purposes of this code, the term is used to identify all the types of vessels governed by this code, including: swimming pools, aquatic facilities, *spas* and hot tubs, and related equipment. Such vessels are either used in a *residential* application or in a public application.

Revise IPSDC as follows:

IPSDC 401.3.2 Undisturbed site. The replacement system shall not be disturbed to the extent that the site area is no longer suitable. The replacement system area shall not be used for construction of buildings, parking lots or parking areas, below-ground ~~swimming pools~~ aquatic vessels or any other use that will adversely affect the replacement area.

IPSDC TABLE 406.1
MINIMUM HORIZONTAL SEPARATION DISTANCES FOR SOIL ABSORPTION SYSTEMS

ELEMENT	DISTANCE (feet)
~~Swimming Pool~~ Aquatic vessel	**15**

(Portions of table not shown remain unchanged)

IPSDC TABLE 604.1(2)
CONVERSION FACTOR

BUILDING CLASSIFICATION	UNITS	FACTOR
~~Swimming pool~~ Aquatic vessel bathhouse	1 per person	0.2

(Portions of table not shown remain unchanged)

IPSDC TABLE 802.7.2
ADDITIONAL CAPACITY FOR OTHER BUILDINGS

BUILDING CLASSIFICATION	CAPACITY (GALLONS)
~~Swimming pool~~ Aquatic vessel bathhouses (per person)	10

(Portions of table not shown remain unchanged)

IPSDC TABLE 802.8
MINIMUM HORIZONTAL SEPARATION DISTANCES FOR TREATMENT TANKS

ELEMENT	DISTANCE (feet)
~~Swimming pool~~ Aquatic vessel	**15**

(Portions of table not shown remain unchanged)

Add new definition as follows: *(Same definition as in IBC)*

IPSDC SECTION 202
DEFINITIONS

AQUATIC VESSEL. Any vessel, permanent or temporary, intended for swimming, bathing, or wading and that is designed and manufactured to be connected to a *circulation system*. Portable vessels 12 inches or less in designed water depth which are drained and filled daily are not considered *aquatic vessels*. For purposes of this code, the term is used to identify all the types of vessels governed by this code, including: swimming pools, aquatic facilities, *spas* and hot tubs, and related equipment. Such vessels are either used in a *residential* application or in a public application.

Reason: IMC,IFGC, IPC and IPSDC. The new International Swimming Pool & Spa Code (ISPSC) utilizes a new definition to encompass all different types of pools, hot tubs, and spas – aquatic vessel. This proposal utilizes the new terminology found in the ISPSC for consistency between the I-codes.

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

T1004.2-E-Hatfield.doc

Public Hearing Results

PART IV – IPC
Committee Action: **Approved as Submitted**

Committee Reason: Based upon action on G193-12 Part I and for correlation with the ISPSC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler, City of Seattle, representing Department of Planning & Development, requests Disapproval.

Commenter's Reason: This modification substitutes a simple reference to the International Swimming Pool and Spa Code for the original proposal. This is the only change necessary to incorporate the new Pool and Spa Code into the IBC and revisions to other I-Codes were felt unnecessary.

The bulk of the original proposal consists of changes in terminology, largely replacing the term "swimming pool" with "aquatic vessel". We're suggesting that this change not be made. The change in terminology is unnecessary. The name of the referenced code is "International Swimming Pool and Spa Code". The IBC definition of "swimming pool" includes spas, hot tubs, wading pools, and other facilities, consistent with the proposed definition of "aquatic vessel". Furthermore, "aquatic vessel" is an obscure term that isn't commonly understood to mean "swimming pool". The term "vessel" is commonly used to refer to ships, and adding "aquatic" reinforces the impression that an "aquatic vessel" is a boat. Adding a definition to the code solves the technical issue with the use of the term, but it leaves us using an awkward and unusual term to refer to a common object.

The original proposal contains one additional technical change. It replaces the Table 1004.1.2 floor area allowance for pools with a reference to the Pool and Spa Code. Our modification eliminates that change. Determination of occupant loads is a fundamental aspect of the design of means of egress systems, and belongs in the egress chapter of the IBC rather than in a specialty code. If the proponents prefer the numbers used in the Pool and Spa Code, those numbers should be proposed for inclusion in the IBC. Code change proposals related to floor area allowances should be reviewed by the Means of Egress Committee.

G193-12, Part IV
Final Action: AS AM AMPC____ D

G195-12
3109.4

Proposed Change as Submitted

Proponent: Steve Pfeiffer, City of Seattle, Dept. of Planning & Development (steve.pfeiffer@seattle.gov)

Revise as follows

3109.4 Residential swimming pools. Residential swimming pools shall ~~comply~~ be completely enclosed by a barrier complying with Sections 3109.4.1 through 3109.4.3.

> **Exception:** A swimming pool with a power safety cover or a spa with a safety cover complying with ASTM F 1346 need not comply with Section 3109.4.

Reason: The purpose of this change is to clarify the location where barriers are required at a residential swimming pool. The current code provisions specify how to construct a barrier, but don't specify that the pool must be entirely surrounded by the barrier. The proposed language is similar to Section 3109.3 for public swimming pools.

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

3109.4-G-PFEIFFER.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the proponents request and action taken on G193-12 Parts I through IV.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Lupton, City of Seattle representing Dept of Planning & Development, requests Approval as Submitted.

Commenter's Reason: The purpose of this change is to clarify the location where barriers are required at a residential swimming pool. The current code provisions specify how to construct a barrier, but don't specify that the pool must be entirely surrounded by the barrier. The proposed language is similar to Section 3109.3 for public swimming pools. If G193 does not pass then this code change is still necessary. If G193 passes at the Final Action Hearing then the proposal will be withdrawn.

G195-12
Final Action: AS AM AMPC____ D

G198-12
202, 107.2.6 (New), 3101.1, 3112 (New)

Proposed Change as Submitted

Proponent: Carl F. Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee (CTC)

Revise as follows:

3101.1 Scope. The provisions of this chapter shall govern special building construction including membrane structures, temporary structures, *pedestrian walkways* and tunnels, automatic *vehicular gates*, *awnings* and *canopies*, *marquees*, signs, and towers, ~~and~~ antennas, and relocatable buildings.

SECTION 3112
RELOCATABLE BUILDINGS

3112.1 General. The provisions of this section shall apply to relocatable buildings. Relocatable buildings manufactured after the effective date of this code shall comply with the applicable provisions of this code.

3112.1.1 Compliance. A relocatable building transported to a new location, or a relocatable building that is undergoing *alteration or additions* shall comply with Section 3410.

3112.2 Supplemental information. Supplemental information specific to a relocatable building shall be submitted to the authority having jurisdiction, and shall, *as a minimum,* include all of the following:

1. Application for approval or permit
2. Manufacturer's name, address, contact information
3. Date of manufacture
4. Serial number of module
5. Manufacturer's design drawings
6. Type of construction in accordance with Section 602.
7. Occupancy type in accordance with Section 302.
8. Design loads including: roof live load, roof snow load, floor live load, wind load and seismic site class, use group and design category
9. Additional building planning and structural design data
10. Site plan indicating the location of the relocatable building
11. Site built structure or appurtenance attached to the relocatable building

3112.3 Manufacturer's Data Plate. The manufactures data plate shall be the basis for determining code compliance. Each relocatable module shall have a data plate that is posted in the location as noted on the drawings, and shall include the following information:

1. Manufacturer's name and address
2. Serial number
3. Date of manufacture
4. The quality assurance agency or approved inspection agency
5. Codes, and standards of construction
6. Design live roof load, design live floor load, snow load, wind and seismic design
7. Envelope thermal resistance values
8. Electrical service size
9. Fuel burning equipment and size
10. Special limitations if any

3112.4 Inspections. Inspections of a relocatable building shall be performed in accordance with Section 110.4 of this code during off-site construction, and the applicable sections of Section 110.3 during installation at the site.

Add new definition as follows:

SECTION 202
DEFINITIONS

RELOCATABLE BUILDING. A partially or completely assembled building constructed and designed to be reused multiple times and transported to different building sites.

Add new text as follows:

107.2.6 Relocatable buildings. Construction documents for relocatable buildings shall comply with this section and Section 3112.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Unlike site-built buildings, which are typically intended to remain on their original site for the life of the building, relocatable modular buildings are designed and intended for relocation, reuse and/or repurposing. Many states have statutes that govern the building and relocating of relocatable modular buildings. For those that do not have state mandated requirements, much confusion and inconsistency exists about the requirements for relocatable modular buildings as existing buildings.

The Modular Building Institute (MBI) (www.modular.org) estimates that there are over 600,000 code compliant relocatable buildings in use in North America today. While it is impossible to determine the exact amount owned by the public at large, MBI estimates that public school districts across North America collectively own and operate about 180,000 relocatable classrooms with the industry owning and leasing an additional 120,000. Additionally, the industry owns and leases approximately 280,000 relocatable buildings for various other business occupancies, including construction site offices and temporary sales offices.

The Code Technology Committee Study Group on Relocatable Modular Buildings identified a number of unique characteristics of relocatable modular buildings that are unlike site-built buildings. Their findings are as follows:

- There are sections of the IBC that are applicable equally to both site-built and relocatable modular buildings, particularly for new construction.
- There are sections of the conflicting code sections that cannot be applied to both site-built and relocatable modular buildings, specifically related to construction documents, inspection, and relocation.

The IBC does not have specific requirements on how to treat these buildings. In the absence of clear definitions and requirements that are specific to both new and existing relocatable modular buildings, many code officials attempt to apply similar, but non-related sections of the building code intended for site built buildings to the relocatable modular industry. There are unique attributes to relocatable modular buildings that warrant their own requirements in a new chapter in this code.

CTC has submitted two proposals on the subject of relocatable modular buildings. One proposal for new construction (this proposal) and a second proposal to address the relocation of modular buildings (proposal to Chapter 34). This proposal includes:

- The definition has been distilled from industry publications and definitions found in state statutes that govern modular (industrialized) buildings. This definition was also approved in the 2012 IGCC.
- Identification and inclusion of relocatables into Special Construction, Chapter 31. This chapter applies to new relocatable buildings, and also new site built structures.

Moving this document forward through the ICC code development process will help the modular building industry comply with the intent of the code, provide a clear and consistent path for enforcement professionals, and for compliance by owners of relocatable buildings who wish to re-use or repurpose their existing buildings.

Cost impact: This code change proposal will not increase the cost of construction due to the re-usable/relocatable nature of such buildings.

3112 (NEW)-G-BALDASSARRA-CTC.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The concept was acceptable but the proposal was disapproved with concern for the varied use of such buildings without a particular occupancy classification being associated with the buildings. Also, it was felt that the proposal needed to better address change of occupancy. Currently only alterations and additions were addressed. Additionally, there was a suggestion that perhaps this should be located within and appendix or a guidance document.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee requests Approval as Modified by this public comment

Modify the proposal as follows:

SECTION 3112
RELOCATABLE BUILDINGS

3112.1 General. The provisions of this section shall apply to relocatable buildings. Relocatable buildings manufactured after the effective date of this code shall comply with the applicable provisions of this code.

3112.1.1 Compliance. A relocatable building transported to a new location, or a relocatable building that is undergoing alteration, ~~or~~ additions, <u>or change in occupancy group</u> shall comply with Section 3410.

3112.2 Supplemental information. Supplemental information specific to a relocatable building shall be submitted to the authority having jurisdiction, and shall, *as a minimum,* include all of the following:

1. Application for approval or permit
~~7.~~ <u>2.</u> <u>Occupancy</u> ~~type~~ <u>group</u> ~~in accordance with Section 302.~~
~~2.~~ <u>3.</u> Manufacturer's name, address, ~~contact information~~
~~3.~~ <u>4.</u> Date of manufacture
~~4.~~ <u>5.</u> Serial number of module
~~5.~~ <u>6</u>. Manufacturer's design drawings
~~6.~~ <u>7</u>. Type of construction in accordance with Section 602.
8. Design loads including: roof live load, roof snow load, floor live load, wind load and seismic site class, use group and design category
9. Additional building planning and structural design data
10. Site plan indicating the location of the relocatable building
11. Site built structure or appurtenance attached to the relocatable building

3112.3 Manufacturer's Data Plate. The manufactures data plate shall be the basis for determining code compliance. Each relocatable module shall have a data plate that is posted in the location as noted on the drawings, and shall include the following information:

<u>1.</u> <u>Occupancy group</u>
~~1.~~ <u>2</u>. Manufacturer's name and address
3. Date of manufacture
~~2.~~ <u>4.</u> Serial number <u>of module</u>
~~6.~~ <u>5</u>. <u>Design live roof load, design live floor load, snow load, wind and seismic design</u>
~~4.~~ <u>6.</u> ~~The~~ <u>Q</u>uality assurance agency or approved inspection agency
~~5.~~ <u>7.</u> Codes, and standards of construction
~~7.~~ <u>8.</u> Envelope thermal resistance values
~~8~~ <u>9.</u> Electrical service size
~~9.~~ <u>10</u>. Fuel burning equipment and size
~~10.~~ <u>11.</u> Special limitations if any

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Unlike traditional site-built buildings that are rarely, if ever, moved to another location, relocatable modular buildings are designed and intended to be relocated numerous times.

During the public hearing, there was general support for the new language in G198 that specifically addresses the unique conditions related to the permitting, installation, and inspection of new relocatable buildings. It was recognized that supplemental information is necessary to complete the permitting, approval and inspection process for new relocatable modular buildings.

Proposal G203-12 addresses the requirements to approve and re-inspect existing relocatable modular buildings when they are subsequently transported from one site to another site.

This public comment addresses the concern expressed by the committee about identifying the occupancy group of the new modular building when it is delivered from the factory. The occupancy group must be designated in the supplemental information submitted to the building department, and also must be found on the manufacturers data plate which is physically attached to each module.

The lists in 3112.2 and 3112.3 were modified to incorporate the occupancy group, and to be consistent with each other.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Relocatable Modular Buildings". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/RelocatableModularBuildings.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

G198-12

Final Action: AS AM AMPC____ D

G199-12

202, Table 503, 1609.1.2, 2405.3, 2606.11, 2607.4, 2609.4, 3112 (New), 3102.1

Proposed Change as Submitted

Proponent: Vickie J. Lovell, InterCode Incorporated, representing National Greenhouse Manufacturers Association (vickie@InterCodeinc.com)

Add new text as follows:

SECTION 3112
GREENHOUSES

3112.1 General. The provisions of this section shall apply to structures defined as greenhouses that are designed and used primarily for the cultivation, maintenance, or protection of plants. Greenhouses are constructed for agricultural production, educational purposes, research, retail or business uses.

3112.2 Definitions. The following terms are defined in Chapter 2.

GREENHOUSE
ATTACHED GREENHOUSE

3112.3 Occupancy. The occupancy provisions of this section shall apply to structures defined as greenhouses, and attached greenhouses.

3112.3.1 Group B. Greenhouses that are structurally attached to, but thermally isolated from college or university classrooms shall be classified as Group B.

3112.3.2 Group E. Greenhouses that are structurally attached to, but thermally isolated from elementary, middle or high school classrooms shall be classified as Group E.

3112.3.3 Group M. Greenhouses and attached greenhouses with access by the general access used primarily for the display and sale of plants shall be classified as Group M.

3112.3.4 Group U. Greenhouses that are any of the following shall be classified as Group U:

1. Greenhouses used primarily for the agricultural use for the production, cultivation, maintenance, or protection of plants.
2. Greenhouses that are accessory buildings to Group B, E, or M occupancies.
3. Utility or accessory greenhouses that are not classified in any specific occupancy.

3112.4 Type of Construction. Greenhouses shall be permitted to be constructed as Type I, II, III, IV or V construction. Combustible materials used in Type I and II construction shall be permitted in accordance with Section 603.

3112.5 Allowable Height and Area. The maximum allowable height and area for greenhouses shall comply with Table 3112.5. When an automatic sprinkler system is installed in accordance with Section 903.3.1.1, the values specified in Table 3112.5 for maximum building height is increased by 20 feet (6096mm) and the maximum number of stories is increased by one. These increases are permitted in addition to the building area increase in accordance with Sections 506.2 and 506.3.

3112.5.1 One-story unlimited area. The area of a one-story Group U agricultural building shall not be limited if the building is surrounded and adjoined by *public ways* or yards not less than 60 feet (18 288 mm) in width.

3112.5.2 Two-story unlimited area. The area of a two-story Group U agricultural building shall not be limited if the building is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width and is provided with an approved automatic sprinkler system throughout in accordance with Section 903.3.1.1.

TABLE 3112.5
BASIC ALLOWABLE AREA FOR GREENHOUSES

I		**II**		**III and IV**		**V**	
A	**B**	**A**	**B**	**III A and IV**	**III B**	**A**	**B**
ALLOWABLE AREA (square feet)a							
Unlimited	60,000	27,100	18,000	27,100	18,000	21,100	12,000
MAXIMUM HEIGHT IN STORIES							
Unlimited	12	4	2	4	2	3	2
MAXIMUM HEIGHT IN FEET							
Unlimited	160	65	55	65	55	50	40

3112.6 Mixed use and occupancy. Attached greenhouses shall comply with the requirements for mixed occupancies and use requirements in Section 508.

3112.6.1 Fire Rating. The fire rating for the exterior wall of an attached greenhouse classified as Group E, B, or M shall comply with Table 602. Where Table 705.3 permits nonbearing exterior walls with unlimited area of unprotected openings, the fire resistance rating for the exterior walls is 0 hours.

3112 7 Materials. Materials used for the exterior of greenhouses shall comply with Sections 3112.11 through 3112.12.5

3112.8 Means of egress. Greenhouses shall provide means of egress in accordance with Chapters 10.

3112. 9 Accessibility. Attached greenhouses with access by the general public in use Groups B, E, and M shall provide accessibility in accordance with Chapter 11.

3112.9.1 Use Group U. Greenhouses in use group U are exempt from Chapter 11 except as specified in this section.

3112.9.1.1 Employee work areas. Employees work areas shall comply with 1103.2.3 and 1104.3.1.

3112.9.1.2 Paved areas. Greenhouses with access to the general public shall be required to pave work areas and areas open to the general public in accordance with Section 1103.2.5.

3112.10 General Structural Design. Greenhouses with shall comply with the structural design requirements for live and dead loads appropriate for greenhouses in Chapter 16.

3112.10.1 Wind loads. All greenhouses are considered as Risk Category I as defined in Section 1604.5. Openings shall be permitted to be unprotected.

3112.11 Glass and Glazing. Glass and glazing used in greenhouses shall comply with Section 2405.

3112.11.1 Monolithic and multiple-layer sloped glazing systems. Glazing material, including annealed glass, is permitted to be installed without screens in the sloped glazing system of commercial greenhouses, or detached production greenhouses without public access, provided that the height of the greenhouse at the ridge does not exceed 30- feet (6096 mm) above grade.

3112.11.2 Greenhouse frames. Greenhouse frames shall be noncombustible if the height of the sloped glazing exceeds 30-feet (6096 mm) above grade.

3112.11.3 Energy. Greenhouses are exempt from fenestration requirements for U factor and SHGC, and envelope insulation of the International Energy Conservation Code.

3112.12 Light-transmitting Plastics. Light-transmitting plastics shall be permitted in lieu of plain glass in greenhouses and shall comply with Section 2606.

3112.12.1 Plastic wall panels. Greenhouses shall comply with Section 2607 for plastic wall panels. Greenhouses are not required to comply with the area limitations for plastic wall panels in Section 2607.4 but shall be limited as required for unprotected openings in accordance with 705.8

3112.12.2 Plastic glazing. Light transmitting plastic glazing shall comply with Section 2608.

3112.12.3 Plastic roof panels limitations. Greenhouses shall comply with Section 2609 for plastic roof panels. Greenhouses that have access by the general public are exempt from the area limitations of Table 2607.4 provided that the greenhouse has a minimum *fire separation distance* of 30 feet (1219 mm), or are equipped with an automatic sprinkler system in accordance with 903.3.1.1 and minimum fire separation distance of 4 feet (1219 mm). Group U greenhouses without access by the general public are exempt from the area limitations of Table 2607.4 provided that the greenhouse has a minimum fire separation distance of 4 feet (1219 mm).

3112.12.4 Shade and Curtain systems. Greenhouses that have access by the general public shall use material that is flame resistant with either of following:

1. Any textile shade or covering shall be flame resistant as determined by tests conducted in accordance with NFPA 701.
2. Any covering, other than textiles, shall have a *flame spread index* not greater than 25 when tested in accordance with ASTM E 84 or UL 723 in the form intended for use.

Any material is permitted to be used in a shade or curtain system in greenhouses without general public access.

3112.12.5 Plastic film. Plastic less than 30 feet (9144mm) above any floor, and plastic interior liners less than 20 mil (0.5 mm) in thickness used in greenhouses used in greenhouses without access by the general public is not required to comply with 311212.4.

3112.13 Membrane Structures. Greenhouses that are air-inflated or air-supported shall comply with Section 3103.1. Greenhouses that use an arch or truss to support plastic film shall not be considered a membrane structure.

Add new definitions as follows:

GREENHOUSE. A structure designed and used primarily for the cultivation, maintenance, or protection of plants. Greenhouses may or may not be accessible to the general public.

ATTACHED GREENHOUSE. A greenhouse that is structurally attached to another building, but thermally isolated from the adjoining building.

Revise as follows:

3102.1 General. The provisions of Sections 3102.1 through 3102.8 shall apply to air-supported, air-inflated, membrane covered cable and membrane-covered frame structures, collectively known as membrane structures, erected for a period of 180 days or longer. Those erected for a shorter period of time shall comply with the *International Fire Code*. Membrane structures covering water storage facilities, water clarifiers, water treatment plants, sewage treatment plants, ~~greenhouses~~ and similar facilities not used for human occupancy are required to meet only the requirements of Sections 3102.3.1 and 3102.7. Membrane structures erected on a building, balcony, deck or other structure for any period of time shall comply with this section.

1609.1.2 Protection of openings. In *wind-borne debris regions*, glazing in buildings shall be impact resistant or protected with an impact-resistant covering meeting the requirements of an *approved* impact-resistant standard or ASTM E 1996 and ASTM E 1886 referenced herein as follows:

1. Wood structural panels with a minimum thickness of $^{7}/_{16}$ inch (11.1 mm) and maximum panel span of 8 feet (2438 mm) shall be permitted for opening protection in one- and two-story buildings classified as Group R-3 or R-4 occupancy.

   Panels shall be precut so that they shall be attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided. Attachments shall be designed to resist the components and cladding loads determined in accordance with the provisions of ASCE 7, with corrosion-resistant attachment hardware provided and anchors permanently installed on the building. Attachment in accordance with Table 1609.1.2 with corrosion resistant attachment hardware provided and anchors permanently installed on the building is permitted for buildings with a mean roof height of 45 feet (13 716 mm) or less where V_{asd} determined in accordance with Section 1609.3.1 does not exceed 140 mph (63 m/s).
2. Glazing in *Risk Category* I buildings as defined in Section 1604.5~~, including greenhouses that are occupied for growing plants on a production or research basis, without public access~~ shall be permitted to be unprotected.

   Exceptions:

   1. through 3. *(Portions of text not shown remain unchanged)*

2405.3 Screening. Where used in monolithic glazing systems, heat-strengthened glass and fully tempered glass shall have screens installed below the glazing material. The screens and their fastenings shall: (1) be capable of supporting twice the weight of the glazing; (2) be firmly and substantially fastened to the framing members and (3) be installed within 4 inches (102 mm) of the glass. The screens shall be constructed of a noncombustible material not thinner than No. 12 B&S gage (0.0808 inch) with mesh not larger than 1 inch by 1 inch (25 mm by 25 mm). In a corrosive atmosphere, structurally equivalent noncorrosive screen materials shall be used. Heat-strengthened glass, fully tempered glass and wired glass, when used in multiple-layer glazing systems as the bottom glass layer over the walking surface, shall be equipped with screening that conforms to the requirements for monolithic glazing systems.

Exception: In monolithic and multiple-layer sloped glazing systems, the following applies:

1. Fully tempered glass installed without protective screens where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane shall have the highest point of the glass 10 feet (3048 mm) or less above the walking surface.
2. Screens are not required below any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. ~~Any glazing material, including annealed glass, is permitted to be installed without screens in the sloped glazing systems of commercial or detached noncombustible greenhouses used exclusively for growing plants and not open to the public, provided that the height of the greenhouse at the ridge does not exceed 30 feet (9144 mm) above grade.~~
4. *(no change to text)*
5. *(no change to text)*

~~**2606.11 Greenhouses.** Light-transmitting plastics shall be permitted in lieu of plain glass in greenhouses.~~

2607.4 Area limitation and separation. The maximum area of a single wall panel and minimum vertical and horizontal separation requirements for exterior light-transmitting plastic wall panels shall be as provided for in Table 2607.4. The maximum percentage of wall area of any *story* in light-transmitting plastic wall panels shall not exceed that indicated in Table 2607.4 or the percentage of unprotected openings permitted by Section 705.8, whichever is smaller.

Exceptions:

1. In structures provided with approved flame barriers extending 30 inches (760 mm) beyond the *exterior wall* in the plane of the floor, a vertical separation is not required at the floor except that provided by the vertical thickness of the flame barrier projection.
2. Veneers of approved weather-resistant light-transmitting plastics used as exterior siding in buildings of Type V construction in compliance with Section 1406.
3. ~~The area of light-transmitting plastic wall panels in *exterior walls* of greenhouses shall be exempt from the area limitations of Table 2607.4 but shall be limited as required for unprotected openings in accordance with Section 704.8.~~

2609.4 Area limitations. Roof panels shall be limited in area and the aggregate area of panels shall be limited by a percentage of the floor area of the room or space sheltered in accordance with Table 2609.4.

Exceptions:

1. The area limitations of Table 2609.4 shall be permitted to be increased by 100 percent in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Low-hazard occupancy buildings, such as swimming pool shelters, shall be exempt from the area limitations of Table 2609.4, provided that the buildings do not exceed 5,000 square feet (465 m_2) in area and have a minimum fire separation distance of 10 feet (3048 mm).
3. ~~Greenhouses that are occupied for growing plants on a production or research basis, without public access, shall be exempt from the area limitations of Table 2609.4 provided they have a minimum fire separation distance of 4 feet (1220 mm).~~
4. *(no change to text)*

TABLE 503
ALLOWABLE BUILDING HEIGHTS AND AREAS[a]
Building height limitations shown in feet above grade plane. Story limitations shown as stories above grade plane. Building area limitations shown in square feet, as determined by the definition of "Area, building," per story

(Portions of table not shown remain unchanged)

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.
A = building area per story, S = stories above grade plane, UL = Unlimited, NP = Not permitted.
a. See the following sections for general exceptions to Table 503:
1. Section 504.2, Allowable building height and story increase due to automatic sprinkler system installation.
2. Section 506.2, Allowable building area increase due to street frontage.
3. Section 506.3, Allowable building area increase due to automatic sprinkler system installation.
4. Section 507, Unlimited area buildings.
5. <u>See Section 3112 for allowable height and area for greenhouses.</u>

b. through d. *(no change to text)*

Reason: Because the primary purpose of a greenhouse is for the propagation of plants, and not for human comfort, many typical building requirements are not applicable or necessary for greenhouses. This proposal has been submitted to distinguish the use and purpose of greenhouses, which better defines the applicable code requirements, and appropriate exceptions to the code.

The word "greenhouse" used throughout the IBC is too general of a term. Definitions and descriptions of greenhouses have been proposed that make the distinctions between the purposes of greenhouses, which better defines their occupancy classification.

Existing requirements for fire safety, structural, allowable height and area, accessibility, and other provisions for greenhouses have been extracted from the current code, and relocated into this new section without any significant technical changes. In two locations, Table 1604.3, 1607.12.2.1, it was impractical to remove the word "greenhouses" due to context. Some new sections have been added that are not presently addressed in the code, but are based on common, accepted practice for greenhouse construction. Some applicable text has been derived from Appendix C Agricultural Buildings.

Greenhouses are a type of unique structure, not a type of use group. Greenhouses fall into categories depending on their use. Greenhouse use groups include B, E, M, and U.

Two distinguishing features between types of greenhouses for the purposes of code enforcement is the access by the public or not and whether they are attached to another structure. These situations have been addressed in numerous locations within the proposal.

Although employees, students, faculty, or members of the general public may occupy the space, the primary function of a greenhouse is to create a controlled environment for the propagation and cultivation of plants, and is intended to achieve the optimum environment for the protection of the plants from the outside environment. Below are photos of typical types of greenhouses.

Greenhouse for display and retail sales of plants intended for general public access

Production greenhouse for agricultural use without public access

Greenhouses used by universities for research and scientific studies, access is limited to students and faculty.

T503 Appendix C contains the height and area requirements for greenhouses.

A proposal has been submitted to Chapter 31, Special Construction, that provides the allowable height and area requirements for greenhouses.

202. Currently, there is no definition for greenhouse in the IBC, although there are numerous requirements for greenhouses in the IBC.

Greenhouses fall into categories depending on their use. Greenhouse can fall into different use groups including B, E, M, and U. A proposal has been submitted to Chapter 31 to distinguish the use and purpose of greenhouses, and better define the applicable code requirements and appropriate exceptions to the code.

Although employees, students, faculty, or the general public may occupy the space, the primary function of a greenhouse is to create a controlled environment for the propagation or maintenance of plants, and to achieve the optimum environment for the protection of the plants from the outside environment.

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

31XX(NEW)-G-Lovell.doc

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

3112.3.3 Group M. Greenhouses and attached greenhouses with access by the general ~~access~~ public used primarily for the display and sale of plants shall be classified as Group M occupancies.

3112.6.1 Fire resistance rating. The fire resistance rating for the exterior wall of an attached greenhouse classified as Group E, B, or M shall comply with Table 602. Where Table 705.3 permits nonbearing exterior walls with unlimited area of unprotected openings, the fire resistance rating for the exterior walls is 0 hours.

3112.10 General Structural Design. Greenhouses ~~with~~ shall comply with the structural design requirements for live and dead loads appropriate for greenhouses in Chapter 16.

3112.10.1 Wind loads. All greenhouses in Group U are considered as Risk Category I as defined in Section 1604.5. Openings in greenhouses without public access shall be permitted to be unprotected.

3112.11.1 Monolithic and multiple-layer sloped glazing systems. Glazing material, including annealed glass, is permitted to be installed without screens in the sloped glazing system of commercial ~~greenhouses~~, or detached production greenhouses without public access, provided that the height of the greenhouse at the ridge does not exceed 30- feet (6096 mm) above grade.

3112.12.4 Shade and Curtain systems. Greenhouses that have access by the general public shall use material that complies ~~is flame resistant~~ with either of following:

1. Any textile shade or covering shall comply with the fire propagation performance criteria contained in Test Method 1 or Test Method 2, as appropriate, of ~~be flame resistant as determined by tests conducted in accordance with~~ NFPA 701.
2. Any covering, other than textiles, shall have a *flame spread index* not greater than 25 when tested in accordance with ASTM E 84 or UL 723 in the form intended for use.

Any material is permitted to be used in a shade or curtain system in greenhouses without general public access.

3112.12.5 Plastic film. Plastic less than 30 feet (9144mm) above any floor, and plastic interior liners less than 20 mil (0.5 mm) in thickness used in greenhouses ~~used in greenhouses~~ without access by the general public is not required to comply with 311212.4.

(Portions not shown remain unchanged)

Committee Reason: These provisions were seen as necessary to be assembled in one location in the IBC and will improve the consistency of enforcement on these structures. The modifications addressed necessary language clean up, clarification of which greenhouses would not require protection from wind and correlation with action taken on G84-12 addressing NFPA 701. It should be noted further clarification of the applicability of wind requirements to greenhouses should be made.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler, City of Seattle, representing Department of Planning & Development, requests Disapproval.

Commenter's Reason: While there may be some benefits to gathering together all the code provisions related to greenhouses, the flaws of this proposal by far outweigh any benefits. The proposal would be confusing to apply, and it contains contradictory and conflicting provisions. There may be the seeds of a decent code provision in this proposal, but this one is not ready to be adopted into the code. Here are some examples of problems with the proposal:

- Table 3112.5 is used in this proposal to apply to all greenhouses, regardless of occupancy classification. The table is copied from Appendix C where it applies only to Group U greenhouses, and, according to Section C101.1, item 5 it only applies to detached production greenhouses. In this proposal, the table applies to all occupancies, to non-production greenhouses, and to attached greenhouses. The proponents provided no justification for this huge increase in application of the table.
- The values in Table 3112.5 are much larger than would be allowed for other uses by Table 503, even for Group U. For example, in Table 503, the tabular values for Group U of Type VB construction are 1 story and 5,500 sq. ft. This proposal more than doubles that, by allowing 12,000 sq. ft. and 2 stories. Another example--the Table 503 values for Group E Type VB buildings are 9,500 sq. ft. and 1 story. In this proposal, a greenhouse, which could be attached to and classified as Group E, is given a tabular value of 12,000 sq. ft. and 2 stories. Similarly, the Table 503 values for Group M Type VB are 9,000 sq. ft. and 1 story. Sprinkler increases magnify the discrepancy between what's allowed in this proposal and what's allowed in Chapter 5. In every case other than Type IA, this proposal allows significantly greater area for greenhouses than Chapter 5 would allow, with no justification from the proponents other than that the table is in the appendix (which doesn't apply to the same occupancies).
- The definition of "attached greenhouse" says it is structurally attached to a building but thermally isolated. What would you call a greenhouse that's structurally attached but isn't thermally isolated? Because of this definition, it wouldn't be an "attached greenhouse." It's possible the proposal is meant to require all attached greenhouses to be thermally isolated, but it doesn't say that, and the definition wouldn't be the correct place for a requirement anyway.
- The definition of greenhouse says that greenhouses are "used primarily for the cultivation, maintenance, or protection of plants." Section 3112.3.4 says that greenhouses "used primarily for the cultivation, maintenance, or protection of plants" "<u>shall be</u> classified as Group U", therefore all greenhouses are classified as Group U. But, the 3 previous sections said some greenhouses <u>shall be</u> B, E, or M. There may be a way those provisions were meant to fit together, but this proposal doesn't tell us how to do it.
- Section 3112.9 scopes accessibility for "attached greenhouses". What about greenhouses that aren't attached? It's confusing for accessibility to be addressed in chapter 31, and inaccurate. Accessibility should be left to Chapter 11 where it can be more easily coordinated with federal accessibility laws.
- Section 3112.10 requires greenhouses to comply with live and dead load provisions of Chapter 16. What about snow loads, and lateral loads, and other loads that might cause a greenhouse to collapse? Wind is addressed in 3112.10.1 but it isn't scoped in 3112.10, and seismic loads are ignored. It's confusing for structural loads to be addressed in Chapter 31—they should be left to Chapter 16.
- 3112.11.3 says greenhouses are exempt from some provisions of the Energy Code. That provision belongs in the Energy Code—one code can't modify the provisions of a different code. Whether the Energy Code applies is determined by the Energy Code, not the Building Code.
- Section 3112.4 says greenhouses can be of any construction type, apparently without any limitation. Why is this necessary? Is there anything in the code that would limit the construction type? Is it intended to mean that they can be of any construction type regardless of other conditions, such as being attached to or part of a building of a higher construction type?
- There are numerous other problems with the drafting of the proposal; many are minor but they add up to a code change that would be difficult to use. Section 3112.6 is "Mixed use and occupancy"—subsection 3112.6.1 is about the fire rating of exterior walls, and seems to apply whether or not the greenhouse is in a mixed use building. Section 3112.7 is the scoping section for Section 3112.12—why are those sections so far apart? Section 3112.9.1.2 "Greenhouses…shall pave work areas…"—the greenhouse is going to do the paving?

G199-12

Final Action: AS AM AMPC____ D

G201-12
[A] 101.4, [A] 116.5, 201.3, 202, Chapter 34

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA., ICC Building Code Action Committee (BCAC)

Delete without substitution as follows:

~~CHAPTER 34~~
~~EXISTING STRUCTURES~~

Revise as follows:

[A] 101.4 Referenced codes. The other codes listed in Sections 101.4.1 through ~~101.4.6~~ 101.4.7 and referenced elsewhere in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference.

[A] 101.4.7 Existing buildings. The provisions of the *International Existing Building Code* shall apply to all matters governing the repairs, alterations, change of occupancy, additions and relocation of existing buildings.

[A] 116.5 Restoration. The structure or equipment determined to be unsafe by the *building official* is permitted to be restored to a safe condition. To the extent that repairs, *alterations* or *additions* are made or a change of occupancy occurs during the restoration of the structure, such repairs, *alterations*, *additions* or change of occupancy shall comply with the requirements of Section 105.2.2 and ~~Chapter 34~~ *the International Existing Building Code*.

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the *International Energy Conservation Code*, *International Fuel Gas Code*, *International Fire Code*, *International Existing Building Code,* *International Mechanical Code* or *International Plumbing Code,* such terms shall have the meanings ascribed to them as in those codes.

Revise as follows:

SECTION 202
DEFINITIONS

EXISTING STRUCTURE ~~(For Chapter 34)~~. A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building *permit* has been issued.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Consistency and coordination among the International Codes is one of the cornerstones of the ICC Code Development process. The ICC Board established the ICC Building Code Action Committee (BCAC) to act as a forum to deal with complex issues ahead of the Code Development Process, identify emerging issues and draft proposed code changes.

This proposed change is a result of the BCAC's work. This code change proposal was identified as the highest priority of the code change topics brought to the committee.

The purpose of this code change is to eliminate redundant and otherwise unnecessary and confusing requirements in the ICC family of codes. This is an effort to consolidate requirements for Existing Buildings into one code. The IEBC takes a more comprehensive approach to existing buildings than the IBC. The amount of language needed to properly regulate Existing Buildings would make the IBC Chapter 34 too large, or require the IBC to be split into two volumes. Therefore it is necessary and proper to regulate Existing Buildings under the provisions of the IEBC. This does not mean that the IEBC is the only document for regulation of Existing Buildings because the IEBC references the IBC and vice versa.

Some opposition to the deletion of Chapter 34 has been expressed in past code cycles with the reason that most jurisdictions do not adopt the IEBC. Data collected by ICC Government Relations indicates that 75% of all the States have adopted the IEBC locally or statewide. Of those 75%, 60% adopt the IEBC Statewide in some fashion.

Some opposition to the deletion of Chapter 34 has been expressed in past code cycles with the reason that jurisdictions do not want to adopt another book or that it would require burdensome legislative actions. The data collected by ICC Government Relations indicates that the IEBC is adopted in more jurisdictions than the Plumbing Code, yet the International Plumbing Code is referenced throughout the IBC in more sections than the IEBC. This would require jurisdictions to make several legislative actions to amend to those Plumbing Code references in the IBC, whereas they would only have to take one legislative action in the adoption of the IEBC.

The topic of governance of Existing Buildings has gone through several code cycles flip-flopping from being in the IBC, to being in an appendix, to being in a new code - the IEBC. Opposition to removing it from the IBC and putting it in the IEBC has been expressed that the IEBC was "not ready for prime time" while leaving Chapter 34 in the IBC. The text of Chapter 34 is duplicated in Chapter 4 and 14 of the IEBC and is now "ready for prime time"

It is problematic and confusing when attempting to create code changes to address Existing Buildings. The proponent would have to propose amendments to both the IBC and the IEBC. Furthermore a code change in one committee may fail to get approved but approved in the other. Therefore it only makes sense to have the requirements for Existing Buildings in one document, the IEBC. Then all focus and efforts to properly address regulations for Existing Buildings can be handled through one committee, one avenue and one process.

1. This is more of an editorial change, adding the IEBC.
2. There is no need to have the term "for Chapter 34" in the definition. The ICC codes contain language for Terms not defined in current code but are defined in other codes.
3. The IEBC is already referenced for compliance in IBC 3401.6. The IBC committee agreed to place the reference section 3401.6, stating that the IEBC was a viable design tool as a compliance option. The IEBC is one of the several code documents in the ICC Family of Codes. The requirements in Chapter 34 are duplicated in the IEBC in Chapters 4 and 14 as two separate compliance Chapters/Methods the Table below shows the section references between IBC Chapter 34 and IEBC Chapter 4 and 14.
4. This is proposed to be revised and consistent with language in Section 101.4. The IEBC should be a referenced code the same as the IFGC, IMC, IPC, IPMC, IFC and the IECC. The IEBC is referenced in IBC 3401.6.
5. This is more of an editorial change, adding the IEBC.

Comparison Table of the IBC Chapter 34 and the IEBC Chapter 4

IBC 34	IEBC 4	Notes	IBC 34	IEBC 4	Notes	IBC 34	IEBC 4	Notes
3401.1	401.1		3404.5	403.5		3408.3	407.3	
3401.2		Not in IEBC	3404.6	403.6		3408.4	407.4	
3401.3		Found in 301.2	3405.1	404.1		3409.1	408.1	
3401.4	401.2		3405.2	404.2		3409.2	408.2	
3401.5	401.3		3405.3	404.3		3410.1	409.1	
3402		Found in 202	3405.4	404.4		3411.1	410.1	
3403.1	402.1		3405.5	404.5		3411.2	410.2	
3403.2	402.2		3406.1	405.1		3411.3	410.3	
3403.3	402.3		3406.2	405.2		3411.4	410.4	
3403.4	402.4		3406.3	405.3		3411.5	410.5	
3403.5	402.5		3406.4	405.4		3411.6	410.6	
3404.1	403.1		3406.5	405.5		3411.7	410.7	
3404.2	403.2		3407.1	406.1		3411.8	410.8	
3404.3	403.3		3408.1	407.1		3411.9	410.9	
3404.4	403.4		3408.2	407.2		3412	1401	

Notes:

1. 3401.2 of the IBC contains maintenance language. Similar language regarding maintenance is found in the IPMC.
2. 3401.3 of the IBC is not found in IEBC Chapter 4, however it is found in 301.2.
3. 3402 of the IBC is the definition section and is not found in IEBC Chapter 4, however it is found in 202.

Bibliography: ICC Government Relations Code Adoption Resources.

Analysis:

1. This code change proposal will not remove Chapter 4 or Chapter 14 of the IEBC.
2. ICC Staff would have to change the references in Section 1009.7.2 from ~~3404.1~~ to <u>403.1 of the International Existing Building Code</u>
3. ICC Staff would have to change the references in Section 1103.2.2 from ~~3411~~ <u>410 of the International Existing Building Code</u>

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

Staff note: The IEBC does not have a definition for 'existing structure', however, it does have a definition for 'existing building' that reads as follows: [B] EXISTING BUILDING. A building erected prior to the date of the adoption of the appropriate code, or one for which a legal building permit has been issued.

CH 34-G-BAJNAI-BCAC.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal deletes Chapter 34 from the IBC. This proposal was preferred over G202 and G205 which would move the IEBC into the IBC in different forms. It was felt to be the most straightforward approach of simply referencing a single document and not moving all the text from the IEBC into the IBC. Keeping the IEBC as a document of choice will keep the Appendix A and C chapters intact. States such as NJ already address existing buildings within a separate document. Generally it was felt that it was necessary to go down this path to see if the membership is ready. The scoping of the IEBC is more appropriate than the IBC for existing buildings. Finally this will mean all existing building code related issues will go to a single committee. It should be noted that currently the structural provisions of both Chapter 34 and the IEBC are heard by the IBC Structural committee.

Analysis: This code change proposal considered by the IBC-General Committee was one of several proposals addressing the scope and application of the *International Building Code,* Chapter 34, and the *International Existing Building Code.* These proposals included G201-12, G202-12, and G205-12. The action taken by the IBC-General Committee on these proposals coupled with the final action taken at the 2012 Final Action Hearings will be limited to an advisory recommendation to the ICC Board of Directors who will determine the final disposition on these proposed changes.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Jim Edelson, New Buildings Institute, requests Approval as Submitted.

Commenter's Reason: Achieving energy use efficiency in existing commercial buildings is universally recognized as critical to most energy and environmental policies at local, state and federal levels. Consistency and coordination of the energy provisions in the ICC family of codes will establish an important framework for achieving meaningful, consistent and cost-effective reductions in energy consumption in existing buildings. An easily understood and enforceable path for the application of energy code measures to existing buildings will lead to higher levels of compliance and more widespread adoption. Thus, the approval of this proposal to achieve the consistency of existing building provisions in the IBC in this code cycle, followed by modifications to the IEBC, IECC and IRC in Code Cycle B, is one of the most important steps the ICC can take to reduce energy waste in commercial buildings.

Public Comment 2:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Disapproval.

Commenter's Reason: This code change removes provisions for existing buildings from the IBC and places all requirements into the IEBC. While I understand the purpose, I disagree with the result of having to use the IEBC for existing buildings. In G205-12, provisions that duplicate what is in the IEBC are put into the IBC so that the resource for both designers and code officials is the same single source document.

Analysis: This code change proposal considered by the IBC-General Committee was one of several proposals addressing the scope and application of the *International Building Code,* Chapter 34, and the *International Existing Building Code.* These proposals included G201-12, G202-12, and G205-12. As reported at the Code Development Hearing, the action taken by the IBC-General Committee on these proposals coupled with the final action taken at the 2012 Final Action Hearings will be limited to an advisory recommendation to the ICC Board of Directors who will determine the final disposition on these proposed changes in accordance with Section 1.3 of CP 28 which stipulates that the Board determines the scope of the I-Codes.

It should be noted that G201-12 and G205-12 have received Public Comments. For reference the committee action and summary of each proposal are as follows:

- G201-12 (Approved as submitted) – Deletes Chapter 34 and simply references the IEBC for existing buildings.
- G202-12 (Disapproved) – Places the work area method of the IEBC within Chapter 34 of the IBC. This is similar in approach to G205-12 except it focuses solely on building code issues.
- G205-12 (Disapproved) – Places the work area method of the IEBC within Chapter 34 of the IBC.

G201-12
Final Action: AS AM AMPC____ D

G203-12
202, 3401.1, 3410.1, 3410.2 (New); [IEBC (B0 401.1, 409.1, 409.2 (New)]

<u>Proposed Change as Submitted</u>

Proponent: Carl F. Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee (CTC)

Revise as follows:

<u>**RELOCATABLE BUILDING.** A partially or completely assembled building constructed and designed to be reused multiple times and transported to different building sites.</u>

3401.1 (IEBC [B] 401.1) Scope. The provisions of this chapter shall control the *alteration*, *repair*, *addition* ~~and~~ change of occupancy<u>, and the relocation</u> of existing buildings and structures.

> **Exception:** Existing *bleachers*, grandstands and folding and telescopic seating shall comply with ICC 300.

3410.1 (IEBC [B] 409.1) Conformance. Structures moved into or within the jurisdiction shall comply with the provisions of this code for new structures.

> <u>**Exception:** Existing relocatable buildings moved into or within the jurisdiction shall be permitted to comply with the provisions of Chapter 13 of the International Existing Building Code.</u>

<u>**3410.2 (IEBC [B] 409.2) Additions and Alterations.** Additions and alterations made to relocatable buildings shall comply with the applicable provisions of Section 3403 and 3404 or the International Existing Building Code.</u>

Reason: Unlike site-built buildings, which are typically intended to remain on their original site for the life of the building, relocatable modular buildings are designed and intended for relocation, reuse and/or repurposing. Many states have statutes that govern the building and relocating of relocatable modular buildings. For those that do not have state mandated requirements, much confusion and inconsistency exists about the requirements for relocatable modular buildings as existing buildings.

The Modular Building Institute (MBI) (www.modular.org) estimates that there are over 600,000 code compliant relocatable buildings in use in North America today. While it is impossible to determine the exact amount owned by the public at large, MBI estimates that public school districts across North America collectively own and operate about 180,000 relocatable classrooms with the industry owning and leasing an additional 120,000. Additionally, the industry owns and leases approximately 280,000 relocatable buildings for various other business occupancies, including construction site offices and temporary sales offices.

The Code Technology Committee Study Group on Relocatable Modular Buildings identified a number of unique characteristics of relocatable modular buildings that are unlike site-built buildings and compared them to the IBC and the IEBC. Their findings are as follows:

- There are provisions of the IBC that are not applicable/appropriate to relocatable modular buildings. Specifically, there is an unintended conflict between the IBC Section 3410, and the intent of the IEBC that cannot be realistically applied to relocatable modular buildings.
- There are sections of the conflicting code sections that cannot be applied to <u>both</u> site-built and relocatable modular buildings, specifically related to construction documents, inspection, and relocation.

Both the IBC and the IEBC are unclear on how to treat these buildings, particularly when they are relocated to a new site. In the absence of clear definitions and requirements that are specific to both new and existing relocatable modular buildings, many code officials attempt to apply similar, but non-related sections of the building code intended for site built buildings to the relocatable modular industry. There are unique attributes to relocatable modular buildings that warrant their own requirements in a new chapter in this code.

CTC has submitted two proposals on the subject of relocatable modular buildings. One proposal to Section 3112 for new construction and this proposal for existing buildings which are relocated. This proposal includes:

- The definition has been distilled from industry publications and definitions found in state statutes that govern modular (industrialized) buildings. This definition was also approved in the 2012 IGCC.
- An exception to IBC 3410 for relocatable buildings (currently treats all moved buildings as “new” buildings) with a pointer to Chapter 13 of IEBC. Moved relocatable modular buildings are to be treated as existing buildings.
- Relocatables undergoing additions or alterations shall comply with the appropriate section of the IEBC, which also applies to site built buildings. This section clarifies that there is no difference between the requirements for modular buildings and site built buildings when either undergoes construction for alteration or addition.

Moving this document forward through the ICC code development process will help the modular building industry comply with the intent of the code, provide a clear and consistent path for enforcement professionals, and for compliance by owners of relocatable buildings who wish to re-use or repurpose their existing buildings.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

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

202-RELOCATABLE BUILDING-G-BALDASSARRA-CTC

<u>Public Hearing Results</u>

Committee Action: Disapproved

Committee Reason: The main concern was related to how change of occupancy would be addressed from one site to the next. Similar to G198-12 it was suggested that perhaps these issues are addressed in an appendix since states deal with these buildings in varied ways. There was concern generally that these provisions are necessary but are not quite ready to be enforced.

Assembly Action: None

<u>Individual Consideration Agenda</u>

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

Public Comment:

Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee, requests Approval as Modified by this public comment

Modify the proposal as follows:

3410.2 (IEBC [B] 409.2) Additions, ~~and~~ Alterations, <u>or Change of Occupancy.</u> Additions, ~~and~~ alterations, <u>or change of occupancy classification from one group to a different group</u> made to relocatable buildings shall comply with the applicable provisions of Section 3403 and 3404 or the International Existing Building Code.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Unlike traditional site-built buildings that are rarely, if ever, moved to another location, relocatable modular buildings are designed and intended to be relocated numerous times.

During the public hearing, there was general support for the new language in G198 that specifically addresses the unique conditions related to the permitting, installation, and inspection of <u>new</u> relocatable buildings. It was recognized that supplemental information is necessary to complete the permitting, approval and inspection process when <u>existing</u> relocatable modular buildings are subsequently transported from one site to another site.

Proposal G203-12 provides a pointer to the International Existing Building Code which will contain the requirements to approve and re-inspect relocatable buildings when they are transported to future sites. During the Group B code change cycle, additional information will be proposed to the International Existing Building Code that will specifically address the relocation of modular buildings from one site to another site.

This public comment addresses the concern expressed by the committee about identifying the occupancy group of an existing relocatable modular building when it is moved to another location and used for different purpose, or when it stays in the same jurisdiction, but is used for a different purpose.

If the occupancy group changes when the building is reused for a different purpose other than those uses within the designated occupancy group, then the new occupancy group must be designated in the supplemental information and submitted to the building department. The new occupancy group must also be indicated on the manufacturers' data plate which is physically attached to each module.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Relocatable Modular Buildings". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/RelocatableModularBuildings.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

G203-12

Final Action: AS AM AMPC____ D

G205-12, Part I
3401.1.2 (New)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART I – IBC GENERAL

Add new text as follows:

3401.1 Scope. The provisions of this chapter shall control the *alteration*, *repair*, *addition* and change of occupancy of existing buildings and structures.

> **Exception:** Existing *bleachers*, grandstands and folding and telescopic seating shall comply with ICC 300.

<u>**3401.1.2 Intent.** The intent of this code is to provide flexibility to permit the use of alternative approaches to achieve compliance with minimum requirements to safeguard the public health, safety and welfare insofar as they are affected by the repair, alteration, change of occupancy, addition and relocation of existing buildings.</u>

Reasons: The AIA Codes and Standards Committee has become increasingly concerned that the sheer volume of codes have become unwieldy, leaving users of the code (designers and code officials) in the precarious position of not being able to embrace all the criteria that a single jurisdiction may choose to enforce. One of the obvious ways that the codes can be streamlined is to eliminate duplicative elements of the codes. The IBC now includes Chapter 34 for existing buildings and the IEBC is dedicated completely too existing buildings. While there is a great deal of duplication in these documents, they are not 100% the same.

Complicating the problem are jurisdictions that adopt both the IBC and the IEBC and do not provide any additional direction as to how the two documents are to be used. Lack of consistency is created among jurisdictions when one neighboring jurisdictions adopt one of the codes, but their neighbor adopts another. If the ICC intends to have provisions that are equally applicable, they can most easily be incorporated into the building code and applied consistently as part of that code.

(202 items) All these definitions are found in the IEBC but are not found in the IBC even though buildings that are designed and constructed per the IBC are subject to the IEBC once completed. Common terminology and meaning should be applied through both codes.

(3401.1.2) The intent in the IEBC Section 101.3 is not the same as the intent of the IBC and should be restated here.

(3401.3) The requirements in Section 104.10.1 in the IEBC are more comprehensively applied to repair and alterations and are moved here for consistency.

(3401.5) Requirements for flood hazard areas appear in three sections (3403.2, 3404.2 and 3405.2) in Chapter 34 establishing the exact same provisions for flood hazard but applying them to additions, alterations and repairs. The IEBC has a completely different approach to the same subject in Section 104.10.1. They are all placed in one section here to provide a concise and consistent set of requirements for flood protection in existing buildings.

(3401.6) By moving the provisions from the IEBC into the IBC this isn't necessary.

(3401.6 (NEW)) Structural requirements in the IBC and IEBC are being made the same.

(3401.7.1 (NEW)) The provisions in Chapter 34 and the IEBC for accessibility use of fire escapes and replacement glass have been moved to the general section of the Chapter so that these requirements will apply to all buildings using any compliance method.

(3403.1 #1) The requirements for alterations in 3404 and Section 403 establish that the alterations must be made in compliance with the IBC and do not make the existing portions of the building any less compliant. The structural requirements are redundant with other structural requirements and are consolidated into Section 3401.4.5 and flood criteria are in Section 3401.5.

(3403.1 #2) In the IBC, Section 3403.1 requires the addition and any alterations needed to make the existing structure "no less conforming." This section also requires the addition to meet the code making any elements that are part of the code for new construction applicable; the accessibility and energy conservation requirements in the IEBC are redundant.

(3403.2) This section is moved to 3401.5 and combined with criteria from the IEBC and other sections in Chapter 34 to form a single section on flood provisions. Both the addition and the existing building are limited to compliance with Chapter 5, so the provisions for height and area in the IEBC Section 1102, are unnecessary; the structural requirements for the additions are addressed in the new Section 3401.4.5.3, and are combined with the requirements from the IEBC. Energy conservation requirements aren't needed since Section

(3404 through 3412) Proposed change to the IBC incorporating the provisions of the IEBC.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART I – IBC GENERAL
Committee Action: Disapproved

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: The IEBC is not an independent code, it is tied intrinsically with the IBC for a myriad of provisions. Having provisions and options for design, construction and review in two different documents complicates the work by the owners, designers, code officials and contractors. This code change compiles all the criteria for existing buildings into one code with all the construction elements that are referenced in that code as part of the document.

The option to move all existing building provisions into the IEBC may appear to remove the overlap, but they will still remain as long as that code relies on the IBC for fundamental aspects of structural loading and adds to the complexity of the code user that must go to another document to find the requirements. The design of the I-codes doesn't envision dividing up the requirements of the code, but to package them as simply as possible.

AIA recently surveyed our members and received significant input that the codes are moving in the wrong direction, making the ability to find and apply information in the codes further and further away from what was envisioned when we endorsed these codes. Instead of spreading information out over more documents, the members responses called for inclusion of fundamental information for all projects in the building code.

This change brings the elements of the IEBC back into Chapter 34, which was specifically crafted as the location for existing building provisions.

Analysis: This code change proposal considered by the IBC-General Committee was one of several proposals addressing the scope and application of the *International Building Code,* Chapter 34, and the *International Existing Building Code.* These proposals included G201-12, G202-12, and G205-12. As reported at the Code Development Hearing, the action taken by the IBC-General Committee on these proposals coupled with the final action taken at the 2012 Final Action Hearings will be limited to an advisory recommendation to the ICC Board of Directors who will determine the final disposition on these proposed changes in accordance with Section 1.3 of CP 28 which stipulates that the Board determines the scope of the I-Codes.

It should be noted that G201-12 and G205-12 have received Public Comments. For reference the committee action and summary of each proposal are as follows:

- G201-12 (Approved as submitted) – Deletes Chapter 34 and simply references the IEBC for existing buildings.

- G202-12 (Disapproved) – Places the work area method of the IEBC within Chapter 34 of the IBC. This is similar in approach to G205-12 except it focuses solely on building code issues.
- G205-12 (Disapproved) – Places the work area method of the IEBC within Chapter 34 of the IBC.

G205-12, Part I

Final Action: AS AM AMPC____ D

G205-12, Part II
3401.3, 3401.1.3 through 3401.3.4 (New)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART II – IBC GENERAL

Revise as follows:

~~**3401.3 Compliance.** *Alterations*, *repairs*, *additions* and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions for *alterations*, *repairs*, *additions* and changes of occupancy or relocation, respectively, in the *International Energy Conservation Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Private Sewage Disposal Code, International Residential Code* and NFPA 70. Where provisions of the other codes conflict with provisions of this Chapter, the provisions of this Chapter shall take precedence~~.

<u>**3401.3 Compliance.** The repair, alteration, change of occupancy, addition or relocation of all existing buildings shall comply with the applicable provisions of Section 3401 and one of the methods listed in Sections 3401.3.2 through 3401.3.4. Application of a method shall be the sole basis for assessing the compliance of work performed under a single permit unless otherwise approved by the code official. Sections 3401.3.2 through 3401.3.4 shall not be applied in combination with each other.</u>

<u>**3401.3.1 Compliance with laws at the time the building was constructed.** Subject to the approval of the code official, alterations complying with the laws in existence at the time the building or the affected portion of the building was built shall be considered in compliance with the provisions of this code unless the building is undergoing more than a limited structural alteration as prescribed in Section 907.4.3. New structural members added as part of the alteration shall comply with the International Building Code. Alterations of existing buildings in flood hazard areas shall comply with Section 3401.5.</u>

<u>**3401.3.2 Prescriptive compliance method.** Repairs, alterations, additions and changes of occupancy complying with Section 3403 of this code in buildings complying with the International Fire Code.</u>

<u>**3401.3.3 Work area compliance method.** Repairs, alterations, additions, changes in occupancy and relocated buildings complying with the applicable requirements of Sections 3404 to 3412 of this code.</u>

<u>**3401.3.4 Performance compliance method.** Repairs, alterations, additions, changes in occupancy and relocated buildings complying with Section 3413 of this code.</u>

Reason: See G205-12 Part I

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART II – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I

G205-12, Part II
Final Action: AS AM AMPC____ D

G205-12, Part III
3401.5 (NEW), 3403.2, 3404.2, 3505.5 (IEBC [B] 402.2, 403.2, 404.5)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART III – IBC GENERAL

Revise as follows:

3401.5 Flood hazard areas. For buildings and structures in flood hazard areas established in Section 1612.3, any repairs, alterations and additions that constitutes substantial improvement of the existing structure, as defined in Section 1612.2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in flood hazard areas established in Section 1612.3, any additions that do not constitute substantial improvement of the existing structure, as defined in Section 1612.2, are not required to comply with the flood design requirements for new construction.

The code official shall not grant modifications to provisions related to flood resistance unless a determination is made that:

1. The applicant has presented good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render compliance with the flood-resistant construction provisions inappropriate.
2. Failure to grant the modification would result in exceptional hardship.
3. The granting of the modification will not result in increased flood heights, additional threats to public safety, extraordinary public expense nor create nuisances, cause fraud on or victimization of the public or conflict with existing laws or ordinances.
4. The modification is the minimum necessary to afford relief, considering the flood hazard.
5. A written notice will be provided to the applicant specifying, if applicable, the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation and that construction below the design flood elevation increases risks to life and property.

~~**3403.2 (IEBC [B] 402.2) Flood hazard areas.** For buildings and structures in *flood hazard areas* established in Section 1612.3, any *addition* that constitutes substantial improvement of the existing structure, as defined in Section 1612.2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.~~

~~For buildings and structures in *flood hazard areas* established in Section 1612.3, any additions that do not constitute substantial improvement of the existing structure, as defined in Section 1612.2, are not required to comply with the flood design requirements for new construction.~~

~~**3404.2 (IEBC [B] 403.2) Flood hazard areas.** For buildings and structures in *flood hazard areas* established in Section 1612.3, any *alteration* that constitutes *substantial improvement* of the *existing structure*, as defined in Section 1612.2, shall comply with the flood design requirements for new~~

~~construction, and all aspects of the *existing structure* shall be brought into compliance with the requirements for new construction for flood design.~~

~~For buildings and structures in *flood hazard areas* established in Section 1612.3, any *alterations* that do not constitute *substantial improvement* of the *existing structure*, as defined in Section 1612.2, are not required to comply with the flood design requirements for new construction.~~

~~**3405.5 (IEBC [B] 404.5) Flood hazard areas.** For buildings and structures in *flood hazard areas* established in Section 1612.3, any *repair* that constitutes substantial improvement of the existing structure, as defined in Section 1612.2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.~~

~~For buildings and structures in *flood hazard areas* established in Section 1612.3, any *repairs* that do not constitute substantial improvement or repair of substantial damage of the existing structure, as defined in Section 1612.2, are not required to comply with the flood design requirements for new construction.~~

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART III – IBC GENERAL
Committee Action: Disapproved

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part III
Final Action: AS AM AMPC____ D

G205-12, Part IV
3401.6

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART IV – IBC GENERAL

Delete without substitution:

~~**3401.6 Alternative compliance.** Work performed in accordance with the *International Existing Building Code* shall be deemed to comply with the provisions of this chapter.~~

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART IV – IBC GENERAL
Committee Action: Disapproved

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part IV
Final Action: AS AM AMPC____ D

G205-12, Part V
3401.6 (New)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART V – IBC GENERAL

Add new text as follows:

3401.6 Structural requirements. Where this chapter requires consideration of the structural system of an existing building subject to repair, alteration, change of occupancy, addition or relocation of existing buildings, the structure shall be made to comply with this section. (IEBC 301.1)

3401.6.1 New structural elements. New structural elements in alterations, including connections and anchorage, shall comply with the International Building Code.

3401.6.2 Minimum design loads. The minimum design loads on existing elements of a structure that do not support additional loads as a result of an alteration shall be the loads applicable at the time the building was constructed.

3401.6.3 Existing structural elements carrying gravity loads. Alterations shall not reduce the capacity of existing gravity load-carrying structural elements unless it is demonstrated that the elements have the capacity to carry the applicable design gravity loads required in Chapter 16. Existing structural elements supporting any additional gravity loads as a result of the alterations, including the effects of snow drift, shall comply with the International Building Code. (IBC 3404.3, IEBC 807.4)

Exceptions:

1. Structural elements whose stress is not increased by more than 5 percent.
2. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the existing building and its alteration comply with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.

3401.6.4 Existing structural elements resisting lateral loads. Additions or alterations affecting existing structural elements resisting lateral loads shall comply with this section. Where the existing seismic force-resisting system is a type that can be designated ordinary, values of R , W0, and Cd for the existing seismic force-resisting system shall be those specified by this code for an ordinary system unless it is demonstrated that the existing system will provide performance equivalent to that of a detailed, intermediate or special system.

3401.6.4.1 Additions. Where an addition is structurally independent of the existing structure, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the addition is not structurally independent of the existing structure, the existing structure and its addition acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613.

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the addition considered is no more than 10 percent greater than its demand-capacity ratio with the addition ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.

3401.6.4.2 Alterations. Alterations affecting the demands or capacities of existing elements of the lateral load-resisting system shall be evaluated using the wind provisions in Section 1609 and the reduced IBC-level seismic forces per Section 1604.10. Any existing lateral load-resisting structural elements whose demand-capacity ratio with the alteration considered is more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be brought into compliance with those wind and seismic provisions. In addition, the alteration shall not create a structural irregularity prohibited by ASCE 7 unless the entire structure complies with Section 3401.4.5.5. For the purposes of this section, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacity shall account for the cumulative effects of additions and alterations since the original construction. (3403.4 IBC, 807.5 IEBC)

3401.6.4.3 Voluntary lateral force-resisting system alterations. Alterations of existing structural elements and additions of new structural elements that are initiated for the purpose of increasing the lateral force-resisting strength or stiffness of an existing structure and that are not required by other sections of this code shall not be required to be designed for forces conforming to the International Building Code, provided that an engineering analysis is submitted including all of the following:

1 The capacity of existing structural elements required to resist forces is not reduced;
2 The lateral loading to existing structural elements is not increased either beyond its capacity or more than 10 percent;
3 New structural elements are detailed and connected to the existing structural elements as required by the International Building Code;
4 New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the International Building Code; and
5 A dangerous condition as defined in this code is not created. Voluntary alterations to lateral force-resisting systems conducted in accordance with Appendix A and the referenced standards of this code shall be permitted. (IBC 3404.5, IEBC 807.6)

3401.6.4.4 Compliance with reduced IBC level seismic forces. Where seismic evaluation and design is permitted to meet reduced International Building Code seismic force levels, the procedures used shall be in accordance with one of the following:

1. The International Building Code using 75 percent of the prescribed forces. Values of R, W0 and Cd used for analysis shall be as specified in Section 301.1.4.1 of this code.
2. Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A as specified in Items 2.1 through 2.5 and subject to the limitations of the respective Appendix A Chapters shall be deemed to comply with this section.
   2.1. The seismic evaluation and design of unreinforced masonry bearing wall buildings in Risk Category I or II are permitted to be based on the procedures specified in Appendix Chapter A1.
   2.2. Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in Risk Category I or II are permitted to be based on the procedures specified in Chapter A2.
   2.3. Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A3.
   2.4. Seismic evaluation and design of soft, weak, or open-front wall conditions in multiunit residential buildings of wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A4.
   2.5. Seismic evaluation and design of concrete buildings in all risk categories are permitted to be based on the procedures specified in Chapter A5.
3. Compliance with ASCE 31 based on the applicable performance level as shown in Table 3401.1.4.5.5. It shall be permitted to use the BSE-1 earthquake hazard level as defined in ASCE 41 and subject to the limitations in Item 4 below.

4. Compliance with ASCE 41 using the BSE-1 Earthquake Hazard Level and the performance level shown in Table 3401.6.4.4. The design spectral response acceleration parameters SXS and SX1 specified in ASCE 41 shall not be taken less than 75 percent of the respective design spectral response acceleration parameters SDS and SD1 defined by the International Building Code.

(IEBC Table 301.1.4.2)

TABLE 3401.6.4.4 (IEBC TABLE 301.1.4.2)
PERFORMANCE CRITERIA FOR REDUCED CHAPTER 16-LEVEL SEISMIC FORCES OCCUPANCY

RISK CATEGORY (Based on IBC Table 1604.5)	PERFORMANCE LEVEL FOR USE WITH ASCE 31	PERFORMANCE LEVEL FOR USE WITH ASCE 41 BSE-1 EARTHQUAKE HAZARD LEVEL
I	Life safety (LS)	Life safety (LS)
II	Life safety (LS)	Life safety (LS)
III	Notes a, b	Note a
IV	Immediate occupancy (IO)	Life safety (LS)

a. Acceptance criteria for Risk Category III shall be taken as 80 percent of the acceptance criteria specified for Risk Category II performance levels, but need not be less than the acceptance criteria specified for Risk Category IV levels.
b. For Risk Category III, the ASCE 31 screening phase checklists shall be based on the life safety performance level.
a. Acceptance criteria for Risk Category III shall be taken as 80 percent of the acceptance criteria specified for Risk Category II performance levels, but need not be less than the acceptance criteria specified for Risk Category IV levels.
b. For Risk Category III, the ASCE 31 screening phase checklists shall be based on the life safety performance level.
(IBC 3401.4.3, IEBC 301.1.4.2)

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART V – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part V
Final Action: AS AM AMPC____ D

G205-12, Part VI
3406, 3407, 3411 (IEBC [B] 405, 406, 410)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART VI – IBC GENERAL

Revise as follows:

~~SECTION 3411 (IEBC [B] 410)~~
~~ACCESSIBILITY FOR EXISTING BUILDINGS~~

3401.7 Accessibility for existing buildings. Accessibility for existing buildings shall be in accordance with Sections 3401.7.1 through 3401.7.9.4.

~~3411.1(IEBC [B] 410.1)~~ 3401.7.1 Scope. The provisions of Sections ~~3411.1 through 3411.9~~ 3401.7.1 through 3401.7.9 apply to maintenance, change of occupancy, additions and alterations to existing buildings, including those identified as historic buildings.

~~3411.2 (IEBC [B] 410.2)~~ 3401.7.2 Maintenance of facilities. A facility that is constructed or altered to be accessible shall be maintained accessible during occupancy.

~~3411.3 (IEBC [B] 410.3)~~ 3401.7.3 Extent of application. An alteration of an existing facility shall not impose a requirement for greater accessibility than that which would be required for new construction. Alterations shall not reduce or have the effect of reducing accessibility of a facility or portion of a facility.

~~3411.4 (IEBC [B] 410.4)~~ 3401.7.4 Change of occupancy. Existing buildings that undergo a change of group or occupancy shall comply with this section.

> **Exception:** Type B dwelling units or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with alterations where the work area is 50 percent or less of the aggregate area of the building.

~~3411.4.1 (IEBC [B] 410.4.1)~~ 3401.7.4.1 Partial change in occupancy. Where a portion of the building is changed to a new occupancy classification, any alterations shall comply with Sections 3401.7.6, 3401.7.7 and 3401.7.8.

~~3411.4.2 (IEBC [B] 410.4.2)~~ 3401.7.4.2 Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 3401.7.4.1 and shall have all of the following accessible features:

1. At least one accessible building entrance.
2. At least one accessible route from an accessible building entrance to primary function areas.
3. Signage complying with Section 1110.
4. Accessible parking, where parking is being provided.
5. At least one accessible passenger loading zone, when loading zones are provided.
6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

Exception: The accessible features listed in Items 1 through 6 are not required for an accessible route to Type B units.

~~**3411.5 (IEBC [B] 410.5)**~~ **3401.7.5 Additions.** Provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, a primary function shall comply with the requirements in Section 3401.7.7.

~~**3411.6 (IEBC [B] 410.6)**~~ **3401.7.6 Alterations.** A facility that is altered shall comply with the applicable provisions in Chapter 11 of this code, unless technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent technically feasible.

Exceptions:

1. The altered element or space is not required to be on an accessible route, unless required by Section 3401.7.7.
2. Accessible means of egress required by Chapter 10 are not required to be provided in existing facilities.
3. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a Type B dwelling unit.
4. Type B dwelling or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with alterations where the work area is 50 percent or less of the aggregate area of the building.

~~**3411.7 (IEBC [B] 410.7)**~~ **3401.7.7 Alterations affecting an area containing a primary function.** Where an alteration affects the accessibility to, or contains an area of primary function, the route to the primary function area shall be accessible. The accessible route to the primary function area shall include toilet facilities or drinking fountains serving the area of primary function.

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function.
2. This provision does not apply to alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to alterations undertaken for the primary purpose of increasing the accessibility of a facility.
5. This provision does not apply to altered areas limited to Type B dwelling and sleeping units.

~~**3411.8 (IEBC [B] 410.8)**~~ **3401.7.8 Scoping for alterations.** The provisions of Sections 3401.7.8.1 through 3401.7.8.14 shall apply to alterations to existing buildings and facilities.

~~**3411.8.1 (IEBC [B] 410.8.1)**~~ **3401.7.8.1 Entrances.** Accessible entrances shall be provided in accordance with Section 1105.

Exception: Where an alteration includes alterations to an entrance, and the facility has an accessible entrance, the altered entrance is not required to be accessible, unless required by Section 3401.7.7. Signs complying with Section 1110 shall be provided.

~~**3411.8.2 (IEBC [B] 410.8.2)**~~ **3401.7.8.2** **Elevators.** Altered elements of existing elevators shall comply with ASME A17.1 and ICC A117.1. Such elements shall also be altered in elevators programmed to respond to the same hall call control as the altered elevator.

~~**3411.8.3 (IEBC [B] 410.8.3)**~~ **3401.7.8.3** **Platform lifts.** Platform (wheelchair) lifts complying with ICC A117.1 and installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route.

~~**3411.8.4 (IEBC [B] 410.8.4)**~~ **3401.7.8.4** **Stairs and escalators in existing buildings.** In alterations, change of occupancy or additions where an escalator or stair is added where none existed previously and major structural modifications are necessary for installation, an accessible route shall be provided between the levels served by the escalator or stairs in accordance with Sections 1104.4 and 1104.5.

~~**3411.8.5 (IEBC [B] 410.8.5)**~~ **3401.7.8.5** **Ramps.** Where slopes steeper than allowed by Section 1010.2 are necessitated by space limitations, the slope of ramps in or providing access to existing facilities shall comply with Table 3401.7.8.5.

TABLE ~~3411.8.5~~ 3401.7.8.5
RAMPS

SLOPE	MAXIMUM RISE
Steeper than 1:10 but not steeper than 1:8	3 inches
Steeper than 1:12 but not steeper than 1:10	6 inches

For SI: 1 inch = 25.4 mm.

~~**3411.8.6 (IEBC [B] 410.8.6)**~~ **3401.7.8.6** **Performance areas.** Where it is technically infeasible to alter performance areas to be on an accessible route, at least one of each type of performance area shall be made accessible.

~~**3411.8.7 (IEBC [B] 410.8.7)**~~ **3401.7.8.7** **Accessible dwelling or sleeping units.** Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being altered or added, the requirements of Section 1107 for Accessible units apply only to the quantity of spaces being altered or added.

~~**3411.8.8 (IEBC [B] 410.8.8)**~~ **3401.7.8.8** **Type A dwelling or sleeping units.** Where more than 20 Group R-2 dwelling or sleeping units are being altered or added, the requirements of Section 1107 for Type A units apply only to the quantity of the spaces being altered or added.

~~**3411.8.9 (IEBC [B] 410.8.9)**~~ **3401.7.8.9** **Type B dwelling or sleeping units.** Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 for Type B units apply only to the quantity of the spaces being added. Where Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being altered and where the work area is greater than 50 percent of the aggregate area of the building, the requirements of Section 1107 for Type B units apply only to the quantity of the spaces being altered.

~~**3411.8.10 (IEBC [B] 410.8.10)**~~ **3401.7.8.10** **Jury boxes and witness stands.** In alterations, accessible wheelchair spaces are not required to be located within the defined area of raised jury boxes or witness stands and shall be permitted to be located outside these spaces where the ramp or lift access restricts or projects into the means of egress.

~~**3411.8.11 (IEBC [B] 410.8.11)**~~ **3401.7.8.11** **Toilet rooms.** Where it is technically infeasible to alter existing toilet and bathing rooms to be accessible, an accessible family or assisted-use toilet or bathing room constructed in accordance with Section 1109.2.1 is permitted. The family or assisted-use toilet or bathing room shall be located on the same floor and in the same area as the existing toilet or bathing rooms.

~~3411.8.12 (IEBC [B] 410.8.12)~~ 3401.7.8.12 **Dressing, fitting and locker rooms.** Where it is technically infeasible to provide accessible dressing, fitting or locker rooms at the same location as similar types of rooms, one accessible room on the same level shall be provided. Where separate-sex facilities are provided, accessible rooms for each sex shall be provided. Separate-sex facilities are not required where only unisex rooms are provided.

~~3411.8.13 (IEBC [B] 410.8.13)~~ 3401.7.8.13 **Fuel dispensers.** Operable parts of replacement fuel dispensers shall be permitted to be 54 inches (1370 mm) maximum measured from the surface of the vehicular way where fuel dispensers are installed on existing curbs.

~~3411.8.14 (IEBC [B] 410.8.14)~~ 3401.7.8.14 **Thresholds.** The maximum height of thresholds at doorways shall be 3/4 inch (19.1 mm). Such thresholds shall have beveled edges on each side.

~~3411.9 (IEBC [B] 410.9)~~ 3401.7.9 **Historic buildings.** These provisions shall apply to facilities designated as historic structures that undergo alterations or a change of occupancy, unless technically infeasible. Where compliance with the requirements for accessible routes, entrances or toilet rooms would threaten or destroy the historic significance of the facility, as determined by the applicable governing authority, the alternative requirements of Sections 3401.7.9.1 through 3401.7.9.4 for that element shall be permitted.

> **Exception:** Type B dwelling or sleeping units required by Section 1107 are not required to be provided in historical buildings.

~~3411.9.1 (IEBC [B] 410.9.1)~~ 3401.7.9.1 **Site arrival points.** At least one accessible route from a site arrival point to an accessible entrance shall be provided.

~~3411.9.2 (IEBC [B] 410.9.2)~~ 3401.7.9.2 **Multilevel buildings and facilities.** An accessible route from an accessible entrance to public spaces on the level of the accessible entrance shall be provided.

~~3411.9.3 (IEBC [B] 410.9.3)~~ 3401.7.9.3 **Entrances.** At least one main entrance shall be accessible.

Exceptions:

1. If a main entrance cannot be made accessible, an accessible nonpublic entrance that is unlocked while the building is occupied shall be provided; or
2. If a main entrance cannot be made accessible, a locked accessible entrance with a notification system or remote monitoring shall be provided.

Signs complying with Section 1110 shall be provided at the primary entrance and the accessible entrance.

~~3411.9.4 (IEBC [B] 410.9.4)~~ 3401.7.9.4 **Toilet and bathing facilities.** Where toilet rooms are provided, at least one accessible family or assisted-use toilet room complying with Section 1109.2.1 shall be provided.

~~**SECTION 3406(IEBC [B] 405)**~~
~~**FIRE ESCAPES**~~

~~3406.1 (IEBC [B] 405.1)~~ 3401.8.1 **Fire escapes ~~Where permitted~~.** Fire escapes shall be permitted only as provided for in Sections 3401.8.1.1 through 3401.8.1.4.

~~3406.1.1 (IEBC [B] 405.1.1)~~ 3401.8.1.1 **New buildings.** Fire escapes shall not constitute any part of the required means of egress in new buildings.

~~3406.1.2 (IEBC [B] 405.1.2)~~ 3401.8.1.2 **Existing fire escapes.** Existing fire escapes shall be continued to be accepted as a component in the means of egress in existing buildings only.

~~3406.1.3 (IEBC [B] 405.1.3)~~ 3401.8.1.3 **New fire escapes.** New fire escapes for existing buildings shall be permitted only where exterior stairs cannot be utilized due to lot lines limiting stair size or due to the sidewalks, alleys or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.

~~3406.1.4 (IEBC [B] 405.1.4)~~ 3401.8.1.4 **Limitations.** Fire escapes shall comply with this section and shall not constitute more than 50 percent of the required number of exits nor more than 50 percent of the required exit capacity.

~~3406.2 (IEBC [B] 405.2)~~ 3401.8.2 **Location.** Where located on the front of the building and where projecting beyond the building line, the lowest landing shall not be less than 7 feet (2134 mm) or more than 12 feet (3658 mm) above grade, and shall be equipped with a counterbalanced stairway to the street. In alleyways and thoroughfares less than 30 feet (9144 mm) wide, the clearance under the lowest landing shall not be less than 12 feet (3658 mm).

~~3406.3 (IEBC [B] 405.3)~~ 3401.8.3 **Construction.** The fire escape shall be designed to support a live load of 100 pounds per square foot (4788 Pa) and shall be constructed of steel or other approved noncombustible materials. Fire escapes constructed of wood not less than nominal 2 inches (51 mm) thick are permitted on buildings of Type V construction. Walkways and railings located over or supported by combustible roofs in buildings of Type III and IV construction are permitted to be of wood not less than nominal 2 inches (51 mm) thick.

~~3406.4 (IEBC [B] 405.4)~~ 3401.8.4 **Dimensions.** Stairs shall be at least 22 inches (559 mm) wide with risers not more than, and treads not less than, 8 inches (203 mm) and landings at the foot of stairs not less than 40 inches (1016 mm) wide by 36 inches (914 mm) long, located not more than 8 inches (203 mm) below the door.

~~3406.5 (IEBC [B] 405.5)~~ 3401.8.5 **Opening protectives.** Doors and windows along the fire escape shall be protected with ¾-hour opening protectives.

~~SECTION 3407 (IEBC [B] 406)~~
~~GLASS REPLACEMENT~~

~~3407.1 (IEBC [B] 406.1)~~ 3401.9 **Glass Replacement.** The installation or replacement of glass shall be as required for new installations.

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART VI – IBC GENERAL
Committee Action: Disapproved

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: None

<u>Individual Consideration Agenda</u>

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part VI
Final Action: AS AM AMPC____ D

G205-12, Part VII
3403 (IEBC [B] 402)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART VII- IBC GENERAL

Revise as follows:

~~SECTION 3403(IEBC [B] 402)~~
~~ADDITIONS~~

3403.1 Prescriptive Compliance. The provisions of this section control the alteration, repair, addition and change of occupancy or relocation of existing buildings and structures, including historic buildings and structures when using the prescriptive compliance method as permitted in Section 3401.3.3.

~~3403.1 (IEBC [B] 402.1) General~~ 3403.1.1 Additions. *Additions* to any building or structure shall comply with the requirements of this code for new construction. *Alterations* to the existing building or structure shall be made to ensure that the existing building or structure together with the *addition* are no less conforming with the provisions of this code than the existing building or structure was prior to the *addition*. An existing building together with its *additions* shall comply with the height and area provisions of Chapter 5.

~~**3403.3 (IEBC [B] 402.3) Existing structural elements carrying gravity load.** Any existing gravity load-carrying structural element for which an *addition* and its related alterations cause an increase in design gravity load of more than 5 percent shall be strengthened, supplemented, replaced or otherwise altered as needed to carry the increased gravity load required by this code for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased shall be considered an altered element subject to the requirements of Section 3404.3. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered an existing lateral load-carrying structural element subject to the requirements of Section 3403.4.~~

~~**3403.3.1 (IEBC [B] 402.3.3.1) Design live load.** Where the *addition* does not result in increased design live load, existing gravity loadcarrying structural elements shall be permitted to be evaluated and designed for live loads *approved* prior to the *addition*. If the *approved* live load is less than that required by Section 1607, the area designed for the nonconforming live load shall be posted with placards of *approved* design indicating the *approved* live load. Where the *addition* does result in increased design live load, the live load required by Section 1607 shall be used.~~

~~**3403.4 (IEBC [B] 402.3.4) Existing structural elements carrying lateral load.** Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections~~
~~1609 and 1613.~~

> ~~**Exception:** Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is no more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity~~

~~ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.~~

~~3403.5 (IEBC [B] 402.5)~~ **3403.1.1.1** **Smoke alarms in existing portions of a building.** Where an *addition* is made to a building or structure of a Group R or I-1 occupancy, the existing building shall be provided with *smoke alarms* in accordance with Section 1103.8 of the *International Fire Code*.

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART VII – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part VII
Final Action: AS AM AMPC____ D

G205-12, Part VIII
3404 (IEBC [B] 403)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART VIII - IBC GENERAL

Revise as follows:

~~SECTION 3404 (IEBC [B] 403)~~
~~ALTERATIONS~~

~~3404.1 (IEBC [B] 403.1)~~ 3403.1.2 General Alterations. Except as provided by Section 3401.4 or this section, *alterations* to any building or structure shall comply with the requirements of the code for new construction. *Alterations* shall be such that the existing building or structure is no less complying with the provisions of this code than the existing building or structure was prior to the *alteration*.

Exceptions:

1. An existing *stairway* shall not be required to comply with the requirements of Section 1009 where the existing space and construction does not allow a reduction in pitch or slope.
2. *Handrails* otherwise required to comply with Section 1009.15 shall not be required to comply with the requirements of Section 1012.6 regarding full extension of the *handrails* where such extensions would be hazardous due to plan configuration.

~~**3404.3 (IEBC [B] 403.3) Existing structural elements carrying gravity load.** Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design gravity load of more than 5 percent shall be strengthened, supplemented, replaced or otherwise altered as needed to carry the increased gravity load required by this code for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design gravity loads required by this code for new structures.~~

~~**3404.3.1 (IEBC [B] 403.3.1) Design live load.** Where the *alteration* does not result in increased design live load, existing gravity load carrying structural elements shall be permitted to be evaluated and designed for live loads *approved* prior to the *alteration*. If the *approved* live load is less than that required by Section 1607, the area designed for the nonconforming live load shall be posted with placards of *approved* design indicating the *approved* live load. Where the *alteration* does result in increased design live load, the live load required by Section 1607 shall be used.~~

~~**3404.4 (IEBC [B] 403.4) Existing structural elements carrying lateral load.** Except as permitted by Section 3404.5, where the *alteration* increases design lateral loads in accordance with Section 1609 or 1613, or where the *alteration* results in a structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall be shown to meet the requirements of Sections 1609 and 1613.~~

~~**Exception:** Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is no more than 10 percent greater than its demand-capacity ratio with the~~

~~*alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces per Sections 1609 and 1613. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.~~

~~**3404.5 (IEBC [B] 403.5) Voluntary seismic improvements.** *Alterations* to existing structural elements or additions of new structural elements that are not otherwise required by this chapter and are initiated for the purpose of improving the performance of the seismic force-resisting system of an *existing structure* or the performance of seismic bracing or anchorage of existing nonstructural elements shall be permitted, provided that an engineering analysis is submitted demonstrating the following:~~

1. ~~The altered structure and the altered nonstructural elements are no less conforming with the provisions of this code with respect to earthquake design than they were prior to the alteration.~~
2. ~~New structural elements are detailed as required for new construction.~~
3. ~~New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required for new construction.~~
4. ~~The alterations do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.~~

~~3404.6 (IEBC [B] 403.6)~~ 3403.1.2.1 Smoke alarms. Individual *sleeping units* and individual *dwelling units* in Group R and I-1 occupancies shall be provided with *smoke alarms* in accordance with Section 1103.8 of the *International Fire Code*.

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART VIII – IBC GENERAL
Committee Action: Disapproved

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part VIII
Final Action: AS AM AMPC____ D

G205-12, Part IX
3405 (IEBC [B] 404)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART IX - IBC GENERAL

Revise as follows:

~~SECTION 3405 (IEBC [B] 404)~~
~~REPAIRS~~

3403.1.3 Repairs. Repairs to existing buildings shall be in accordance with Sections 3403.1.3 through 3403.1.

~~3405.1(IEBC [B] 404.1)~~ 3403.1.3.1 General. Buildings and structures, and parts thereof, shall be repaired in compliance with Section 3403.1.3.1 and 3401.2. Work on nondamaged components that is necessary for the required *repair* of damaged components shall be considered part of the *repair* and shall not be subject to the requirements for *alterations* in this chapter. Routine maintenance required by Section 3401.2, ordinary repairs exempt from *permit* in accordance with Section 105.2, and abatement of wear due to normal service conditions shall not be subject to the requirements for *repairs* in this section.

~~3405.2 (IEBC [B] 404.2)~~ 3403.1.3.2 Substantial structural damage to vertical elements of the lateral-force-resisting system. A building that has sustained substantial structural damage to the vertical elements of its lateral-force-resisting system shall be evaluated and repaired in accordance with the applicable provisions of Sections 3403.1.3.2.1 through 3403.1.3.2.3.

Exceptions:

1. Buildings assigned to Seismic Design Category A, B, or C whose *substantial structural damage* was not caused by earthquake need not be evaluated or rehabilitated for load combinations that include earthquake effects.
2. One- and two-family dwellings need not be evaluated or rehabilitated for load combinations that include earthquake effects.

~~3405.2.1 (IEBC [B] 404.2.1)~~ 3403.1.3.2.1 Evaluation. The building shall be evaluated by a *registered design professional*, and the evaluation findings shall be submitted to the *building official*. The evaluation shall establish whether the damaged building, if repaired to its pre-damage state, would comply with the provisions of this code for wind and earthquake loads. Wind loads for this evaluation shall be those prescribed in Section 1609. Earthquake loads for this evaluation, if required, shall be permitted to be 75 percent of those prescribed in Section 1613.

~~3405.2.2 (IEBC [B] 404.2.2)~~ 3403.1.3.2.2 Extent of repair for compliant buildings. If the evaluation establishes compliance of the pre-damage building in accordance with Section 3403.1.3.2.1, then repairs shall be permitted that restore the building to its pre-damage state, based on material properties and design strengths applicable at the time of original construction.

~~3405.2.3 (IEBC [B] 404.2.3)~~ 3403.1.3.2.3 Extent of repair for noncompliant buildings. If the evaluation does not establish compliance of the predamage building in accordance with Section 3403.1.3.2.1, then the building shall be rehabilitated to comply with applicable provisions of this code for load combinations that include wind or seismic loads. The wind loads for the repair shall be as required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be as required by this code. Earthquake loads for this rehabilitation design shall be those required for the design of the pre-damage building, but not less than seventy-five percent of those prescribed in Section 1613. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

~~3405.3 (IEBC [B] 404.3)~~ 3403.1.3.3 Substantial structural damage to gravity load-carrying components. Gravity load-carrying components that have sustained *substantial structural damage* shall be rehabilitated to comply with the applicable provisions of this code for dead and live loads. Snow loads shall be considered if the *substantial structural damage* was caused by or related to snow load effects. Existing gravity load-carrying structural elements shall be permitted to be designed for live loads *approved* prior to the damage. Nondamaged gravity load-carrying components that receive dead, live or snow loads from rehabilitated components shall also be rehabilitated or shown to have the capacity to carry the design loads of the rehabilitation design. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

~~3405.3.1 (IEBC [B] 404.3.1)~~ 3403.1.3.3.1 Lateral force-resisting elements. Regardless of the level of damage to vertical elements of the lateral force-resisting system, if *substantial structural damage* to gravity load-carrying components was caused primarily by wind or earthquake effects, then the building shall be evaluated in accordance with Section 3403.1.3.2.1 and, if noncompliant, rehabilitated in accordance with Section 3403.1.3.2.3.

Exceptions:

1. One- and two-family dwellings need not be evaluated or rehabilitated for load combinations that include earthquake effects.
2. Buildings assigned to Seismic Design Category A, B, or C whose *substantial structural damage* was not caused by earthquake need not be evaluated or rehabilitated for load combinations that include earthquake effects.

~~3405.4 (IEBC [B] 404.4)~~ 3403.1.3.4 Less than substantial structural damage. For damage less than *substantial structural damage*, *repairs* shall be allowed that restore the building to its pre-damage state, based on material properties and design strengths applicable at the time of original construction. New structural members and connections used for this repair shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART IX – IBC GENERAL
Committee Action: Disapproved

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part IX
Final Action: AS AM AMPC____ D

G205-12, Part X
202 (New)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART X – IBC GENERAL

Add new definitions as follows:

SECTION 202
DEFINITIONS

CHANGE OF OCCUPANCY. A change in the purpose or level of activity within a building that involves a change in application of the requirements of this code.

EQUIPMENT OR FIXTURE. Any plumbing, heating, electrical, ventilating, air conditioning, refrigerating, and fire protection equipment, and elevators, dumb waiters, escalators, boilers, pressure vessels and other mechanical facilities or installations that are related to building services. Equipment or fixture shall not include manufacturing, production, or process equipment, but shall include connections from building service to process equipment.

LOAD-BEARING ELEMENT. Any column, girder, beam, joist, truss, rafter, wall, floor or roof sheathing that supports any vertical load in addition to its own weight or any lateral load.

NONCOMBUSTIBLE MATERIAL. A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

REHABILITATION. Any work, as described by the categories of work defined herein, undertaken in an existing building.

REHABILITATION, SEISMIC. Work conducted to improve the seismic lateral force resistance of an existing building.

REPAIR. The restoration to good or sound condition of any part of an existing building for the purpose of its maintenance.

SEISMIC LOADING. The forces prescribed herein, related to the response of the structure to earthquake motions, to be used in the analysis and design of the structure and its components.

UNSAFE. Buildings, structures or equipment that are unsanitary, or that are deficient due to inadequate means of egress facilities, inadequate light and ventilation, or that constitute a fire hazard, or in which the structure or individual structural members meet the definition of "Dangerous," or that are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance shall be deemed unsafe. A vacant structure that is not secured against entry shall be deemed unsafe.

WORK AREA. That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code.

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART X – IBC GENERAL
Committee Action: Disapproved

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part X
Final Action: AS AM AMPC____ D

G205-12, Part XI

3408, 3409, 3410 (IEBC [B] 407, 408, 409)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART XI – IBC GENERAL

Revise as follows:

~~SECTION 3408 (IEBC [B] 407)~~
~~CHANGE OF OCCUPANCY~~

3403.6 Change of occupancy. Change of occupancy shall be in accordance with Sections 3403.6.1 through 3403.6.4

~~3408.1 (IEBC [B] 407.1)~~ 3403.6.1 Conformance. No change shall be made in the use or occupancy of any building that would place the building in a different division of the same group of occupancies or in a different group of occupancies, unless such building is made to comply with the requirements of this code for such division or group of occupancies. Subject to the approval of the *building official*, the use or occupancy of existing buildings shall be permitted to be changed and the building is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.

~~3408.2 (IEBC [B] 407.2)~~ 3403.6.2 Certificate of occupancy. A certificate of occupancy shall be issued where it has been determined that the requirements for the new occupancy classification have been met.

~~3408.3 (IEBC [B] 407.3)~~ 3403.6.3 Stairways. An existing stairway shall not be required to comply with the requirements of Section 1009 where the existing space and construction does not allow a reduction in pitch or slope.

3408.4 (IEBC [B] 407.4) 3403.6.4 Seismic. When a change of occupancy results in a structure being reclassified to a higher risk category, the structure shall conform to the seismic requirements for a new structure of the higher risk category.

Exceptions:

1. Specific seismic detailing requirements of Section 1613 for a new structure shall not be required to be met where the seismic performance is shown to be equivalent to that of a new structure. A demonstration of equivalence shall consider the regularity, overstrength, redundancy and ductility of the structure.
2. When a change of use results in a structure being reclassified from Risk Category I or II to Risk Category III and the structure is located where the seismic coefficient, *SDS,* is less than 0.33, compliance with the seismic requirements of Section 1613 are not required.

~~SECTION 3409 (IEBC [B] 408)~~
~~HISTORIC BUILDINGS~~

3403.7 Historic Buildings. Historic buildings shall be in accordance with Sections 3403.7.1 and 3403.7.2

~~**3409.1 (IEBC [B] 408.1)**~~ **3403.7.1** ~~**Historic buildings**~~ **General.** The provisions of this code relating to the construction, *repair*, *alteration*, *addition*, restoration and movement of structures, and change of occupancy shall not be mandatory for *historic buildings* where such buildings are judged by the *building official* to not constitute
a distinct life safety hazard.

~~**3409.2 (IEBC [B] 408.2)**~~ **3403.7.2 Flood hazard areas.** Within *flood hazard areas* established in accordance with Section 1612.3, where the work proposed constitutes *substantial improvement* as defined in Section 1612.2, the building shall be brought into compliance with Section 1612.

Exception: *Historic buildings* that are:

1. *Listed* or preliminarily determined to be eligible for listing in the National Register of Historic Places;
2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or
3. Designated as historic under a state or local historic preservation program that is *approved* by the Department of Interior.

~~**SECTION 3410 (IEBC [B] 409)**~~
~~**MOVED STRUCTURES**~~

~~**3410.1 (IEBC [B] 409.1)**~~ **3403.8** ~~**Conformance**~~ **Moved structures.** Structures moved into or within the jurisdiction shall comply with the provisions of this code for new structures.

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART XI – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part XI
Final Action: AS AM AMPC____ D

G205-12, Part XII
3404.1 (NEW) through 3412.1.8 (NEW)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing The American Institute of Architects

THIS IS A 12 PART CODE CHANGE PROPOSAL. ALL 12 PARTS OF THE PROPOSAL WILL BE HEARD BY THE IBC GENERAL COMMITTEE.

PART XII - IBC GENERAL

Add new text as follows

SECTION 3404
WORK AREA METHOD

3404.1 Work area compliance. The provisions of this section and Sections 3405 through 3412 control the alteration, repair, addition and change of occupancy or relocation of existing buildings and structures, including historic buildings and structures when using the work area compliance method as permitted in Section 3401.3.3.

3404.1.1 Work area. The work area, as defined in Chapter 2, shall be identified on the construction documents.

3404.1.2 Occupancy and use. When determining the appropriate application of the referenced sections of this code, the occupancy and use of a building shall be determined in accordance with Section 3401.3 of the International Building Code.

SECTION 3405
REPAIRS

3405.1 General. Repairs within the work area shall comply with the applicable requirements of Section 3403.1.3 for repairs. The work shall not make the building less conforming than it was before the repair was undertaken.

3405.1.1 Structural. Structural repairs shall be in compliance with this section and Section 3403.1.3. Repairs to damaged buildings shall comply with this section.

3405.1.2 Flood hazard areas. In flood hazard areas, buildings that have sustained substantial damage shall be brought into compliance with Section 3401.5.

3405.1.3 Electrical. Existing electrical wiring and equipment undergoing repair shall be allowed to be repaired or replaced with like material as required by this section.

3405.1.3.1 Receptacles. Replacement of electrical receptacles shall comply with the applicable requirements of Section 406.3(D) of NFPA 70.

3405.1.3.2 Plug fuses. Plug fuses of the Edison-base type shall be used for replacements only where there is no evidence of over fusing or tampering per applicable requirements of Section 240.51(B) of NFPA 70.

3405.1.3.3 Nongrounding-type receptacles. For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuitry, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system or to any accessible point on the grounding electrode conductor in accordance with Section 250.130(C) of NFPA 70.

3405.1.3.4 Group I-2 receptacles. Non-“hospital grade” receptacles in patient bed locations of Group I-2 shall be replaced with “hospital grade” receptacles, as required by NFPA 99 and Article 517 of NFPA 70.

3405.1.3.5 Grounding of appliances. Frames of electric ranges, wall-mounted ovens, counter-mounted cooking units, clothes dryers and outlet or junction boxes that are part of the existing branch circuit for these appliances shall be permitted to be grounded to the grounded circuit conductor in accordance with Section 250.140 of NFPA 70.

3405.1.4 Mechanical systems. Mechanical systems in existing buildings shall be in accordance with Section 3405.1.4.1 through 3405.1.4.2

3405.1.4.1 General. Existing mechanical systems undergoing repair shall not make the building less conforming than it was before the repair was undertaken.

3405.1.4.2 Mechanical draft systems for manually fired appliances and fireplaces. A mechanical draft system shall be permitted to be used with manually fired appliances and fireplaces where such a system complies with all of the following requirements:

1. The mechanical draft device shall be listed and installed in accordance with the manufacturer’s installation instructions.
2. A device shall be installed that produces visible and audible warning upon failure of the mechanical draft device or loss of electrical power at any time that the mechanical draft device is turned on. This device shall be equipped with a battery backup if it receives power from the building wiring.
3. A smoke detector shall be installed in the room with the appliance or fireplace. This device shall be equipped with a battery backup if it receives power from the building wiring.

3405.1.5 Plumbing. Plumbing fixtures, supplies and materials in existing buildings shall be in accordance with Sections 3405.1.5.1 through 3405.1.5.2.

3405.1.5.1 Plumbing materials. Plumbing materials and supplies shall not be used for repairs that are prohibited in the International Plumbing Code.

3405.1.5.2 Water closet replacement. The maximum water consumption flow rates and quantities for all replaced water closets shall be 1.6 gallons (6 L) per flushing cycle.

Exception: Blowout-design water closets [3.5 gallons (13 L) per flushing cycle].

SECTION 3406
LEVEL 1 ALTERATIONS

3406.1 General. Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose shall comply with the requirements of this section. Level 1 alterations to historic buildings shall comply with this chapter, except as modified in Section 3411.

3406.2 Safety. An existing building or portion thereof shall not be altered such that the building becomes less safe than its existing condition. Where the current level of safety or sanitation is proposed to be reduced, the portion altered shall conform to the requirements of the International Building Code.

(INTERIOR FINISHES AND BUILDING MATERIALS ARE COVERED IN SECTION 3401.4)

[FG] 3406.3 International Fuel Gas Code. The following sections of the *International Fuel Gas Code* shall constitute the fuel gas materials and methods requirements for Level 1 alterations.

1. All of Chapter 3, entitled "General Regulations," except Sections 303.7 and 306.
2. All of Chapter 4, entitled "Gas Piping Installations," except Sections 401.8 and 402.3.
    - 2.1. Sections 401.8 and 402.3 shall apply when the work being performed increases the load on the system such that the existing pipe does not meet the size required by code. Existing systems that are modified shall not require resizing as long as the load on the system is not increased and the system length is not increased even if the altered system does not meet code minimums.
3. All of Chapter 5, entitled "Chimneys and Vents."
4. All of Chapter 6, entitled "Specific Appliances."

(*FIRE PROTECTION AND MEANS OF EGRESS ARE MEANINGLESS)*

3406.4 Accessibility. A facility that is altered shall comply with the applicable provisions in Sections 3401.7

3406.5 Structural. Where alteration work includes replacement of equipment that is supported by the building or where a reroofing permit is required, the provisions of this section shall apply.

3406.5.1 Addition or replacement of roofing or replacement of equipment. Where addition or replacement of roofing or replacement of equipment results in additional dead loads, structural components supporting such reroofing or equipment shall comply with the gravity load requirements of this code.

Exceptions:

1. Structural elements where the additional dead load from the roofing or equipment does not increase the force in the element by more than 5 percent.
2. Buildings constructed in accordance with the *International Residential Code* or the conventional lightframe construction methods of the *International Building Code* and where the dead load from the roofing or equipment is not increased by more than 5 percent.
3. Addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m2) or less over an existing, single layer of roof covering.

3406.5.2 Additional requirements for reroof permits. The requirements of this section shall apply to *alteration* work requiring reroof permits.

3406.5.2.1 Bracing for unreinforced masonry bearing wall parapets. Where a permit is issued for reroofing for more than 25 percent of the roof area of a building assigned to Seismic Design Category D, E or F that has parapets constructed of unreinforced masonry, the work shall include installation of parapet bracing to resist the reduced *International Building Code* level seismic forces as specified in Section 3401.6.4.4 of this code, unless an evaluation demonstrates compliance of such items.

3406.5.2.2 Roof diaphragms resisting wind loads in high-wind regions. Where roofing materials are removed from more than 50 percent of the roof diaphragm or section of a building located where the basic wind speed is greater than 90 mph or in a special wind region, as defined in Section 1609 of the *International Building Code*, roof diaphragms, connections of the roof diaphragm to roof framing members, and roof-to-wall connections shall be evaluated for the wind loads specified in the *International Building Code*, including wind uplift. If the diaphragms and connections in their current condition are not capable of resisting at least 75 percent of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in the *International Building Code*.

3406.6 Energy code compliance. Level 1 alterations to existing buildings or structures shall only require the portions of the building altered to comply with energy requirements of the International Energy Conservation Code or International Residential Code.

(ALTERATIONS—LEVEL 2
SECTION 801)

SECTION 3407
LEVEL 2 ALTERATIONS.

3407.1 Level 2 alterations. Level 2 alterations shall be in accordance with Sections 3407.1.1 through 3407.11.1.

3407.1.1 Scoping. Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of additional equipment shall comply with the requirements of this section.

3407.1.2 Accessibility. Buildings in which the reconfiguration is exclusively the result of compliance with the accessibility requirements of Section 3401.7 shall be permitted to comply with level 1 alterations per Section 3406.

3407.1.3 Limits to compliance. All new construction elements, components, systems, and spaces shall comply with the requirements of this code for new construction.

Exceptions:

1. Windows may be added without requiring compliance with the light and ventilation requirements.
2. Newly installed electrical equipment shall comply with the requirements of Section 3404.11.
3. The length of dead-end corridors in newly constructed spaces shall only be required to comply with the provisions of Section 3407.6.6.
4. The minimum ceiling height of the newly created habitable and occupiable spaces and corridors shall be 7 feet (2134 mm).

(SECTION 802 SPECIAL USE AND OCCUPANCY)

3407.2 Special use and occupancy. Alteration of buildings classified as special use and occupancy as described in the International Building Code shall comply with the requirements of Section 3407.1.1 and the scoping provisions of Chapter 1 where applicable.

(SECTION 803 BUILDING ELEMENTS AND MATERIALS)

3407.3 Building elements and materials. The requirements of this section are limited to work areas in which Level 2 alterations are being performed, and shall apply beyond the work area where specified.

3407.3.1 Vertical openings. Existing vertical openings shall comply with the provisions of Sections 3407.3.1.1, 3407.3.1.2 and 3407.3.1.3.

3407.3.1.1 Existing vertical openings. All existing interior vertical openings connecting two or more floors shall be enclosed with approved assemblies having a fire-resistance rating of not less than 1 hour with approved opening protectives.

Exceptions:

1. Where vertical opening enclosure is not required by the International Building Code or the International Fire Code.

2. Interior vertical openings other than stairways may be blocked at the floor and ceiling of the work area by installation of not less than 2 inches (51 mm) of solid wood or equivalent construction.
3. The enclosure shall not be required where:
    3.1. Connecting the main floor and mezzanines; or
    3.2. All of the following conditions are met:
        3.2.1. The communicating area has a low hazard occupancy or has a moderate hazard occupancy that is protected throughout by an automatic sprinkler system.
        3.2.2. The lowest or next to the lowest level is a street floor.
        3.2.3. The entire area is open and unobstructed in a manner such that it may be assumed that a fire in any part of the interconnected spaces will be readily obvious to all of the occupants.
        3.2.4. Exit capacity is sufficient to provide egress simultaneously for all occupants of all levels by considering all areas to be a single floor area for the determination of required exit capacity.
        3.2.5. Each floor level, considered separately, has at least one-half of its individual required exit capacity provided by an exit or exits leading directly out of that level without having to traverse another communicating floor level or be exposed to the smoke or fire spreading from another communicating floor level.
4. In Group A occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories.
5. In Group B occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 3407.3.1.1, shall not be required in the following locations:
    5.1. Buildings not exceeding 3,000 square feet (279 m2) per floor.
    5.2. Buildings protected throughout by an approved automatic fire sprinkler system.
6. In Group E occupancies, the enclosure shall not be required for vertical openings not exceeding three stories when the building is protected throughout by an approved automatic fire sprinkler system.
7. In Group F occupancies, the enclosure shall not be required in the following locations:
    7.1. Vertical openings not exceeding three stories.
    7.2. Special purpose occupancies where necessary for manufacturing operations and direct access is provided to at least one protected stairway.
    7.3. Buildings protected throughout by an approved automatic sprinkler system.
8. In Group H occupancies, the enclosure shall not be required for vertical openings not exceeding three stories where necessary for manufacturing operations and every floor level has direct access to at least two remote enclosed stairways or other approved exits.
9. In Group M occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 3407.3.1.1, shall not be required in the following locations:
    9.1. Openings connecting only two floor levels.
    9.2. Occupancies protected throughout by an approved automatic sprinkler system.
10. In Group R-1 occupancies, the enclosure shall not be required for vertical openings not exceeding three stories in the following locations:
    10.1. Buildings protected throughout by an approved automatic sprinkler system.
    10.2. Buildings with less than 25 dwelling units or sleeping units where every sleeping room above the second floor is provided with direct access to a fire escape or other approved second exit by means of an approved exterior door or window having a sill height of not greater than 44 inches (1118 mm) and where:

        10.2.1. Any exit access corridor exceeding 8 feet (2438 mm) in length that serves two means of egress, one of which is an unprotected vertical opening, shall have at least one of the means of egress separated from the vertical opening by a 1-hour fire barrier; and

10.2.2. The building is protected throughout by an automatic fire alarm system, installed and supervised in accordance with the International Building Code.

11. In Group R-2 occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 3407.3.1.1, shall not be required in the following locations:
    - 11.1. Vertical openings not exceeding two stories with not more than four dwelling units per floor.
    - 11.2. Buildings protected throughout by an approved automatic sprinkler system.
    - 11.3. Buildings with not more than four dwelling units per floor where every sleeping room above the second floor is provided with direct access to a fire escape or other approved second exit by means of an approved exterior door or window having a sill height of not greater than 44 inches (1118 mm) and the building is protected throughout by an automatic fire alarm system complying with Section 3407.4.3.
12. One- and two-family dwellings.
13. Group S occupancies where connecting not more than two floor levels or where connecting not more than three floor levels and the structure is equipped throughout with an approved automatic sprinkler system.
14. Group S occupancies where vertical opening protection is not required for open parking garages and ramps.

3407.3.1.2 Supplemental shaft and floor opening enclosure requirements. Where the work area on any floor exceeds 50 percent of that floor area, the enclosure requirements of Section 3407.3.1 shall apply to vertical openings other than stairways throughout the floor.

Exception: Vertical openings located in tenant spaces that are entirely outside the work area.

3407.3.1.3 Supplemental stairway enclosure requirements. Where the work area on any floor exceeds 50 percent of that floor area, stairways that are part of the means of egress serving the work area shall, at a minimum, be enclosed with smoke-tight construction on the highest work area floor and all floors below.

Exception: Where stairway enclosure is not required by the International Building Code or the International Fire Code.

3407.3.2 Smoke barriers. Smoke barriers in Group I-2 occupancies shall be installed where required by Sections 3407.3.2.1 and 3407.3.2.2.

3407.3.2.1 Compartmentation. Where the work area is on a story used for sleeping rooms for more than 30 patients, the story shall be divided into not less than two compartments by smoke barrier walls complying with Section 3407.3.2.2 such that each compartment does not exceed 22,500 square feet (2093 m2), and the travel distance from any point to reach a door in the required smoke barrier shall not exceed 200 feet (60 960 mm).

Exception: Where neither the length nor the width of the smoke compartment exceeds 150 feet (45 720 mm), the travel distance to reach the smoke barrier door shall not be limited.

3407.3.2.2 Fire-resistance rating. The smoke barriers shall be fire-resistance rated for 30 minutes and constructed in accordance with the International Building Code.

3407.3.3 Interior finish. The interior finish of walls and ceilings in exits and corridors in any work area shall comply with the requirements of the International Building Code.

Exception: Existing interior finish materials that do not comply with the interior finish requirements of the International Building Code shall be permitted to be treated with an approved fire-retardant coating in accordance with the manufacturer's instructions to achieve the required rating.

3407.3.3.1 Supplemental interior finish requirements. Where the work area on any floor exceeds 50 percent of the floor area, Section 3407.3.3 shall also apply to the interior finish in exits and corridors serving the work area throughout the floor.

Exception: Interior finish within tenant spaces that are entirely outside the work area.

3407.3.4 Guards. The requirements of Sections 3407.3.4.1 and 3407.3.4.2 shall apply in all work areas.

3407.3.4.1 Minimum requirement. Every portion of a floor, such as a balcony or a loading dock, that is more than 30 inches (762 mm) above the floor or grade below and is not provided with guards, or those in which the existing guards are judged to be in danger of collapsing, shall be provided with guards.

3407.3.4.2 Design. Where there are no guards or where existing guards must be replaced, the guards shall be designed and installed in accordance with the International Building Code.

(SECTION 804 FIRE PROTECTION)

3407.4 Fire protection. The requirements of this section shall be limited to work areas in which Level 2 alterations are being performed, and where specified they shall apply throughout the floor on which the work areas are located or otherwise beyond the work area.

3407.4.1 Corridor ratings. Where an approved automatic sprinkler system is installed throughout the story, the required fire-resistance rating for any corridor located on the story shall be permitted to be reduced in accordance with the International Building Code. In order to be considered for a corridor rating reduction, such system shall provide coverage for the stairwell landings serving the floor and the intermediate landings immediately below.

3407.4.2 Automatic sprinkler systems. Automatic sprinkler systems shall be provided in accordance with the requirements of Sections 3407.4.2.1 through 3407.4.2.5. Installation requirements shall be in accordance with the International Building Code.

3407.4.2.1 High-rise buildings. In high-rise buildings, work areas that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with automatic sprinkler protection in the entire work area where the work area is located on a floor that has a sufficient sprinkler water supply system from an existing standpipe or a sprinkler riser serving that floor.

3407.4.2.1.1 Supplemental automatic sprinkler system requirements. Where the work area on any floor exceeds 50 percent of that floor area, Section 3407.4.2.1 shall apply to the entire floor on which the work area is located.

Exception: Tenant spaces that are entirely outside the work area.

3407.4.2.2 Groups A, B, E, F-1, H, I, M, R-1, R-2, R-4, S-1 and S-2. In buildings with occupancies in Groups A, B, E, F-1, H, I, M, R-1, R-2, R-4, S-1 and S-2, work areas that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with automatic sprinkler protection where all of the following conditions occur:

1. The work area is required to be provided with automatic sprinkler protection in accordance with the International Building Code as applicable to new construction; and
2. The work area exceeds 50 percent of the floor area.

Exceptions:

1. Work areas in Group R occupancies three stories or less in height.

2. If the building does not have sufficient municipal water supply for design of a fire sprinkler system available to the floor without installation of a new fire pump, work areas shall be protected by an automatic smoke detection system throughout all occupiable spaces other than sleeping units or individual dwelling units that activates the occupant notification system in accordance with Sections 907.4, 907.5 and 907.6 of the International Building Code.

3407.4.2.2.1 Mixed uses. In work areas containing mixed uses, one or more of which requires automatic sprinkler protection in accordance with Section 3407.4.2.2, such protection shall not be required throughout the work area provided that the uses requiring such protection are separated from those not requiring protection by fire-resistance-rated construction having a minimum 2-hour rating for Group H and a minimum 1-hour rating for all other occupancy groups.

3407.4.2.3 Windowless stories. Work located in a windowless story, as determined in accordance with the International Building Code, shall be sprinklered where the work area is required to be sprinklered under the provisions of the International Building Code for newly constructed buildings and the building has a sufficient municipal water supply without installation of a new fire pump.

3407.4.2.4 Other required automatic sprinkler systems. In buildings and areas listed in Table 903.2.11.6, work areas that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with an automatic sprinkler system under the following conditions:

1. The work area is required to be provided with an automatic sprinkler system in accordance with the International Building Code applicable to new construction; and
2. The building has sufficient municipal water supply for design of an automatic sprinkler system available to the floor without installation of a new fire pump.

3407.4.2.5 Supervision. Fire sprinkler systems required by this section shall be supervised by one of the following methods:

1. Approved central station system in accordance with NFPA 72;
2. Approved proprietary system in accordance with NFPA 72;
3. Approved remote station system of the jurisdiction in accordance with NFPA 72; or
4. When approved by the code official, approved local alarm service that will cause the sounding of an alarm in accordance with NFPA 72.

   Exception: Supervision is not required for the following:

   1. Underground gate valve with roadway boxes.
   2. Halogenated extinguishing systems.
   3. Carbon dioxide extinguishing systems.
   4. Dry- and wet-chemical extinguishing systems.
   5. Automatic sprinkler systems installed in accordance with NFPA 13R where a common supply main is used to supply both domestic and automatic sprinkler systems and a separate shutoff valve for the automatic sprinkler system is not provided.

3407.4.3 Standpipes. Where the work area includes exits or corridors shared by more than one tenant and is located more than 50 feet (15 240 mm) above or below the lowest level of fire department access, a standpipe system shall be provided. Standpipes shall have an approved fire department connection with hose connections at each floor level above or below the lowest level of fire department access. Standpipe systems shall be installed in accordance with the International Building Code.

Exceptions:

1. No pump shall be required provided that the standpipes are capable of accepting delivery by fire department apparatus of a minimum of 250 gallons per minute (gpm) at 65 pounds per square inch (psi) (946 L/m at 448KPa) to the topmost floor in buildings equipped throughout with an automatic sprinkler system or a minimum of 500 gpm at 65 psi (1892 L/m at 448KPa) to the topmost floor in all other buildings. Where the standpipe terminates below the topmost floor, the standpipe shall be designed to meet (gpm/psi) (L/m/KPa) requirements of this exception for possible future extension of the standpipe.
2. The interconnection of multiple standpipe risers shall not be required.

3407.4.4 Fire alarm and detection. An approved fire alarm system shall be installed in accordance with Sections 3407.4.4.1 through 3407.4.4.3. Where automatic sprinkler protection is provided in accordance with Section 3407.4.2 and is connected to the building fire alarm system, automatic heat detection shall not be required.

An approved automatic fire detection system shall be installed in accordance with the provisions of this code and NFPA 72. Devices, combinations of devices, appliances, and equipment shall be approved. The automatic fire detectors shall be smoke detectors, except that an approved alternative type of detector shall be installed in spaces such as boiler rooms, where products of combustion are present during normal operation in sufficient quantity to actuate a smoke detector.

3407.4.4.1 Occupancy requirements. A fire alarm system shall be installed in accordance with Sections 3407.4.4.1.1 through 3407.4.4.1.7. Existing alarm-notification appliances shall be automatically activated throughout the building. Where the building is not equipped with a fire alarm system, alarm-notification appliances within the work area shall be provided and automatically activated.

Exceptions:

1. Occupancies with an existing, previously approved fire alarm system.
2. Where selective notification is permitted, alarm-notification appliances shall be automatically activated in the areas selected.

3407.4.4.1.1 Group E. A fire alarm system shall be installed in work areas of Group E occupancies as required by the International Fire Code for existing Group E occupancies.

3407.4.4.1.2 Group I-1. A fire alarm system shall be installed in work areas of Group I-1 residential care/assisted living facilities as required by the International Fire Code for existing Group I-1 occupancies.

3407.4.4.1.3 Group I-2. A fire alarm system shall be installed in work areas of Group I-2 occupancies as required by the International Fire Code for existing Group I-2 occupancies.

3407.4.4.1.4 Group I-3. A fire alarm system shall be installed in work areas of Group I-3 occupancies as required by the International Fire Code for existing Group I-3 occupancies.

3407.4.4.1.5 Group R-1. A fire alarm system shall be installed in Group R-1 occupancies as required by the International Fire Code for existing Group R-1 occupancies.

3407.4.4.1.6 Group R-2. A fire alarm system shall be installed in work areas of Group R-2 apartment buildings as required by the International Fire Code for existing Group R-2 occupancies.

3407.4.4.1.7 Group R-4. A fire alarm system shall be installed in work areas of Group R-4 residential care/assisted living facilities as required by the International Fire Code for existing Group R-4 occupancies.

3407.4.4.2 Supplemental fire alarm system requirements. Where the work area on any floor exceeds 50 percent of that floor area, Section 3407.4.4 .1 shall apply throughout the floor.

> **Exception:** Alarm-initiating and notification appliances shall not be required to be installed in tenant spaces outside of the work area.

3407.4.4.3 Smoke alarms. Individual sleeping units and individual dwelling units in any work area in Group R and I-1 occupancies shall be provided with smoke alarms in accordance with the International Fire Code.

> **Exception:** Interconnection of smoke alarms outside of the work area shall not be required.

(SECTION 805 MEANS OF EGRESS)

3407.5 Means of egress. Means of egress requirements for work areas in a level 2 alteration shall be in accordance with Sections 3407.5.1 through 3407.5.10.2 .

3407.5.1 Scope. The requirements of this section shall be limited to work areas that include exits or corridors shared by more than one tenant within the work area in which Level 2 alterations are being performed, and where specified they shall apply throughout the floor on which the work areas are located or otherwise beyond the work area.

3407.5.2 General. The means of egress shall comply with the requirements of this section.

Exceptions:

1. Where the work area and the means of egress serving it complies with NFPA 101.
2. Means of egress conforming to the requirements of the building code under which the building was constructed shall be considered compliant means of egress if, in the opinion of the code official, they do not constitute a distinct hazard to life.

3407.5.3 Number of exits. The number of exits shall be in accordance with Sections 3407.5.3.1 through 3407.5.3.3

3407.5.3.1 Minimum number. Every story utilized for human occupancy on which there is a work area that includes exits or corridors shared by more than one tenant within the work area shall be provided with the minimum number of exits based on the occupancy and the occupant load in accordance with the International Building Code. In addition, the exits shall comply with Sections 3407.5.3.1.1 and 3407.5.3.1.2.

3407.5.3.1.1 Single-exit buildings. Only one exit is required from buildings and spaces of the following occupancies:

1. In Group A, B, E, F, M, U and S occupancies, a single exit is permitted in the story at the level of exit discharge when the occupant load of the story does not exceed 50 and the exit access travel distance does not exceed 75 feet (22 860 mm).
2. Group B, F-2, and S-2 occupancies not more than two stories in height that are not greater than 3,500 square feet per floor (326 m2), when the exit access travel distance does not exceed 75 feet (22 860 mm). The minimum fire-resistance rating of the exit enclosure and of the opening protection shall be 1 hour.
3. Open parking structures where vehicles are mechanically parked.
4. In community residences for the developmentally disabled, the maximum occupant load excluding staff is 12.
5. Groups R-1 and R-2 not more than two stories in height, when there are not more than four dwelling units per floor and the exit access travel distance does not exceed 50 feet (15 240 mm).

The minimum fire-resistance rating of the exit enclosure and of the opening protection shall be 1 hour.

6. In multilevel dwelling units in buildings of occupancy Group R-1 or R-2, an exit shall not be required from every level of the dwelling unit provided that one of the following conditions is met:
   6.1. The travel distance within the dwelling unit does not exceed 75 feet (22 860 mm); or
   6.2. The building is not more than three stories in height and all third-floor space is part of one or more dwelling units located in part on the second floor; and no habitable room within any such dwelling unit shall have a travel distance that exceeds 50 feet (15 240 mm) from the outside of the habitable room entrance door to the inside of the entrance door to the dwelling unit.
7. In Group R-2, H-4, H-5 and I occupancies and in rooming houses and child care centers, a single exit is permitted in a one-story building with a maximum occupant load of 10 and the exit access travel distance does not exceed 75 feet (22 860 mm).
8. In buildings of Group R-2 occupancy that are equipped throughout with an automatic fire sprinkler system, a single exit shall be permitted from a basement or story below grade if every dwelling unit on that floor is equipped with an approved window providing a clear opening of at least 5 square feet (0.47 m2) in area, a minimum net clear opening of 24 inches (610 mm) in height and 20 inches (508 mm) in width, and a sill height of not more than 44 inches (1118 mm) above the finished floor.
9. In buildings of Group R-2 occupancy of any height with not more than four dwelling units per floor; with a smokeproof enclosure or outside stair as an exit; and with such exit located within 20 feet (6096 mm) of travel to the entrance doors to all dwelling units served thereby.
10. In buildings of Group R-3 occupancy equipped throughout with an automatic fire sprinkler system, only one exit shall be required from basements or stories below grade.

3407.5.3.1.2 Fire escapes required. When more than one exit is required, an existing or newly constructed fire escape complying with Section 3407.5.3.1.2.1 shall be accepted as providing one of the required means of egress.

3407.5.3.1.2.1 Fire escape access and details. Fire escapes shall comply with all of the following requirements:

1. Occupants shall have unobstructed access to the fire escape without having to pass through a room subject to locking.
2. Access to a new fire escape shall be through a door, except that windows shall be permitted to provide access from single dwelling units or sleeping units in Group R-1, R-2 and I-1 occupancies or to provide access from spaces having a maximum occupant load of 10 in other occupancy classifications.
   2.1. The window shall have a minimum net clear opening of 5.7 square feet (0.53 m2) or 5 square feet (0.46 m2) where located at grade.
   2.2. The minimum net clear opening height shall be 24 inches (610 mm) and net clear opening width shall be 20 inches (508 mm).
   2.3. The bottom of the clear opening shall not be greater than 44 inches (1118 mm) above the floor.
   2.4. The operation of the window shall comply with the operational constraints of the International Building Code.
3. Newly constructed fire escapes shall be permitted only where exterior stairs cannot be utilized because of lot lines limiting the stair size or because of the sidewalks, alleys, or roads at grade level.
4. Openings within 10 feet (3048 mm) of fire escape stairs shall be protected by fire assemblies having minimum 3/4-hour fire-resistance ratings.

   Exception: Opening protection shall not be required in buildings equipped throughout with an approved automatic sprinkler system.

5. In all buildings of Group E occupancy, up to and including the 12th grade, buildings of Group I occupancy, rooming houses and childcare centers, ladders of any type are prohibited on fire escapes used as a required means of egress.

3407.5.3.1.2.2 Construction. The fire escape shall be designed to support a live load of 100 pounds per square foot (4788 Pa) and shall be constructed of steel or other approved noncombustible materials. Fire escapes constructed of wood not less than nominal 2 inches (51 mm) thick are permitted on buildings of Type V construction. Walkways and railings located over or supported by combustible roofs in buildings of Types III and IV construction are permitted to be of wood not less than nominal 2 inches (51 mm) thick.

3407.5.3.1.2.3 Dimensions. Stairs shall be at least 22 inches (559 mm) wide with risers not more than, and treads not less than, 8 inches (203 mm). Landings at the foot of stairs shall not be less than 40 inches (1016 mm) wide by 36 inches (914 mm) long and located not more than 8 inches (203 mm) below the door.

3407.5.3.2 Mezzanines. Mezzanines in the work area and with an occupant load of more than 50 or in which the travel distance to an exit exceeds 75 feet (22 860 mm) shall have access to at least two independent means of egress.

Exception: Two independent means of egress are not required where the travel distance to an exit does not exceed 100 feet (30 480 mm) and the building is protected throughout with an automatic sprinkler system.

3407.5.3.3 Main entrance—Group A. All buildings of Group A with an occupant load of 300 or more shall be provided with a main entrance capable of serving as the main exit with an egress capacity of at least one-half of the total occupant load. The remaining exits shall be capable of providing one-half of the total required exit capacity.

Exception: Where there is no well-defined main exit or where multiple main exits are provided, exits shall be permitted to be distributed around the perimeter of the building provided that the total width of egress is not less than 100 percent of the required width.

3407.5.4 Egress doorways. Egress doorways in any work area shall comply with Sections 3407.5.4.1 through 3407.5.4.5.

3407.5.4.1 Two egress doorways required. Work areas shall be provided with two egress doorways in accordance with the requirements of Sections 3404.8.4.1.1 and 3404.8.4.1.2.

3407.5.4.1.1 Occupant load and travel distance. In any work area, all rooms and spaces having an occupant load greater than 50 or in which the travel distance to an exit exceeds 75 feet (22 860 mm) shall have a minimum of two egress doorways.

Exceptions:

1. Storage rooms having a maximum occupant load of 10.
2. Where the work area is served by a single exit in accordance with Section 3407.5.3.1.1.

3407.5.4.1.2 Group I-2. In buildings of Group I-2 occupancy, any patient sleeping room or suite of patient rooms greater than 1,000 square feet (93 m2) within the work area shall have a minimum of two egress doorways.

3407.5.4.2 Door swing. In the work area and in the egress path from any work area to the exit discharge, all egress doors serving an occupant load greater than 50 shall swing in the direction of exit travel.

3407.5.4.2.1 Supplemental requirements for door swing. Where the work area exceeds 50 percent of the floor area, door swing shall comply with Section 3407.5.4.2 throughout the floor.

> **Exception:** Means of egress within or serving only a tenant space that is entirely outside the work area.

3407.5.4.3 Door closing. In any work area, all doors opening onto an exit passageway at grade or an exit stair shall be self-closing or automatic-closing by listed closing devices.

> **Exceptions:**
>
> 1. Where exit enclosure is not required by the International Building Code.
> 2. Means of egress within or serving only a tenant space that is entirely outside the work area.

3407.5.4.3.1 Supplemental requirements for door closing. Where the work area exceeds 50 percent of the floor area, doors shall comply with Section 3407.5.4.3 throughout the exit stair from the work area to, and including, the level of exit discharge.

3407.5.4.4 Panic hardware. In any work area, and in the egress path from any work area to the exit discharge, in buildings or portions thereof of Group A assembly occupancies with an occupant load greater than 100, all required exit doors equipped with latching devices shall be equipped with approved panic hardware.

3407.5.4.4.1 Supplemental requirements for panic hardware. Where the work area exceeds 50 percent of the floor area, panic hardware shall comply with Section 3407.5.4.4 throughout the floor.

> **Exception:** Means of egress within a tenant space that is entirely outside the work area.

3407.5.4.5 Emergency power source in Group I-3. Work areas in buildings of Group I-3 occupancy having remote power unlocking capability for more than 10 locks shall be provided with an emergency power source for such locks. Power shall be arranged to operate automatically upon failure of normal power within 10 seconds and for a duration of not less than 1 hour.

3407.5.5 Openings in corridor walls. Openings in corridor walls in any work area shall comply with Sections 3407.5.5.1 through 3407.5.5.4.

> **Exception:** Openings in corridors where such corridors are not required to be rated in accordance with the International Building Code.

3407.5.5.1 Corridor doors. Corridor doors in the work area shall not be constructed of hollow core wood and shall not contain louvers. All dwelling unit or sleeping unit corridor doors in work areas in buildings of Groups R-1, R-2, and I-1 shall be at least 13/8-inch (35 mm) solid core wood or approved equivalent and shall not have any glass panels, other than approved wired glass or other approved glazing material in metal frames. All dwelling unit or sleeping unit corridor doors in work areas in buildings of Groups R-1, R-2, and I-1 shall be equipped with approved door closers. All replacement doors shall be 13/4-inch (45 mm) solid bonded wood core or approved equivalent, unless the existing frame will accommodate only a 13/8-inch (35 mm) door.

> **Exceptions:**
>
> 1. Corridor doors within a dwelling unit or sleeping unit.
> 2. Existing doors meeting the requirements of Guidelines on Fire Ratings of Archaic Materials and Assemblies (IEBC Resource A) for a rating of 15 minutes or more shall be accepted as meeting the provisions of this requirement.

3. Existing doors in buildings protected throughout with an approved automatic sprinkler system shall be required only to resist smoke, be reasonably tight fitting, and shall not contain louvers.
4. In group homes with a maximum of 15 occupants and that are protected with an approved automatic detection system, closing devices may be omitted.
5. Door assemblies having a fire protection rating of at least 20 minutes.

3407.5.5.2 Transoms. In all buildings of Group I-1, R-1 and R-2 occupancy, all transoms in corridor walls in work areas shall either be glazed with 1/4-inch (6.4 mm) wired glass set in metal frames or other glazing assemblies having a fire protection rating as required for the door and permanently secured in the closed position or sealed with materials consistent with the corridor construction.

3407.5.5.3 Other corridor openings. In any work area, any other sash, grille, or opening in a corridor and any window in a corridor not opening to the outside air shall be sealed with materials consistent with the corridor construction.

3407.5.5.3.1 Supplemental requirements for other corridor opening. Where the work area exceeds 50 percent of the floor area, Section 3407.5.5.3 shall be applicable to all corridor windows, grills, sashes, and other openings on the floor.

Exception: Means of egress within or serving only a tenant space that is entirely outside the work area.

3407.5.5.4 Supplemental requirements for corridor openings. Where the work area on any floor exceeds 50 percent of the floor area, the requirements of Sections 3407.5.5.1 through 3407.5.5.3 shall apply throughout the floor.

3407.5.6 Dead-end corridors. Dead-end corridors in any work area shall not exceed 35 feet (10 670 mm).

Exceptions:

1. Where dead-end corridors of greater length are permitted by the International Building Code.
2. In other than Group A and H occupancies, the maximum length of an existing dead-end corridor shall be 50 feet (15 240 mm) in buildings equipped throughout with an automatic fire alarm system installed in accordance with the International Building Code.
3. In other than Group A and H occupancies, the maximum length of an existing dead-end corridor shall be 70 feet (21 356 mm) in buildings equipped throughout with an automatic sprinkler system installed in accordance with the International Building Code.
4. In other than Group A and H occupancies, the maximum length of an existing, newly constructed, or extended dead-end corridor shall not exceed 50 feet (15 240 mm) on floors equipped with an automatic sprinkler system installed in accordance with the International Building Code.

3407.5.7 Means-of-egress lighting. Means-of-egress lighting shall be in accordance with Section 3407.5.7.1 through 3407.5.7.2, as applicable.

3407.5.7.1 Artificial lighting required. Means of egress in all work areas shall be provided with artificial lighting in accordance with the requirements of the International Building Code.

3407.5.7.2 Supplemental requirements for means-of-egress lighting. Where the work area on any floor exceeds 50 percent of that floor area, means of egress throughout the floor shall comply with Section 3407.5.7.1.

Exception: Means of egress within or serving only a tenant space that is entirely outside the work area.

3407.5.8 Exit signs. Exit signs shall be in accordance with Sections 3407.5.8.1 and 3407.5.8.2, as applicable.

3407.5.8.1 Work areas. Means of egress in all work areas shall be provided with exit signs in accordance with the requirements of the International Building Code.

3407.5.8.2 Supplemental requirements for exit signs. Where the work area on any floor exceeds 50 percent of that floor area, means of egress throughout the floor shall comply with Section 3407.5.8.1.

Exception: Means of egress within a tenant space that is entirely outside the work area.

3407.5.9 Handrails. The requirements of Sections 3407.5.9.1 and 3407.5.9.2 shall apply to handrails from the work area floor to, and including, the level of exit discharge.

3407.5.9.1 Minimum requirement. Every required exit stairway that is part of the means of egress for any work area and that has three or more risers and is not provided with at least one handrail, or in which the existing handrails are judged to be in danger of collapsing, shall be provided with handrails for the full length of the run of steps on at least one side. All exit stairways with a required egress width of more than 66 inches (1676 mm) shall have handrails on both sides.

3407.5.9.2 Design. Handrails required in accordance with Section 3407.5.9.1 shall be designed and installed in accordance with the provisions of the International Building Code.

3407.5.10 Guards. The requirements of Sections 3407.5.10.1 and 3407.5.10.2 shall apply to guards from the work area floor to, and including, the level of exit discharge but shall be confined to the egress path of any work area.

3407.5.10.1 Minimum requirement. Every open portion of a stair, landing, or balcony that is more than 30 inches (762 mm) above the floor or grade below and is not provided with guards, or those portions in which existing guards are judged to be in danger of collapsing, shall be provided with guards.

3407.5.10.2 Design. Guards required in accordance with Section 3407.5.10.1 shall be designed and installed in accordance with the International Building Code.

(SECTION 806 ACCESSIBILITY)

3407.6 Accessibility. A building, facility, or element that is altered shall comply with Sections 3407.6.1 through 3407.6.4 and Section 3406.4.

3407.6.1 Stairs and escalators in existing buildings. In alterations where an escalator or stair is added where none existed previously, an accessible route shall be provided in accordance with Sections 1104.4 and 1104.5.

3407.6.2 Accessible dwelling units and sleeping units. Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 of the International Building Code for accessible units and Chapter 9 for visible alarms apply only to the quantity of spaces being added.

3407.6.3 Type A dwelling or sleeping units. Where more than 20 Group R-2 dwelling or sleeping units are being added, the requirements of Section 1107 of the International Building Code for Type A units and Chapter 9 for visible alarms apply only to the quantity of the spaces being added.

3407.6.4 Type B dwelling or sleeping units. Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements of Section 1107 of the International Building

Code for Type B units and Chapter 9 for visible alarms apply only to the quantity of the spaces being added.

(SECTION 807STRUCTURAL)

3407.7 Structural. Structural elements and systems within buildings undergoing Level 2 alterations shall comply with Sections 3407.7.1 through 3407.7.5

3407.7.1 New structural elements. New structural elements in alterations, including connections and anchorage, shall comply with the International Building Code.

3407.7.2 Minimum design loads. The minimum design loads on existing elements of a structure that do not support additional loads as a result of an alteration shall be the loads applicable at the time the building was constructed.

3407.7.3 Existing structural elements carrying gravity loads. Alterations shall not reduce the capacity of existing gravity load-carrying structural elements unless it is demonstrated that the elements have the capacity to carry the applicable design gravity loads required by the International Building Code. Existing structural elements supporting any additional gravity loads as a result of the alterations, including the effects of snow drift, shall comply with the International Building Code.

Exceptions:

1. Structural elements whose stress is not increased by more than 5 percent.
2. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the existing building and its alteration comply with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.

3407.7.4 Existing structural elements resisting lateral loads. Alterations affecting the demands or capacities of existing elements of the lateral load-resisting system shall be evaluated using the wind provisions of the International Building Code and the reduced IBC-level seismic forces. Any existing lateral load-resisting structural elements whose demand-capacity ratio with the alteration considered is more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be brought into compliance with those wind and seismic provisions. In addition, the alteration shall not create a structural irregularity prohibited by ASCE 7 unless the entire structure complies with Section 3401.6.4.4. For the purposes of this section, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacity shall account for the cumulative effects of additions and alterations since the original construction.

3407.7.5 Voluntary lateral force-resisting system alterations. Alterations of existing structural elements and additions of new structural elements that are initiated for the purpose of increasing the lateral force-resisting strength or stiffness of an existing structure and that are not required by other sections of this code shall not be required to be designed for forces conforming to the International Building Code, provided that an engineering analysis is submitted to show that:

1. The capacity of existing structural elements required to resist forces is not reduced;
2. The lateral loading to existing structural elements is not increased either beyond its capacity or more than 10 percent;
3. New structural elements are detailed and connected to the existing structural elements as required by the International Building Code;
4. New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the International Building Code; and
5. A dangerous condition as defined in this code is not created. Voluntary alterations to lateral force-resisting systems conducted in accordance with Appendix A and the referenced standards of this code shall be permitted.

(SECTION 808 ELECTRICAL)

3407.8 Electrical. Electrical equipment and wiring in buildings undergoing a level 2 alteration shall be in accordance with Sections 3407.8.1 through 3407.8.3.

3407.8.1 New installations. All newly installed electrical equipment and wiring relating to work done in any work area shall comply with the materials and methods requirements of Section 3406.1.

> **Exception:** Electrical equipment and wiring in newly installed partitions and ceilings shall comply with all applicable requirements of NFPA 70.

3407.8.2 Existing installations. Existing wiring in all work areas in Group A-1, A-2, A-5, H and I occupancies shall be upgraded to meet the materials and methods requirements of Section 3404.3.

3407.8.3 Residential occupancies. In Group R-2, R-3 and R-4 occupancies and buildings regulated by the International Residential Code, the requirements of Sections 3407.8.3.1 through 3407.8.3.7 shall be applicable only to work areas located within a dwelling unit.

3407.8.3.1 Enclosed areas. All enclosed areas, other than closets, kitchens, basements, garages, hallways, laundry areas, utility areas, storage areas and bathrooms shall have a minimum of two duplex receptacle outlets or one duplex receptacle outlet and one ceiling or wall-type lighting outlet.

3407.8.3.2 Kitchens. Kitchen areas shall have a minimum of two duplex receptacle outlets.

3407.8.3.3 Laundry areas. Laundry areas shall have a minimum of one duplex receptacle outlet located near the laundry equipment and installed on an independent circuit.

3407.8.3.4 Ground fault circuit interruption. Newly installed receptacle outlets shall be provided with ground fault circuit interruption as required by NFPA 70.

3407.8.3.5 Minimum lighting outlets. At least one lighting outlet shall be provided in every bathroom, hallway, stairway, attached garage, and detached garage with electric power, and to illuminate outdoor entrances and exits.

3407.8.3.6 Utility rooms and basements. At least one lighting outlet shall be provided in utility rooms and basements where such spaces are used for storage or contain equipment requiring service.

3407.8.3.7 Clearance for equipment. Clearance for electrical service equipment shall be provided in accordance with the NFPA 70.

(SECTION 809 MECHANICAL)

3407.9 Mechanical. Mechanical ventilation in buildings undergoing a level 2 alteration shall be in accordance with Sections 3407.9.1 through 3407.9.3

3407.9.1 Mechanical. All reconfigured spaces intended for occupancy and all spaces converted to habitable or occupiable space in any work area shall be provided with natural or mechanical ventilation in accordance with the International Mechanical Code.

> **Exception:** Existing mechanical ventilation systems shall comply with the requirements of Section 3407.9.2.

3407.9.2 Altered existing systems. In mechanically ventilated spaces, existing mechanical ventilation systems that are altered, reconfigured, or extended shall provide not less than 5 cubic feet per minute (cfm) (0.0024 m3/s) per person of outdoor air and not less than 15 cfm (0.0071 m3/s) of ventilation air per person; or not less than the amount of ventilation air determined by the Indoor Air Quality Procedure of ASHRAE 62.

3407.9.3 Local exhaust. All newly introduced devices, equipment, or operations that produce airborne particulate matter, odors, fumes, vapor, combustion products, gaseous contaminants, pathogenic and allergenic organisms, and microbial contaminants in such quantities as to affect adversely or impair health or cause discomfort to occupants shall be provided with local exhaust.

(SECTION 810 PLUMBING)

3407.10 Plumbing fixtures. Where the occupant load of the story is increased by more than 20 percent, plumbing fixtures for the story shall be provided in quantities specified in the International Plumbing Code based on the increased occupant load.

(SECTION 811 ENERGY CONSERVATION)

3407.11 Energy conservation. Level 2 alterations to existing buildings or structures are permitted without requiring the entire building or structure to comply with the energy requirements of the International Energy Conservation Code or International Residential Code. The alterations shall conform to the energy requirements of the International Energy Conservation Code or International Residential Code as they relate to new construction only.

(CHAPTER 9 ALTERATIONS—LEVEL 3, SECTION 901GENERAL)

SECTION 3408
LEVEL 3 ALTERATIONS

3408.1 General. Level 3 alterations shall comply with Sections 3408.1.1 through 3408.9

3408.1 Scoping. Level 3 alterations includes alterations where the work area exceeds 50% of the aggregate area of the building.

3408.2 Compliance. In addition to the provisions of this chapter, work shall comply with all of the requirements of Chapters 3406 and 3407. The requirements of Sections 3407.3, 3407.4 and 3407.5 shall apply within all work areas whether or not they include exits and corridors shared by more than one tenant and regardless of the occupant load.

> **Exception:** Buildings in which the reconfiguration of space affecting exits or shared egress access is exclusively the result of compliance with the accessibility requirements of Section 3406.4 shall not be required to comply with this chapter.

(SECTION 902 SPECIAL USE AND OCCUPANCY)

3408.3 Special use and occupancy. Buildings undergoing a level 3 alteration containing a special use shall be in accordance with this section.

3408.3.1 High-rise buildings. Any building having occupied floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall comply with the requirements of Sections 3408.3.1.1 and 3408.3.1.2.

3408.3.1.1 Recirculating air or exhaust systems. When a floor is served by a recirculating air or exhaust system with a capacity greater than 15,000 cubic feet per minute (701 m3/s), that system shall be equipped with approved smoke and heat detection devices installed in accordance with the International Mechanical Code.

3408.3.1.2 Elevators. Where there is an elevator or elevators for public use, at least one elevator serving the work area shall comply with this section. Existing elevators with a travel distance of 25 feet (7620 mm) or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for fire-fighting or rescue purposes shall be provided with emergency operation in accordance with ASME A17.3. New elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME A17.1.

3408.3.2 Boiler and furnace equipment rooms. Boiler and furnace equipment rooms adjacent to or within the following facilities shall be enclosed by 1-hour fire-resistance-rated construction: day nurseries, children's shelter facilities, residential childcare facilities, and similar facilities with children below the age of 21/2 years or that are classified as Group I-2 occupancies, shelter facilities, residences for the developmentally disabled, group homes, teaching family homes, transitional living homes, rooming and boarding houses, hotels, and multiple dwellings.

Exceptions:

1. Furnace and boiler equipment of low-pressure type, operating at pressures of 15 pounds per square inch gauge (psig) (103.4 KPa) or less for steam equipment or 170 psig (1171 KPa) or less for hot water equipment, when installed in accordance with manufacturer recommendations.
2. Furnace and boiler equipment of residential R-3 type with 200,000 British thermal units (Btu) (2.11 × 108 J) per hour input rating or less is not required to be enclosed.
3. Furnace rooms protected with automatic sprinkler protection.

3408.3.2.1 Emergency controls. Emergency controls for boilers and furnace equipment shall be provided in accordance with the International Mechanical Code in all buildings classified as day nurseries, children's shelter facilities, residential childcare facilities, and similar facilities with children below the age of 21/2 years or that are classified as Group I-2 occupancies, and in group homes, teaching family homes, and supervised transitional living homes in accordance with the following:

1. Emergency shutoff switches for furnaces and boilers in basements shall be located at the top of the stairs leading to the basement; and
2. Emergency shutoff switches for furnaces and boilers in other enclosed rooms shall be located outside of such room.

(SECTION 903 BUILDING ELEMENTS AND MATERIALS)

3408.4 Building elements and materials. Building elements and materials shall be in accordance with this section.

3408.4.1 Existing shafts and vertical openings. Existing stairways that are part of the means of egress shall be enclosed in accordance with Section 3407.3.1.1 from the highest work area floor to, and including, the level of exit discharge and all floors below.

3408.4.2 Fire partitions in Group R-3. Fire separation in Group R-3 occupancies shall be in accordance with Section 3408.4.2.1.

3408.4.2.1 Separation required. Where the work area is in any attached dwelling unit in Group R-3 or any multiple single-family dwelling (townhouse), walls separating the dwelling units that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. All work shall be performed on the side of the dwelling unit wall that is part of the work area.

Exception: Where alterations or repairs do not result in the removal of wall or ceiling finishes exposing the structure, walls are not required to be continuous through concealed floor spaces.

3408.4.3 Interior finish. Interior finish in exits serving the work area shall comply with Section 3407.3.3 between the highest floor on which there is a work area to the floor of exit discharge.

(SECTION 904 FIRE PROTECTION)

3408.5 Fire protection. Fire protection requirements for buildings undergoing level 3 alterations shall be in accordance with this section.

3408.5.1 Automatic sprinkler systems. Automatic sprinkler systems shall be provided in all work areas when required by Section 3407.4.2 or this section.

3408.5.1.1 High-rise buildings. In high-rise buildings, work areas shall be provided with automatic sprinkler protection where the building has a sufficient municipal water supply system to the site. Where the work area exceeds 50 percent of floor area, sprinklers shall be provided in the specified areas where sufficient municipal water supply for design and installation of a fire sprinkler system is available at the site.

3408.5.1.2 Rubbish and linen chutes. Rubbish and linen chutes located in the work area shall be provided with automatic sprinkler system protection or an approved automatic fire-extinguishing system where protection of the rubbish and linen chute would be required under the provisions of the International Building Code for new construction.

3408.5.2 Fire alarm and detection systems. Fire alarm and detection systems complying with Sections 3407.4.4.1 and 3407.4.4.3 shall be provided throughout the building in accordance with the International Building Code.

3408.5.2.1 Manual fire alarm systems. Where required by the International Building Code, a manual fire alarm system shall be provided throughout the work area. Alarm notification appliances shall be provided on such floors and shall be automatically activated as required by the International Building Code.

Exceptions:

1. Alarm-initiating and notification appliances shall not be required to be installed in tenant spaces outside of the work area.
2. Visual alarm notification appliances are not required, except where an existing alarm system is upgraded or replaced or where a new fire alarm system is installed.

3408.5.2.2 Automatic fire detection. Where required by the International Building Code for new buildings, automatic fire detection systems shall be provided throughout the work area.

(SECTION 905 MEANS OF EGRESS)

3408.6. Means of egress. The means of egress shall comply with the requirements of Section 3407.5 except as specifically required in Sections 3408.6.1 and 3408.6.2.

3408.6.1 Means-of-egress lighting. Means of egress from the highest work area floor to the floor of exit discharge shall be provided with artificial lighting within the exit enclosure in accordance with the requirements of the International Building Code.

3408.6.2 Exit signs. Means of egress from the highest work area floor to the floor of exit discharge shall be provided with exit signs in accordance with the requirements of the International Building Code.

(SECTION 906 ACCESSIBILITY)

3408.7 Accessibility. A building, facility or element that is altered shall comply with this section and Sections 3406.4 and 3407.6

3408.7.1 Type B dwelling or sleeping units. Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being altered or added, the requirements of Section 1107 of the International Building Code for Type B units and Chapter 9 for visible alarms apply only to the quantity of the spaces being altered or added.

(SECTION 907STRUCTURAL)

3408.8 Structural. Where buildings are undergoing Level 3 alterations including structural alterations, the provisions of this section shall apply.

3408.8.1 New structural elements. New structural elements shall comply with Section 3407.7.1.

3408.8.2 Existing structural elements carrying gravity loads. Existing structural elements carrying gravity loads shall comply with Section 3407.7.3.

3408.8.3 Existing structural elements resisting lateral loads. All existing elements of the lateral force-resisting system shall comply with this section.

Exceptions:

1. Buildings of Group R occupancy with no more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction methods of the International Building Code or in compliance with the provisions of the International Residential Code.
2. Where such alterations involve only the lowest story of a building and the change of occupancy provisions of Section 3409 do not apply, only the lateral force-resisting components in and below that story need comply with this section.

3408.8.3.1 Evaluation and analysis. An engineering evaluation and analysis that establishes the structural adequacy of the altered structure shall be prepared by a registered design professional and submitted to the code official.

3408.8.3.2 Substantial structural alteration. Where more than 30 percent of the total floor and roof areas of the building or structure have been or are proposed to be involved in structural alteration within a five-year period, the evaluation and analysis shall demonstrate that the altered building or structure complies with the International Building Code for wind loading and with reduced IBC-level seismic forces. The areas to be counted toward the 30 percent shall be those areas tributary to the vertical load-carrying components, such as joists, beams, columns, walls and other structural components that have been or will be removed, added or altered, as well as areas such as mezzanines, penthouses, roof structures and in-filled courts and shafts.

3408.8.3.3 Limited structural alteration. Where the work does not involve a substantial structural alteration, the existing elements of the lateral load-resisting system shall comply with Section 3407.7.4.

3408.8.3.4 Wall anchors for concrete and masonry buildings. For any building assigned to Seismic Design Category D, E or F with a structural system consisting of concrete or reinforced masonry walls with a flexible roof diaphragm or unreinforced masonry walls with any type of roof diaphragm, the alteration work shall include installation of wall anchors at the roof line to resist the reduced IBC-level seismic forces, unless an evaluation demonstrates compliance of existing wall anchorage.

3408.8.3.5 Bracing for unreinforced masonry parapets. Parapets constructed of unreinforced masonry in buildings assigned to Seismic Design Category D, E or F shall have bracing installed as needed to resist the reduced IBC-level seismic forces, unless an evaluation demonstrates compliance of such items.

(SECTION 908 ENERGY CONSERVATION)

3408.9 Energy conservation. Level 3 alterations to existing buildings or structures are permitted without requiring the entire building or structure to comply with the energy requirements of the International Energy Conservation Code or International Residential Code. The alterations shall conform to the energy requirements of the International Energy Conservation Code or International Residential Code as they relate to new construction only.

*(CHAPTER 10 CHANGE OF OCCUPANCY
SECTION 1001 GENERAL)*

SECTION 3409
CHANGE OF OCCUPANCY

3409.1 Scope. The provisions of this section shall apply where a change of occupancy occurs, as defined in Section 202, including:

1. Where the occupancy classification is not changed; or
2. Where there is a change in occupancy classification or the occupancy group designation changes.

3409.2 Change in occupancy with no change of occupancy classification. A change in occupancy, as defined in Section 202, with no change of occupancy classification shall not be made to any structure that will subject the structure to any special provisions of the applicable International Codes, including the provisions of Sections 3409.5 through 3409.14, without the approval of the code official. A certificate of occupancy shall be issued where it has been determined that the requirements for the change in occupancy have been met.

3409.2.1 Repair and alteration with no change of occupancy classification. Any repair or alteration work undertaken in connection with a change of occupancy that does not involve a change of occupancy classification shall conform to the applicable requirements for the work as classified in Chapter 4 and to the requirements of Sections 3409.5 through 3409.14.

Exception: As modified in Section 3411.8 for historic buildings.

3409.3 Change of occupancy classification. Where the occupancy classification of a building changes, the provisions of Sections 3409.5 through 3409.15 shall apply. This includes a change of occupancy classification within a group as well as a change of occupancy classification from one group to a different group.

3409.3.1 Partial change of occupancy classification. Where a portion of an existing building is changed to a new occupancy classification, Section 3409.15 shall apply.

3409.4 Certificate of occupancy required. A certificate of occupancy shall be issued where a change of occupancy occurs that results in a different occupancy classification as determined by the International Building Code.

(SECTION 1002 SPECIAL USE AND OCCUPANCY)

3409.5 Special use and occupancy. Where the character or use of an existing building or part of an existing building is changed to one of the following special use or occupancy categories as defined in the International Building Code, the building shall comply with all of the applicable requirements of the International Building Code:

1. Covered and open mall buildings.
2. Atriums.
3. Motor vehicle-related occupancies.
4. Aircraft-related occupancies.
5. Motion picture projection rooms.
6. Stages and platforms.
7. Special amusement buildings.
8. Incidental use areas.
9. Hazardous materials.
10. Ambulatory care facilities.

3409.5.1 Underground buildings. An underground building in which there is a change of use shall comply with the requirements of the International Building Code applicable to underground structures.

(SECTION 1003 BUILDING ELEMENTS AND MATERIALS

3409.6 Building elements and materials. Building elements and materials in portions of buildings undergoing a change of occupancy classification shall comply with Section 3409.15.

(SECTION 1004 FIRE PROTECTION)

3409.7 Fire protection. Fire protection requirements of Section 3409.15 shall apply where a building or portions thereof undergo a change of occupancy classification.

(SECTION 1005 MEANS OF EGRESS)

3409.8 Means of egress. Means of egress in portions of buildings undergoing a change of occupancy classification shall comply with Section 3409.15.

(SECTION 1006 ACCESSIBILITY)

3409.9 Accessibility. Accessibility in portions of buildings undergoing a change of occupancy classification shall comply with Section 3407.9.8.

(SECTION 1007 STRUCTURAL)

3409.10 Structural. Structural requirements for buildings undergoing a change of occupancy shall comply with this section.

3409.10.1 Gravity loads. Buildings or portions thereof subject to a change of occupancy where such change in the nature of occupancy results in higher uniform or concentrated loads based on Table 1607.1 of the International Building Code shall comply with the gravity load provisions of the International Building Code.

Exception: Structural elements whose stress is not increased by more than 5 percent.

3409.10.2 Snow and wind loads. Buildings and structures subject to a change of occupancy where such change in the nature of occupancy results in higher wind or snow risk categories based on Table 1607.1 of the International Building Code shall be analyzed and shall comply with the applicable wind or snow load provisions of the International Building Code.

Exception: Where the new occupancy with a higher risk category is less than or equal to 10 percent of the total building floor area. The cumulative effect of the area of occupancy changes shall be considered for the purposes of this exception.

3409.10.2 Seismic loads. Existing buildings with a change of occupancy shall comply with the seismic provisions of Sections 3409.10.2.1 and 3409.10.2.2.

3409.10.2.1 Compliance with the International Building Code level seismic forces. Where a building or portion thereof is subject to a change of occupancy that results in the building being assigned to a higher risk category based on Table 1604.5 of the International Building Code; or where such change of occupancy results in a reclassification of a building to a higher hazard category as shown in Table 3409.15.4; or where a change of a Group M occupancy to a Group A, E, I-1, R-1, R-2 or R-4 occupancy with two-thirds or more of the floors involved in Level 3 alteration work, the building shall comply with the requirements for International Building Code level seismic forces as specified in Section 301.1.4.1 for the new risk category.

Exceptions:

1. Group M occupancies being changed to Group A, E, I-1, R-1, R-2 or R-4 occupancies for buildings less than six stories in height and in Seismic Design Category A, B or C.
2. Where approved by the code official, specific detailing provisions required for a new structure are not required to be met where it can be shown that an equivalent level of performance and seismic safety is obtained for the applicable risk category based on the provision for reduced International Building Code level seismic forces as specified in Section 3401.6.4.4.
3. Where the area of the new occupancy with a higher hazard category is less than or equal to 10 percent of the total building floor area and the new occupancy is not classified as Risk Category IV. For the purposes of this exception, buildings occupied by two or more occupancies not included in the same Risk category, shall be subject to the provisions of Section 1604.5.1 of the International Building Code. The cumulative effect of the area of occupancy changes shall be considered for the purposes of this exception.
4. Unreinforced masonry bearing wall buildings in Risk Category III when assigned to Seismic Design Category A or B shall be allowed to be strengthened to meet the requirements of Appendix Chapter A1 of this code [Guidelines for the Seismic Retrofit of Existing Buildings (GSREB)].

3409.10.2.2 Access to Risk Category IV. Where a change of occupancy is such that compliance with Section 3409.10.2.1 is required and the building is assigned to Risk Category IV, the operational access to the building shall not be through an adjacent structure, unless that structure conforms to the requirements for Risk Category IV structures. Where operational access is less than 10 feet (3048 mm) from either an interior lot line or from another structure, access protection from potential falling debris shall be provided by the owner of the Risk Category IV structure.

(SECTION 1008 ELECTRICAL)

3409.11 Electrical. Buildings undergoing a change occupancy shall comply with this Section.

3409.11.1 Special occupancies. Where the occupancy of an existing building or part of an existing building is changed to one of the following special occupancies as described in NFPA 70, the electrical wiring and equipment of the building or portion thereof that contains the proposed occupancy shall comply with the applicable requirements of NFPA 70 whether or not a change of occupancy group is involved:

1. Hazardous locations.
2. Commercial garages, repair, and storage.
3. Aircraft hangars.
4. Gasoline dispensing and service stations.
5. Bulk storage plants.
6. Spray application, dipping, and coating processes.
7. Health care facilities.
8. Places of assembly.

9. Theaters, audience areas of motion picture and television studios, and similar locations.
10. Motion picture and television studios and similar locations.
11. Motion picture projectors.
12. Agricultural buildings.

3409.11.2 Unsafe conditions. Where the occupancy of an existing building or part of an existing building is changed, all unsafe conditions shall be corrected without requiring that all parts of the electrical system comply with NFPA 70.

3409.11.3 Service upgrade. Where the occupancy of an existing building or part of an existing building is changed, electrical service shall be upgraded to meet the requirements of NFPA 70 for the new occupancy.

3409.11.4 Number of electrical outlets. Where the occupancy of an existing building or part of an existing building is changed, the number of electrical outlets shall comply with NFPA 70 for the new occupancy.

(SECTION 1009 MECHANICAL)

3409.12 Mechanical requirements. Where the occupancy of an existing building or part of an existing building is changed such that the new occupancy is subject to different kitchen exhaust requirements or to increased mechanical ventilation requirements in accordance with the International Mechanical Code, the new occupancy shall comply with the intent of the respective International Mechanical Code provisions.

(SECTION 1010 PLUMBING)

3409.13 Plumbing. Buildings undergoing a change of occupancy shall comply with plumbing requirements of this section.

3409.13.1 Increased demand. Where the occupancy of an existing building or part of an existing building is changed such that the new occupancy is subject to increased or different plumbing fixture requirements or to increased water supply requirements in accordance with the International Plumbing Code, the new occupancy shall comply with the intent of the respective International Plumbing Code provisions.

3409.13.2 Food-handling occupancies. If the new occupancy is a food-handling establishment, all existing sanitary waste lines above the food or drink preparation or storage areas shall be panned or otherwise protected to prevent leaking pipes or condensation on pipes from contaminating food or drink. New drainage lines shall not be installed above such areas and shall be protected in accordance with the International Plumbing Code.

3409.13.3 Interceptor required. If the new occupancy will produce grease or oil-laden wastes, interceptors shall be provided as required in the International Plumbing Code.

3409.13.4 Chemical wastes. If the new occupancy will produce chemical wastes, the following shall apply:

1. If the existing piping is not compatible with the chemical waste, the waste shall be neutralized prior to entering the drainage system, or the piping shall be changed to a compatible material.
2. No chemical waste shall discharge to a public sewer system without the approval of the sewage authority.

3409.13.5 Group I-2. If the occupancy group is changed to Group I-2, the plumbing system shall comply with the applicable requirements of the International Plumbing Code.

(SECTION 1011 OTHER REQUIREMENTS)

3409.14 Light and ventilation. Light and ventilation shall comply with the requirements of the International Building Code for the new occupancy.

(SECTION 1012 CHANGE OF OCCUPANCY CLASSIFICATION)

3409.15 Change of occupancy classification. Buildings undergoing a change of occupancy classification shall comply with this section.

3409.15.1 General. The provisions of this section shall apply to buildings or portions thereof undergoing a change of occupancy classification. This includes a change of occupancy classification within a group as well as a change of occupancy classification from one group to a different group. Such buildings shall also comply with Sections 3409.5 through 3409.14. The application of requirements for the change of occupancy shall be as set forth in Sections 3409.15.1.1 through 3409.15.1.4. A change of occupancy, as defined in Section 202, without a corresponding change of occupancy classification shall comply with Section 3409.2.

3409.15.1.1 Compliance with Section 3408. The requirements of Section 3405.1 shall be applicable throughout the building for the new occupancy classification based on the separation conditions set forth in Sections 3409.15.1.1.1 and 3409.15.1.1.2.

3409.15.1.1.1 Change of occupancy classification without separation. Where a portion of an existing building is changed to a new occupancy classification and that portion is not separated from the remainder of the building with fire barriers having a fire-resistance rating as required in the International Building Code for the separate occupancy, the entire building shall comply with all of the requirements of Section 3408 applied throughout the building for the most restrictive occupancy classification in the building and with the requirements of this chapter.

3409.15.1.1.2 Change of occupancy classification with separation. Where a portion of an existing building that is changed to a new occupancy classification and that portion is separated from the remainder of the building with fire barriers having a fire-resistance rating as required in the International Building Code for the separate occupancy, that portion shall comply with all of the requirements of Section 3408 for the new occupancy classification and with the requirements of this chapter.

3409.15.1.2 Fire protection and interior finish. The provisions of Sections 3409.15.2 and 3409.15.3 for fire protection and interior finish, respectively, shall apply to all buildings undergoing a change of occupancy classification.

3409.15.1.3 Change of occupancy classification based on hazard category. The relative degree of hazard between different occupancy classifications shall be determined in accordance with the categories specified in Tables 3409.15.4, 3409.15.5 and 3415.6. Such a determination shall be the basis for the application of Sections 3409.15.4 through 3409.15.7.

3409.15.1.4 Accessibility. All buildings undergoing a change of occupancy classification shall comply with Section 3409.15.8.

3409.15.2 Fire protection systems. Fire protection systems shall be provided in accordance with Sections 3409.15.2.1 and 3409.15.2.2.

3409.15.2.1 Fire sprinkler system. Where a change in occupancy classification occurs that requires an automatic fire sprinkler system to be provided based on the new occupancy in accordance with Chapter 9, such system shall be provided throughout the area where the change of occupancy occurs.

3409.15.2.2 Fire alarm and detection system. Where a change in occupancy classification occurs that requires a fire alarm and detection system to be provided based on the new occupancy in accordance with Chapter 9, such system shall be provided throughout the area where the change of occupancy occurs. Existing alarm notification appliances shall be automatically activated throughout the building. Where the building is not equipped with a fire alarm system, alarm notification appliances shall be provided throughout the area where the change of occupancy occurs and shall be automatically activated.

3409.15.3 Interior finish. In areas of the building undergoing the change of occupancy classification, the interior finish of walls and ceilings shall comply with the requirements of the International Building Code for the new occupancy classification.

3409.15.4 Means of egress, general. Hazard categories in regard to life safety and means of egress shall be in accordance with Table 3409.15.4.

TABLE 3409.15.4 (IEBC TABLE 1012.4)
MEANS OF EGRESS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATIONS
1 (Highest Hazard)	H
2	I-2, I-3, I-4
3	A, E, I-1, M, R-1, R-2, R-4
4	B, F-1, R-3, S-1
5 (Lowest Hazard)	F-2, S-2, U

3409.15.4.1 Means of egress for change to higher hazard category. When a change of occupancy classification is made to a higher hazard category (lower number) as shown in Table 3409.15.4, the means of egress shall comply with the requirements of Chapter 10..

Exceptions:

1. Stairways shall be enclosed in compliance with the applicable provisions of Section 3408.4.1.
2. Existing stairways including handrails and guards complying with the requirements of Section 3408 shall be permitted for continued use subject to approval of the code official.
3. Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.
4. Existing corridor walls constructed on both sides of wood lath and plaster in good condition or 1/2-inch-thick (12.7 mm) gypsum wallboard shall be permitted. Such walls shall either terminate at the underside of a ceiling of equivalent construction or extend to the underside of the floor or roof next above.
5. Existing corridor doorways, transoms and other corridor openings shall comply with the requirements in Sections 3407.5.5.1, 3407.5.5.2 and 3407.5.5.3, .
6. Existing dead-end corridors shall comply with the requirements in Section 3407.5.6.
7. An existing operable window with clear opening area no less than 4 square feet (0.38 m2) and minimum opening height and width of 22 inches (559 mm) and 20 inches (508 mm), respectively, shall be accepted as an emergency escape and rescue opening.

3409.15.4.2 Means of egress for change of use to equal or lower hazard category. When a change of occupancy classification is made to an equal or lesser hazard category (higher number) as shown in Table 3409.15.4, existing elements of the means of egress shall comply with the requirements of Section 3407.15.4 for the new occupancy classification. Newly constructed or configured means of egress shall comply with the requirements of Chapter 10.

Exception: Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.

3409.15.4.3 Egress capacity. Egress capacity shall meet or exceed the occupant load as specified in Chapter 10 for the new occupancy.

3409.15.4.4 Handrails. Existing stairways shall comply with the handrail requirements of Section 3407.5.9 in the area of the change of occupancy classification.

3409.15.4.5 Guards. Existing guards shall comply with the requirements in Section 3407.5.10 in the area of the change of occupancy classification.

3409.15.5 Heights and areas. Hazard categories in regard to height and area shall be in accordance with Table 3409.15.5.

TABLE 3409.15.5 (IEBC TABLE 1012.5)
HEIGHTS AND AREAS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATIONS
1 (Highest Hazard)	**H**
2	A-1, A-2, A-3, A-4, I, R-1, R-2, R-4
3	E, F-1, S-1, M
4 (Lowest Hazard)	B, F-2, S-2, A-5, R-3, U

3409.15.5.1 Height and area for change to higher hazard category. When a change of occupancy classification is made to a higher hazard category as shown in Table 3409.15.5, heights and areas of buildings and structures shall comply with the requirements of Chapter 5 for the new occupancy classification.

Exception: In other than Groups H, F-1 and S-1, in lieu of fire walls, use of fire barriers having a fire-resistance rating of not less than that specified in Table 706.4, constructed in accordance with Section 707, shall be permitted to meet area limitations required for the new occupancy in buildings protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

3409.15.5.1.1 Fire wall alternative. In other than Groups H, F-1 and S-1, fire barriers and horizontal assemblies constructed in accordance with Sections 707 and 711, respectively, shall be permitted to be used in lieu of fire walls to subdivide the building into separate buildings for the purpose of complying with the area limitations required for the new occupancy where all of the following conditions are met:

1. The buildings are protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. The maximum allowable area between fire barriers, horizontal assemblies, or any combination thereof shall not exceed the maximum allowable area determined in accordance with Chapter 5 without an increase allowed for an automatic sprinkler system in accordance with Section 506.
3. The fire-resistance rating of the fire barriers and horizontal assemblies shall not be less than that specified for fire walls in Table 706.4.

Exception: Where horizontal assemblies are used to limit the maximum allowable area, the required fire resistance rating of the horizontal assemblies shall be permitted to be reduced by 1 hour provided the height and number of stories increases allowed for an automatic sprinkler system by Section 504.2 are not used for the buildings.

3409.15.5.2 Height and area for change to equal or lesser hazard category. When a change of occupancy classification is made to an equal or lesser hazard category as shown in Table 3409.15.5, the height and area of the existing building shall be deemed acceptable.

3409.15.5.3 Fire barriers. When a change of occupancy classification is made to a higher hazard category as shown in Table 3409.15.5, fire barriers in separated mixed use buildings shall comply with the fire-resistance requirements of the International Building Code.

Exception: Where the fire barriers are required to have a 1-hour fire-resistance rating, existing wood lath and plaster in good condition or existing 1/2-inch-thick (12.7 mm) gypsum wallboard shall be permitted.

3409.15.6 Exterior wall fire-resistance ratings. Hazard categories in regard to fire-resistance ratings of exterior walls shall be in accordance with Table 3409.15.6.

TABLE 3409.15.6 (IEBC TABLE 1012.6)
EXPOSURE OF EXTERIOR WALLS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATIONS
1 (Highest Hazard)	**H**
2	F-1, M, S-1
3	A, B, E, I, R
4 (Lowest Hazard)	F-2, S-2, U

3409.15.6.1 Exterior wall rating for change of occupancy classification to a higher hazard category. When a change of occupancy classification is made to a higher hazard category as shown in Table 3409.15.6, exterior walls shall have fire resistance and exterior opening protectives as required by the International Building Code.

Exception: A 2-hour fire-resistance rating shall be allowed where the building does not exceed three stories in height and is classified as one of the following groups: A-2 and A-3 with an occupant load of less than 300, B, F, M or S.

3409.15.6.2 Exterior wall rating for change of occupancy classification to an equal or lesser hazard category. When a change of occupancy classification is made to an equal or lesser hazard category as shown in Table 3409.15.6, existing exterior walls, including openings, shall be accepted.

3409.15.6.3 Opening protectives. Openings in exterior walls shall be protected as required by the International Building Code. Where openings in the exterior walls are required to be protected because of their distance from the lot line, the sum of the area of such openings shall not exceed 50 percent of the total area of the wall in each story.

Exceptions:

1. Where the International Building Code permits openings in excess of 50 percent.
2. Protected openings shall not be required in buildings of Group R occupancy that do not exceed three stories in height and that are located not less than 3 feet (914 mm) from the lot line.
3. Where exterior opening protectives are required, an automatic sprinkler system throughout may be substituted for opening protection.
4. Exterior opening protectives are not required when the change of occupancy group is to an equal or lower hazard classification in accordance with Table 3409.15.6.

3409.15.7 Enclosure of vertical shafts. Enclosure of vertical shafts shall be in accordance with Sections 3409.15.7.1 through 3409.15.7.4.

3409.15.7.1 Minimum requirements. Vertical shafts shall be designed to meet the International Building Code requirements for atriums or the requirements of this section.

3409.15.7.2 Stairways. When a change of occupancy classification is made to a higher hazard category as shown in Table 3409.15.4, interior stairways shall be enclosed as required by the International Building Code.

Exceptions:

1. In other than Group I occupancies, an enclosure shall not be required for openings serving only one adjacent floor and that are not connected with corridors or stairways serving other floors.
2. Unenclosed existing stairways need not be enclosed in a continuous vertical shaft if each story is separated from other stories by 1-hour fire-resistance-rated construction or approved wired glass set in steel frames and all exit corridors are sprinklered. The openings between the corridor and the occupant space shall have at least one sprinkler head above the openings on the tenant side. The sprinkler system shall be permitted to be supplied from the domestic watersupply systems, provided the system is of adequate pressure, capacity, and sizing for the combined domestic and sprinkler requirements.
3. Existing penetrations of stairway enclosures shall be accepted if they are protected in accordance with Chapter 7.

3409.15.7.3 Other vertical shafts. Interior vertical shafts other than stairways, including but not limited to elevator hoistways and service and utility shafts, shall be enclosed as required by the International Building Code when there is a change of use to a higher hazard category as specified in Table 3409.15.4.

Exceptions:

1. Existing 1-hour interior shaft enclosures shall be accepted where a higher rating is required.
2. Vertical openings, other than stairways, in buildings of other than Group I occupancy and connecting less than six stories shall not be required to be enclosed if the entire building is provided with an approved automatic sprinkler system.

3409.15.7.4 Openings. All openings into existing vertical shaft enclosures shall be protected by fire assemblies having a fire protection rating of not less than 1 hour and shall be maintained self-closing or shall be automatic-closing by actuation of a smoke detector. All other openings shall be fire protected in an approved manner. Existing fusible link-type automatic door-closing devices shall be permitted in all shafts except stairways if the fusible link rating does not exceed 135°F (57°C).

3409.15.8 Accessibility. Existing buildings that undergo a change of group or occupancy classification shall comply with this section.

Exception: Type B dwelling or sleeping units required by Section 1107 are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with less than a Level 3 alteration.

3409.15.8.1 Partial change in occupancy. Where a portion of the building is changed to a new occupancy classification, any alteration shall comply with Sections 3406.1.2, 3407.6 and 3408.7, as applicable.

3409.15.8.2 Complete change of occupancy. Where an entire building undergoes a change of occupancy, it shall comply with Section 3409.15.8.1 and shall have all of the following accessible features:

1. At least one accessible building entrance.
2. At least one accessible route from an accessible building entrance to primary function areas.
3. Signage complying with Section 1110.
4. Accessible parking, where parking is provided.
5. At least one accessible passenger loading zone, where loading zones are provided.
6. At least one accessible route connecting accessible parking and accessible passenger loading zones to an accessible entrance.

Where it is technically infeasible to comply with the new construction standards for any of these requirements for a change of group or occupancy, the above items shall conform to the requirements to the maximum extent technically feasible.

> **Exception:** The accessible features listed in Items 1 through 6 are not required for an accessible route to Type B units.

(CHAPTER 11 ADDITIONS
SECTION 1101 GENERAL)

SECTION 3410
ADDITIONS

3410.1 Scope. An addition to a building or structure shall comply with the International Codes as adopted for new construction without requiring the existing building or structure to comply with any requirements of those codes or of these provisions, except as required by this chapter. Where an addition impacts the existing building or structure, that portion shall comply with this code.

3410.2 Creation or extension of nonconformity. An addition shall not create or extend any nonconformity in the existing building to which the addition is being made with regard to accessibility, structural strength, fire safety, means of egress, or the capacity of mechanical, plumbing, or electrical systems.

3410.3 Other work. Any repair or alteration work within an existing building to which an addition is being made shall comply with the applicable requirements for the work as classified.

(SECTION 1102 HEIGHTS AND AREAS)

3410.4 Height and areas. Heights and areas in buildings undergoing an addition shall be in accordance with Section 3410.4.1 through 3410.4.3.

3410.4.1 Height limitations. No addition shall increase the height of an existing building beyond that permitted under the applicable provisions of Chapter 5 for new buildings.

3410.4.2 Area limitations. No addition shall increase the area of an existing building beyond that permitted under the applicable provisions of Chapter 5 for new buildings unless fire separation as required by the International Building Code is provided.

> **Exception:** In-filling of floor openings and nonoccupiable appendages such as elevator and exit stair shafts shall be permitted beyond that permitted by this code for new construction.

3410.4.3 Fire protection systems. Existing fire areas increased by the addition shall comply with Chapter 9.

(SECTION 1103 STRUCTURAL)

3410.5 Structural. Structural requirements for additions shall comply with Sections 3410.5.1 through 3410.5.5.

3410.5.1 Compliance with the International Building Code. Additions to existing buildings or structures are new construction and shall comply with the International Building Code.

3410.5.2 Additional gravity loads. Existing structural elements supporting any additional gravity loads as a result of additions shall comply with the International Building Code.

Exceptions:

1. Structural elements whose stress is not increased by more than 5 percent.
2. Buildings of Group R occupancy with no more than five dwelling units or sleeping units used solely for residential purposes where the existing building and the addition comply with the conventional light- frame construction methods of the International Building Code or the provisions of the International Residential Code.

3405.3 Lateral force-resisting system. The lateral force-resisting system of existing buildings to which additions are made shall comply with Sections 3410.5.3.1, 3410.5.3.2 and 3410.5.3.3.

Exceptions:

1. Buildings of Group R occupancy with no more than five dwelling or sleeping units used solely for residential purposes where the existing building and the addition comply with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.
2. In other existing buildings where the lateral-force story shear in any story is not increased by more than 10 percent cumulative.

3410.5.3.1 Vertical addition. Any element of the lateral force-resisting system of an existing building subjected to an increase in vertical or lateral loads from the vertical addition shall comply with the International Building Code wind provisions and the IBC-level seismic forces specified in Section 301.1.4.1 of this code.

3410.5.3.2 Horizontal addition. Where horizontal additions are structurally connected to an existing structure, all lateral force-resisting elements of the existing structure affected by such addition shall comply with the International Building Code wind provisions and the IBC-level seismic forces specified in Section 301.1.4.1 of this code.

3410.5.3.3 Voluntary addition of structural elements to improve the lateral force-resisting system. Voluntary addition of structural elements to improve the lateral force-resisting system of an existing building shall comply with Section 3407.7.5.

3410.5.4 Snow drift loads. Any structural element of an existing building subjected to additional loads from the effects of snow drift as a result of an addition shall comply Chapter 16.

Exceptions:

1. Structural elements whose stress is not increased by more than 5 percent.
2. Buildings of Group R occupancy with no more than five dwelling units or sleeping units used solely for residential purposes where the existing building and the addition comply with the conventional light- frame construction methods of Section 2308 or the provisions of the International Residential Code.

3410.5.5 Flood hazard areas. Additions and foundations in flood hazard areas shall comply with the following requirements:

1. For horizontal additions that are structurally interconnected to the existing building:
   - 1.1. If the addition and all other proposed work, when combined, constitute substantial improvement, the existing building and the addition shall comply with Section 1612 of the International Building Code.
   - 1.2. If the addition constitutes substantial improvement, the existing building and the addition shall comply with Section 1612 of the International Building Code.
2. For horizontal additions that are not structurally interconnected to the existing building:
   - 2.1. The addition shall comply with Section 1612 of the International Building Code.

2.2. If the addition and all other proposed work, when combined, constitute substantial improvement, the existing building and the addition shall comply with Section 1612 of the International Building Code.

3. For vertical additions and all other proposed work that, when combined, constitute substantial improvement, the existing building shall comply with Section 1612 of the International Building Code.
4. For a new, replacement, raised, or extended foundation, if the foundation work and all other proposed work, when combined, constitute substantial improvement, the existing building shall comply with Section 1612 of the International Building Code.

(SECTION 1104 SMOKE ALARMS IN OCCUPANCY GROUPS R AND I-1)

3410.6 Smoke alarms in existing portions of a building. Where an addition is made to a building or structure of a Group R or I-1 occupancy, the existing building shall be provided with smoke alarms as required by Section 1103.8 of the International Fire Code or Section R314 of the International Residential Code as applicable.

(SECTION 1105 ACCESSIBILITY)

3410.7 Accessibility. Accessibility provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, primary function shall comply with the requirements of Sections 3406.1.2, 3407.6 and 3408.7, as applicable.

(SECTION 1106 ENERGY CONSERVATION)

3410.8 Energy conservation. Additions to existing buildings shall conform to the energy requirements of the International Energy Conservation Code or International Residential Code as they relate to new construction.

*(CHAPTER 12 HISTORIC BUILDINGS
SECTION 1201GENERAL)*

SECTION 3411
HISTORIC BUILDINGS

3411.1 Scope. It is the intent of this chapter to provide means for the preservation of historic buildings. Historical buildings shall comply with the provisions of this chapter relating to their repair, alteration, relocation and change of occupancy.

3411.2 Report. A historic building undergoing repair, alteration, or change of occupancy shall be investigated and evaluated. If it is intended that the building meet the requirements of this chapter, a written report shall be prepared and filed with the code official by a registered design professional when such a report is necessary in the opinion of the code official. Such report shall be in accordance with Chapter 1 and shall identify each required safety feature that is in compliance with this chapter and where compliance with other chapters of these provisions would be damaging to the contributing historic features. For buildings assigned to Seismic Design Category D, E or F, a structural evaluation describing, at a minimum, the vertical and horizontal elements of the lateral force-resisting system and any strengths or weaknesses therein shall be prepared. Additionally, the report shall describe each feature that is not in compliance with these provisions and shall demonstrate how the intent of these provisions is complied with in providing an equivalent level of safety.

3411.3 Special occupancy exceptions—museums. When a building in Group R-3 is also used for Group A, B, or M purposes such as museum tours, exhibits, and other public assembly activities, or for museums less than 3,000 square feet (279 m2), the code official may determine that the occupancy is Group B when life-safety conditions can be demonstrated in accordance with Section 3411.2. Adequate means of egress in such buildings, which may include a means of maintaining doors in an open position to permit egress, a limit on building occupancy to an occupant load permitted by the means of egress capacity, a limit on occupancy of certain areas or floors, or supervision by a person knowledgeable in the emergency exiting procedures, shall be provided.

3411.4 Flood hazard areas. In flood hazard areas, if all proposed work, including repairs, work required because of a change of occupancy, and alterations, constitutes substantial improvement, then the existing building shall comply with Section 1612 of the International Building Code.

> **Exception:** If an historic building will continue to be an historic building after the proposed work is completed, then the proposed work is not considered a substantial improvement. For the purposes of this exception, an historic building is:
>
> 1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places;
> 2. Determined by the Secretary of the U.S. Department of Interior to contribute to the historical significance of a registered historic district or a district preliminarily determined to qualify as a historic district; or
> 3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

(SECTION 1202 REPAIRS)

3411.5 Repairs. Repairs to historic buildings shall be in accordance with Sections 3411.5.1 through 3411.5.4.

3411.5.1 General. Repairs to any portion of an historic building or structure shall be permitted with original or like materials and original methods of construction, subject to the provisions of this chapter. Hazardous materials, such as asbestos and lead-based paint, shall not be used where the code for new construction would not permit their use in buildings of similar occupancy, purpose and location.

3411.5.2 Unsafe conditions. Conditions determined by the code official to be unsafe shall be remedied. No work shall be required beyond what is required to remedy the unsafe conditions.

3411.5.3 Relocated buildings. Foundations of relocated historic buildings and structures shall comply with the International Building Code. Relocated historic buildings shall otherwise be considered an historic building for the purposes of this code. Relocated historic buildings and structures shall be sited so that exterior wall and opening requirements comply with the International Building Code or with the compliance alternatives of this code.

3411.5.4 Replacement. Replacement of existing or missing features using original materials shall be permitted. Partial replacement for repairs that match the original in configuration, height, and size shall be permitted.

Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Chapter 24.

> **Exception:** Glass block walls, louvered windows, and jalousies repaired with like materials.

(SECTION 1203 FIRE SAFETY)

3411.6 Scope. Historic buildings undergoing alterations, changes of occupancy, or that are moved shall comply with this section.

3411.6.2 General. Every historic building that does not conform to the construction requirements specified in this code for the occupancy or use and that constitutes a distinct fire hazard as defined herein shall be provided with an approved automatic fire-extinguishing system as determined appropriate by the code official. However, an automatic fire-extinguishing system shall not be used to substitute for, or act as an alternative to, the required number of exits from any facility.

3411.6.3 Means of egress. Existing door openings and corridor and stairway widths less than those specified elsewhere in this code may be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the means of egress. When approved by the code official, the front or main exit doors need not swing in the direction of the path of exit travel, provided that other approved means of egress having sufficient capacity to serve the total occupant load are provided.

3411.6.4 Transoms. In fully sprinklered buildings of Group R-1, R-2 or R-3 occupancy, existing transoms in corridors and other fire-resistance-rated walls may be maintained if fixed in the closed position. A sprinkler shall be installed on each side of the transom.

3411.6.5 Interior finishes. The existing finishes of walls and ceilings shall be accepted when it is demonstrated that they are the historic finishes.

3411.6.6 Stairway enclosure. In buildings of three stories or less, exit enclosure construction shall limit the spread of smoke by the use of tight-fitting doors and solid elements. Such elements are not required to have a fire-resistance rating.

3411.6.7 One-hour fire-resistant assemblies. Where 1-hour fire-resistance-rated construction is required by these provisions, it need not be provided, regardless of construction or occupancy, where the existing wall and ceiling finish is wood or metal lath and plaster.

3411.6.8 Glazing in fire-resistance-rated systems. Historic glazing materials are permitted in interior walls required to have a 1-hour fire-resistance rating where the opening is provided with approved smoke seals and the area affected is provided with an automatic sprinkler system.

3411.6.9 Stairway railings. Grand stairways shall be accepted without complying with the handrail and guard requirements. Existing handrails and guards at all stairs shall be permitted to remain, provided they are not structurally dangerous.

3411.6.10 Guards. Guards shall comply with Sections 3411.6.10.1 and 3411.6.10.2.

3411.6.10.1 Height. Existing guards shall comply with the requirements of Section 3405.1.

3411.6.10.2 Guard openings. The spacing between existing intermediate railings or openings in existing ornamental patterns shall be accepted. Missing elements or members of a guard may be replaced in a manner that will preserve the historic appearance of the building or structure.

3411.6.11 Exit signs. Where exit sign or egress path marking location would damage the historic character of the building, alternative exit signs are permitted with approval of the code official. Alternative signs shall identify the exits and egress path.

3411.6.12 Automatic fire-extinguishing systems. Every historical building that cannot be made to conform to the construction requirements specified in the International Building Code for the occupancy or use and that constitutes a distinct fire hazard shall be deemed to be in compliance if provided with an approved automatic fire-extinguishing system.

> **Exception:** When the code official approves an alternative life-safety system.

(SECTION 1204 ALTERATIONS)

3411.7 Alterations. Alterations to historic buildings shall be in accordance with this section.

3411.7.1 Accessibility requirements. The provisions of Sections 3406.1.2, 3407.6 and 3408.7, as applicable, shall apply to facilities designated as historic structures that undergo alterations, unless technically infeasible. Where compliance with the requirements for accessible routes, entrances or toilet rooms would threaten or destroy the historic significance of the building or facility, as determined by the code official, the alternative requirements of Sections 3411.7.1.1 through 3411.7.1.4 for that element shall be permitted.

> **Exception:** Type B dwelling or sleeping units required by Section 1107 of the International Building Code are not required to be provided in historical buildings.

3411.7.1.1 Site arrival points. At least one main entrance shall be accessible.

3411.7.1.2 Multilevel buildings and facilities. An accessible route from an accessible entrance to public spaces on the level of the accessible entrance shall be provided.

3411.7.1.3 Entrances. At least one main entrance shall be accessible.

Exceptions:

1. If a main entrance cannot be made accessible, an accessible nonpublic entrance that is unlocked while the building is occupied shall be provided; or
2. If a main entrance cannot be made accessible, a locked accessible entrance with a notification system or remote monitoring shall be provided.

3411.7.1.4 Toilet and bathing facilities. Where toilet rooms are provided, at least one accessible family or assisted-use toilet room complying with Section 1109.2.1 shall be provided.

(SECTION 1205 CHANGE OF OCCUPANCY)

3411.8 Change of Occupancy. Historic buildings undergoing a change of occupancy shall be in accordance with this Sections 3411.8.1 through 3411.8.15.

3411.8.1 General. Historic buildings undergoing a change of occupancy shall comply with the applicable provisions of Section 3409, except as specifically permitted in this chapter. When Section 3409 requires compliance with specific requirements of Sections 3406, 3407 or 3408 and when those requirements are subject to the exceptions in Section 3410.4, the same exceptions shall apply to this section.

3411.8.2 Building area. The allowable floor area for historic buildings undergoing a change of occupancy shall be permitted to exceed by 20 percent the allowable areas specified in Chapter 5.

3411.8.3 Location on property. Historic structures undergoing a change of use to a higher hazard category in accordance with Section 3409.15.6 may use alternative methods to comply with the fire-resistance and exterior opening protective requirements. Such alternatives shall comply with Section 3411.2.

3411.8.4 Occupancy separation. Required occupancy separations of 1 hour may be omitted when the building is provided with an approved automatic sprinkler system throughout.

3411.8.5 Roof covering. Regardless of occupancy or use group, roof-covering materials not less than Class C shall be permitted where a fire-retardant roof covering is required.

3411.8.6 Means of egress. Existing door openings and corridor and stairway widths less than those that would be acceptable for nonhistoric buildings under these provisions shall be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the exit and that the capacity of the exit system is adequate for the occupant load, or where other operational controls to limit occupancy are approved by the code official.

3411.8.7 Door swing. When approved by the code official, existing front doors need not swing in the direction of exit travel, provided that other approved exits having sufficient capacity to serve the total occupant load are provided.

3411.8.8 Transoms. In corridor walls required by these provisions to be fire-resistance rated, existing transoms may be maintained if fixed in the closed position, and fixed wired glass set in a steel frame or other approved glazing shall be installed on one side of the transom.

Exception: Transoms conforming to Section 3411.6.4 shall be accepted.

3411.8.9 Finishes. Where interior finish materials are required to have a flame spread index of Class C or better, existing nonconforming materials shall be surfaced with approved fire-retardant paint or finish.

Exception: Existing nonconforming materials need not be surfaced with an approved fire-retardant paint or finish where the building is equipped throughout with an automatic sprinkler system installed in accordance with the International Building Code and the nonconforming materials can be substantiated as being historic in character.

3411.8.10 One-hour fire-resistant assemblies. Where 1-hour fire-resistance-rated construction is required by these provisions, it need not be provided, regardless of construction or occupancy, where the existing wall and ceiling finish is wood lath and plaster.

3411.8.11 Stairs and railings. Existing stairways shall comply with the requirements of these provisions. The code official shall grant alternatives for stairways and railings if alternative stairways are found to be acceptable or are judged to meet the intent of these provisions. Existing stairways shall comply with Section 3411.6.

Exception: For buildings less than 3,000 square feet (279 m2), existing conditions are permitted to remain at all stairs and rails.

3411.8.12 Exit signs. The code official may accept alternative exit sign locations where such signs would damage the historic character of the building or structure. Such signs shall identify the exits and exit path.

3411.8.13 Exit stair live load. Existing historic stairways in buildings changed to a Group R-1 or R-2 occupancy shall be accepted where it can be shown that the stairway can support a 75-pounds-per-square-foot (366 kg/m2) live load.

3411.8.14 Natural light. When it is determined by the code official that compliance with the natural light requirements of Section 3409.14 will lead to loss of historic character or historic materials in the building, the existing level of natural lighting shall be considered acceptable.

3411.8.15 Accessibility requirements. The provisions of Section 3409.15.8 shall apply to facilities designated as historic structures that undergo a change of occupancy, unless technically infeasible. Where compliance with the requirements for accessible routes, ramps, entrances, or toilet rooms would threaten or destroy the historic significance of the building or facility, as determined by the authority having jurisdiction, the alternative requirements of Sections 3411.7.1.1 through 3411.7.1.4 for those elements shall be permitted.

Exception: Type B dwelling or sleeping units required by Section 1107.

(SECTION 1206 STRUCTURAL)

3411.9 Historic. Historic buildings shall comply with the requirements for repairs, Level1,2 or 3 alterations or additions as applicable.

Exception: The code official shall be authorized to accept existing floors and approve operational controls that limit the live load on any such floor.

3411.9.2 Dangerous conditions. Conditions determined by the code official to be dangerous shall be remedied. No work shall be required beyond what is required to remedy the dangerous condition.

(CHAPTER 13 RELOCATED OR MOVED BUILDINGS
SECTION 1301GENERAL)

SECTION 3412
RELOCATED OR MOVED BUILDINGS

3412.1 Scope. This section provides requirements for relocated or moved structures.

3412.1.1 Conformance. The building shall be safe for human occupancy as determined by the International Fire Code and the International Property Maintenance Code. Any repair, alteration, or change of occupancy undertaken within the moved structure shall comply with the requirements of this code applicable to the work being performed. Any field-fabricated elements shall comply with the requirements of the International Building Code or the International Residential Code as applicable.

(SECTION 1302 REQUIREMENTS)

3412.1.2 Location on the lot. The building shall be located on the lot in accordance with the requirements of this code or the International Residential Code as applicable.

3412.1.3 Foundation. The foundation system of relocated buildings shall comply with this code or the International Residential Code as applicable.

3412.1.3.1 Connection to the foundation. The connection of the relocated building to the foundation shall comply with this code or the International Residential Code as applicable.

3412.1.4 Wind loads. Buildings shall comply with this code or International Residential Code wind provisions as applicable.

Exceptions:

1. Detached one- and two-family dwellings and Group U occupancies where wind loads at the new location are not higher than those at the previous location.
2. Structural elements whose stress is not increased by more than 10 percent.

3412.1.5 Seismic loads. Buildings shall comply with this code or International Residential Code seismic provisions at the new location as applicable.

Exceptions:

1. Structures in Seismic Design Categories A and B and detached one- and two-family dwellings in Seismic Design Categories A, B and C where the seismic loads at the new location are not higher than those at the previous location.
2. Structural elements whose stress is not increased by more than 10 percent.

3412.1.6 Snow loads. Structures shall comply with this code or International Residential Code snow loads as applicable where snow loads at the new location are higher than those at the previous location.

Exception: Structural elements whose stress is not increased by more than 5 percent.

3412.1.7 Flood hazard areas. If relocated or moved into a flood hazard area, structures shall comply with Section 1612.

3412.1.8 Required inspection and repairs. The code official shall be authorized to inspect, or to require approved professionals to inspect at the expense of the owner, the various structural parts of a relocated building to verify that structural components and connections have not sustained structural damage. Any repairs required by the code official as a result of such inspection shall be made prior to the final approval.

Reason: See G205-12 Part I.

Cost Impact: None.

3404.1 (NEW)-G-COLLINS

Public Hearing Results

All 12 parts of this code change were heard by the IBC General code development committee.

PART XII – IBC GENERAL
Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the action taken on G201-12.

Analysis: See G205-12, Part I.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Submitted.

Commenter's Reason: See G205-12 Part I.

Analysis: See G205-12 Part I.

G205-12, Part XII
Final Action: AS AM AMPC____ D

G209-12
3401.7(New) [IEBC [B] 401.4 (New)]

Proposed Change as Submitted

Proponent: Vickie Lovell, InterCode Incorporated, representing the International Window Film Association

Add new text as follows:

3401.7 (IEBC [B] 401.4) Energy Conservation. Level 1 Alterations, as scoped by Section 503.1 of the *International Existing Building Code*, to existing buildings or structures are permitted without requiring the entire building or structure to comply with the energy requirements of the *International Energy Conservation Code* or the *International Residential Code*. The alterations shall conform to the energy requirements of the *International Energy Conservation Code* or the *International Residential Code* only as they relate to new construction.

Exception: The following need not comply provided the energy use of the building in not increased.

1. Storm windows installed over existing fenestration.
2. Glass only replacements in an existing sash and frame.
3. Surface applied window film on existing single pane fenestration assemblies.
4. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
5. Construction where the existing roof, wall or floor cavity is not exposed.
6. Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.
7. Replacement of existing doors that separate *conditioned space* from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a *conditioned space* from the exterior shall not be removed,
8. Alterations that replace less than 50 percent of the luminares in a space, provided that such alterations do not increase the installed interior lighting power.
9. Alterations that replace only the bulb and ballast within the existing luminares in a space provided that the *alteration* does not increase the installed interior lighting power.

Reason: The IECC Section C401.2.1 requires compliance with Sections C402, C403, and C405 for existing buildings that are undergoing alternations and repairs. This proposal clarifies that certain features of the existing building undergoing Level 1 alterations are exempt from the requirements of the IECC.

The scoping section is extracted from Section 707 of the IEBC.

This list of exempted items has been extracted from IECC Section C101.4.

Surface applied window film to existing fenestration has been added to the list because it can enhance the performance of existing single pane fenestration products for protection from injuries and property damage due to broken glass, reduces solar heat gain and energy use, ultraviolet transmittance and glare, and improves performance when impacted.

A similar proposal will be submitted to the IEBC in the group B proposal cycle.

Without this list of exceptions, the code would require improvements or replacements to be with new materials and systems as for new construction.

Cost Impact: This code change will not increase the cost of construction and may in fact reduce the cost of construction.

3401.7#1-G-LOVELL.doc

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: This proposal was disapproved based upon the previous action on G208-12.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Vickie Lovell, InterCode Incorporated, representing International Window Film Association, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3401.7 (IEBC [B] 401.4) Energy Conservation. Existing buildings or structures shall comply with Sections C101.4.1, C101.4.2, C101.4.3, C401.2.1 and R101.4 of the *International Energy Conservation Code*.

Exception: The following need not comply provided the energy use of the building is not increased.

1. Storm windows installed over existing fenestration.
2. Glass only replacements in an existing sash and frame.
3. Surface applied window film to existing fenestration assemblies.
4. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
5. Construction where the existing roof, wall or floor cavity is not exposed.
6. Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.
7. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a conditioned space from the exterior shall not be removed,
8. Alterations that replace less than 50 percent of the luminares in a space, provided that such alterations do not increase the installed interior lighting power.
9. Alterations that replace only the bulb and ballast within the existing luminares in a space provided that the *alteration* does not increase the installed interior lighting power.

Commenter's Reason: Chapter 13 and 34 of the IBC do not address energy efficiency of existing buildings. The IECC does in Sections C101.4 and R101.4. These sections clarify how and when the IECC applies to commercial and residential existing buildings.

The IECC Section C401.2.1 requires compliance with Sections C402, C403, C404 and C405, and R101.4 for existing buildings that are undergoing alternations, additions, and repairs.

However, this IBC proposal clarifies that certain changes made to a building that improve energy conservation in existing buildings are exempt from the requirements of the IECC. This list of exempted items has been extracted from IECC Section C101.4. (Surface applied window film has been included in this list of exempted materials, and will be proposed to be added to the IECC during the Group B proposals.)

The committee disapproved this code change, stating that the list of exceptions only needed to be in the IECC. However, if the existing building energy performance is being improved, and the energy use is not being increased, the code user should not have to go to the IECC to take advantage of these exceptions.

Without this list of exceptions, the IECC has been used to require improvements or replacements in existing buildings unnecessarily with materials and systems as new construction as an "alteration". This proposal eliminates the need to go to the IECC unless the existing building is being altered, added on to, repaired, or renovated in ways that that trigger compliance with the IECC.

G209-12

Final Action: AS AM AMPC____ D

G211-12

3403.4, 3404.4, 3405.2.1, 3405.2.3, 3408.4 (IEBC [B] 402.4, 403.4, 404.2.1, 404.2.3, 407.4), Chapter 35

Proposed Change as Submitted

Proponent: Jennifer Goupil, The Structural Engineering Institute of ASCE (jgoupil@asce.org)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

3403.4 (IEBC [B] 402.4) Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is no more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.
2. In lieu of compliance with Section 1613 for the existing structure, it shall be permitted to demonstrate compliance of the existing structure and addition, acting together as a single structure, with the performance objectives in ASCE 41 Section 2.2.4. Alterations to existing structural elements initiated for the purpose of improving the performance of the seismic force-resisting system of the existing structure shall be permitted to be included in the ASCE 41 analysis.

3404.4 (IEBC [B] 403.4) Existing structural elements carrying lateral load. Except as permitted by Section 3404.5, where the *alteration* increases design lateral loads in accordance with Section 1609 or 1613, or where the *alteration* results in a structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall be shown to meet the requirements of Sections 1609 and 1613.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is no more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces per Sections 1609 and 1613. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

2. In lieu of compliance with Section 1613 for the altered structure, it shall be permitted to demonstrate compliance of the altered structure and addition with the performance objectives in ASCE 41 Section 2.2.4.

3405.2.1 (IEBC [B] 404.2.1) Evaluation. The building shall be evaluated by a *registered design professional*, and the evaluation findings shall be submitted to the building official. The evaluation shall establish whether the damaged building, if repaired to its pre-damage state, would comply with the provisions of this code for wind and earthquake loads.

Wind loads for this evaluation shall be those prescribed in Section 1609. Earthquake loads for this evaluation, if required, shall be permitted to be 75 percent of those prescribed in Section 1613.

Exception: In lieu of Section 1613, it shall be permitted to demonstrate compliance with the performance objectives in ASCE 41 Section 2.2.1.

3405.2.3 (IEBC [B] 404.2.3) Extent of repair for noncompliant buildings. If the evaluation does not establish compliance of the pre-damage building in accordance with Section 3405.2.1, then the building shall be rehabilitated to comply with applicable provisions of this code for load combinations that include wind or seismic loads. The wind loads for the repair shall be as required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be as required by this code. Earthquake loads for this rehabilitation design shall be those required for the design of the pre-damage building, but not less than 75 percent of those prescribed in Section 1613. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

Exception: It shall be permitted to demonstrate compliance of the rehabilitated structure with the performance objectives in ASCE 41 Section 2.2.1.

3408.4 (IEBC [B] 407.4) Seismic. When a change of occupancy results in a structure being reclassified to a higher risk category, the structure shall conform to the seismic requirements for a new structure of the higher risk category.

Exceptions:

1. ~~Specific seismic detailing requirements of Section 1613 for a new structure shall not be required to be met where the seismic performance is shown to be equivalent to that of a new structure. A demonstration of equivalence shall consider the regularity, over strength, redundancy and ductility of the structure.~~ In lieu of Section 1613, it shall be permitted to demonstrate compliance with the performance objectives in ASCE 41 Section 2.2.4.
2. When a change of use results in a structure being reclassified from Risk Category I or II to Risk Category III and the structure is located where the seismic coefficient, *SDS,* is less than 0.33, compliance with the seismic requirements of Section 1613 are not required.

Reason: The purpose of this proposal is to permit the use of ASCE 41-13 as an exception to IBC Chapter 16 and ASCE 7 where seismic evaluation or retrofit is required for existing buildings. ASCE 41-13 is a combination of two standards referenced in the 2012 IEBC (ASCE 31-03 and 41-06) for seismic evaluation and retrofit. In many cases the provisions of ASCE 31 and 41 are more appropriate for existing buildings by providing strength, stiffness, and acceptance criteria for structural systems that can meet the seismic performance objectives of the IBC without necessarily meeting all the specific detailing requirements. These standards have a history of use and as a result of the current (ANSI compliant) update cycle, incorporate recent research to represent the state of practice for seismic evaluation and retrofit.

Some specific reasons in support of the direct reference of ASCE 41 in the IBC are as follows:

- ASCE 31 and 41 already have been allowed as an option in the 2012 IBC by means of the Section 3401.5 reference to the IEBC as "deemed to comply." The 2012 IEBC utilizes ASCE 31 and 41 as reference standards in a very similar manner to what is being proposed for IBC Chapter 34. This proposal makes the connection more direct and allows the use of ASCE 41 for seismic evaluation and retrofit without requiring compliance with other portions of the IEBC (fire, life safety, MEP, etc), thus giving design professionals more flexibility in using ASCE 41.
- ASCE 41-13 has two explicit performance objectives consistent with the intent of IBC Chapter 34. There is a "new building standard equivalent" (ASCE 41-13 Section 2.2.4) intended to be used in conditions where the IBC/ASCE 7 is

referenced. This performance objective utilizes the seismic hazard levels for new buildings in ASCE 7 and includes other requirements and acceptance criteria intended to provide IBC-equivalent performance. There is also a basic existing building performance (ASCE 41-13 Section 2.2.1) that matches the traditional performance objective of ASCE 31 and 41, and consistent with 75% of IBC-level seismic forces. These two performance objectives are proposed to be applied in the appropriate sections of IBC Chapter 34, consistent with how those sections currently specify IBC forces.

- There is a history of ASCE 41 being referenced in some jurisdictions' adoption of the IBC, including Chapter 34 of the 2007 California Building Code.

A public ballot version of the new standard will be available from ASCE in the spring of 2012 and it is expected that it a prepublication (white cover) version will be available prior to the ICC Final Action Hearings in October of 2012. Any person interested in obtaining a public comment copy of ASCE 41-13 may do so by contacting the proponent at jgoupil@asce.org.

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

Staff Analysis: This code change proposal references ASCE standard 41, which is already referenced in the _International Existing Building code. However, the proposed change to code text is written to correlate with a new edition of the standard ASCE 41-13, rather than the edition presently referenced in the code, which is the 06 edition. The 2013 edition of this standard is not yet completed, published and available. The update to this standard will be considered by the Administrative Code Committee during the 2013 Code Development Cycle. Should this code change proposal be approved, but the update to the standard not be approved by the Administrative Code Committee, the code text will revert to the text as it appears in the 2012 Edition of the Code. Additionally, if the standard update is approved but the document is not published and available by Dec. 1, 2014, an errata will be issued to the Code that will return the affected code text to the text as it appears in the 2012 Edition of the Code.

3403.4-G-GOUPIL.doc

Public Hearing Results

This code change was heard by the IBC Structural code development committee.

Committee Action: Disapproved

Committee Reason: This code change would allow a less robust option that the current code. The committee believes it is necessary to spell out which performance objectives are to be followed.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Jennifer Goupil, The Structural Engineering Institute of ASCE requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3403.4 (IEBC [B] 402.4) Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the *existing structure* and its *addition* acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613. <u>For purposes of this section, compliance with ASCE 41, using a Tier 3 procedure and the two-level performance objective in Table 3403.4 for the applicable risk category, shall be deemed to meet the requirements of Section 1613.</u>

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is no more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.
2. ~~In lieu of compliance with Section 1613 for the existing structure, it shall be permitted to demonstrate compliance of the existing structure and addition, acting together as a single structure, with the performance objectives in ASCE 41~~

~~Section 2.2.4. Alterations to existing structural elements initiated for the purpose of improving the performance of the seismic force-resisting system of the existing structure shall be permitted to be included in the ASCE 41 analysis.~~

TABLE 3403.4 (IEBC [B] TABLE 402.4)
PERFORMANCE OBJECTIVES FOR USE IN ASCE 41
FOR ALTERNATIVE COMPLIANCE WITH SECTION 1613

RISK CATEGORY	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1N EARTHQUAKE HAZARD LEVEL	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-2N EARTHQUAKE HAZARD LEVEL
I	Life Safety (S-3)	Collapse Prevention (S-5)
II	Life Safety (S-3)	Collapse Prevention (S-5)
III	Damage Control (S-2)	Limited Safety (S-4)
IV	Immediate Occupancy (S-1)	Life Safety (S-3)

3404.4 (IEBC [B] 403.4) Existing structural elements carrying lateral load. Except as permitted by Section 3404.5, where the *alteration* increases design lateral loads in accordance with Section 1609 or 1613, or where the *alteration* results in a structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall be shown to meet the requirements of Sections 1609 and 1613. For purposes of this section, compliance with ASCE 41, using a Tier 3 procedure and the two-level performance objective in Table 3403.4.1 for the applicable risk category, shall be deemed to meet the requirements of Section 1613.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is no more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces per Sections 1609 and 1613. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.
2. ~~In lieu of compliance with Section 1613 for the altered structure, it shall be permitted to demonstrate compliance of the altered structure and addition with the performance objectives in ASCE 41 Section 2.2.4.~~

3405.2.1 (IEBC [B] 404.2.1) Evaluation. The building shall be evaluated by a *registered design professional*, and the evaluation findings shall be submitted to the *building official*. The evaluation shall establish whether the damaged building, if repaired to its pre-damage state, would comply with the provisions of this code for wind and earthquake loads.

Wind loads for this evaluation shall be those prescribed in Section 1609. Earthquake loads for this evaluation, if required, shall be permitted to be 75 percent of those prescribed in Section 1613. Alternatively, compliance with ASCE 41, using the performance objective in Table 3405.2.1 for the applicable risk category, shall be deemed to meet the earthquake evaluation requirement.

~~**Exception:** In lieu of Section 1613, it shall be permitted to demonstrate compliance with the performance objectives in ASCE 41 Section 2.2.1.~~

TABLE 3405.2.1 (IEBC [B] TABLE 404.2.1)
PERFORMANCE OBJECTIVES FOR USE IN ASCE 41
FOR ALTERNATIVE COMPLIANCE WITH REDUCED SECTION 1613 SEISMIC FORCES

RISK CATEGORY	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1E EARTHQUAKE HAZARD LEVEL
I	Life Safety (S-3)
II	Life Safety (S-3)
III	Damage Control (S-2). See Note a.
IV	Immediate Occupancy (S-1)

a. Tier 1 evaluation at the Damage Control performance level shall use the Tier 1 Life Safety checklists and Tier 1 Quick Check provisions midway between those specified for Life Safety and Immediate Occupancy performance.

3405.2.3 (IEBC [B] 404.2.3) Extent of repair for noncompliant buildings. If the evaluation does not establish compliance of the pre-damage building in accordance with Section 3405.2.1, then the building shall be rehabilitated to comply with applicable provisions of this code for load combinations that include wind or seismic loads. The wind loads for the repair shall be as required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be as required by this code. Earthquake loads for this rehabilitation design shall be those required for the design of the pre-damage building, but not less than 75 percent of those prescribed in Section 1613. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location. Alternatively, compliance with ASCE 41, using the performance objective in Table 3405.2.1.1 for the applicable risk category, shall be deemed to meet the earthquake rehabilitation requirement.

~~**Exception:** It shall be permitted to demonstrate compliance of the rehabilitated structure with the performance objectives in ASCE 41 Section 2.2.1.~~

3408.4 (IEBC [B] 407.4) Seismic. When a change of occupancy results in a structure being reclassified to a higher risk category, the structure shall conform to the seismic requirements for a new structure of the higher risk category. For purposes of this section, compliance with ASCE 41, using a Tier 3 procedure and the two-level performance objective in Table 3403.4.1 for the applicable risk category, shall be deemed to meet the requirements of Section 1613.

Exceptions:

1. Specific seismic detailing requirements of Section 1613 for a new structure shall not be required to be met where the seismic performance is shown to be equivalent to that of a new structure. A demonstration of equivalence shall consider the regularity, overstrength, redundancy and ductility of the structure. ~~In lieu of Section 1613, it shall be permitted to demonstrate compliance with the performance objectives in ASCE 41 Section 2.2.4.~~
2. When a change of use results in a structure being reclassified from Risk Category I or II to Risk Category III and the structure is located where the seismic coefficient, S_{DS}, is less than 0.33, compliance with the seismic requirements of Section 1613 are not required.

Commenter's Reason: G211-12 was disapproved at the Public Hearings for two reasons, one of which we believe was a misunderstanding of the proposed standard, and the other is being addressed by this public comment. Therefore, we urge AMPC for G211-12 for the reasons stated below. For the purposes of clarity, the text below for this public comment replaces the original proposal; that is, changes indicated are relative to current code text.

We recommend AMPC for the following reasons.

1. The Committee's reason for disapproval indicated that the use of ASCE 41 would allow a "less robust" option than the current code. This is not correct. ASCE 41 can be used under the 2012 IBC, since Chapter 34 (Section 3401.6) allows the IEBC as a "deemed to comply" alternate. ASCE 41 is referenced as option for seismic evaluation and retrofit (Section 301.1.4).
2. In addition, the new version of the standard (ASCE 41-13) referenced in G211-12 contains a new performance objective that is defined as "equivalent to new building standards" (e.g. ASCE 7-10). This performance objective is required where the 2012 IBC required the use of unreduced ASCE 7 forces for evaluation or retrofit (see locations where Table 3403.4.1 is referenced below.)
3. Many local jurisdictions, including the State of California and City of Seattle have for several code cycles modified Chapter 34 to include references to ASCE 41 as an option for seismic evaluation and retrofit, recognizing that for many types of older buildings, it is acceptable and often more suited to the conditions of those buildings than ASCE 7, which is intended primarily for new construction.
4. The Committee's second reason for disapproval was that the performance objectives should be indicated in Chapter 34 rather than just using section reference in ASCE 41. The modifications below include these tables. It should be noted that these tables are consistent with the performance objectives in ASCE 41 so there is no technical change from the original as-submitted G211-12. In addition, the format and content of this modified proposal is consistent to the modifications that were made in EB1-12 which was approved as modified by the Structural Committee. (EB1-12 is the IEBC version comparable to G211-12.)
5. Additional modifications are proposed for G211-12 to make it more consistent with the AM version of EB1-12. These modifications include recasting the references to ASCE 41 as "alternates" rather than "exceptions" and in Section 3408.4, restoring Exception 1 from the current 2012 IBC text that was mistakenly deleted in the original G211-12.
6. ASCE 41-13, entitled "Seismic Evaluation and Retrofit of Existing Buildings," has completed ASCE committee balloting, and public balloting was complete at the end of July. A pre-publication (white cover) version of the standard will be available prior to the FAH.

Analysis: ASCE/SEI 41 is currently referenced in the International Existing Building Code. Update of the edition referenced for the standard will be handled through the Administrative code change proposals as part of Group B changes in the 2013/14 code development cycle.

G211-12

Final Action: AS AM AMPC____ D

G212-12

3404.1, 3405.1, 3405.2.3, 3405.5, 3408.4, 3409.1; (IEBC [B] 403.1, 404.1, 404.2.3, 404.5, 407.4, 408.1)

Proposed Change as Submitted

Proponent: David Bonowitz S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

3404.1 (IEBC [B] 403.1) General. Except as provided by Section 3401.4 or this section, *alterations* to any building or structure shall comply with the requirements of ~~the~~ this code for new construction. *Alterations* shall be such that the existing building or structure is no less ~~complying~~ conforming with the provisions of this code than the existing building or structure was prior to the *alteration*.

Exceptions:

1. An existing *stairway* shall not be required to comply with the requirements of Section 1009 where the existing space and construction does not allow a reduction in pitch or slope.
2. *Handrails* otherwise required to comply with Section 1009.15 shall not be required to comply with the requirements of Section 1012.6 regarding full extension of the *handrails* where such extensions would be hazardous due to plan configuration.

3405.1 (IEBC [B] 404.1) General. Buildings and structures, and parts thereof, shall be repaired in compliance with Section ~~3405 and~~ 3401.2. Work on nondamaged components that is necessary for the required *repair* of damaged components shall be considered part of the *repair* and shall not be subject to the requirements for *alterations* in this chapter. Routine maintenance required by Section 3401.2, ordinary repairs exempt from *permit* in accordance with Section 105.2, and abatement of wear due to normal service conditions shall not be subject to the requirements for *repairs* in this section.

3405.2.3 (IEBC [B] 404.2.3) Extent of repair for noncompliant buildings. If the evaluation does not establish compliance of the predamage building in accordance with Section ~~3404.2.1~~ 3405.2.1, then the building shall be rehabilitated to comply with applicable provisions of this code for load combinations that include wind or seismic loads. The wind loads for the repair shall be as required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be as required by this code. Earthquake loads for this rehabilitation design shall be those required for the design of the pre-damage building, but not less than seventy-five percent of those prescribed in Section 1613. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

3405.5 (IEBC [B] 4 04.5) Flood hazard areas. For buildings and structures in *flood hazard areas* established in Section 1612.3, any *repair* that constitutes substantial improvement of the existing structure, as defined in Section 1612.2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in *flood hazard areas* established in Section 1612.3, any *repairs* that do not constitute substantial improvement ~~or repair of substantial damage~~ of the existing structure, as defined in Section 1612.2, are not required to comply with the flood design requirements for new construction.

3408.4 (IEBC [B] 407.4) Seismic. When a change of occupancy results in a structure being reclassified to a higher risk category, the structure shall conform to the seismic requirements for a new structure of the higher risk category.

Exceptions:

1. Specific seismic detailing requirements of Section 1613 for a new structure shall not be required to be met where the seismic performance is shown to be equivalent to that of a new structure. A demonstration of equivalence shall consider the regularity, over strength, redundancy and ductility of the structure.
2. When a change of use results in a structure being reclassified from Risk Category I or II to Risk Category III and the structure is located where the seismic coefficient, *SDS,* is less than 0.33, compliance with the seismic requirements of Section 1613 ~~are~~ <u>is</u> not required.

3409.1 (IEBC [B] 408.1) Historic buildings. The provisions of this code relating to the construction, *repair*, *alteration*, *addition*, restoration and ~~movement~~ <u>moving</u> of structures, and change of occupancy shall not be mandatory for *historic buildings* where such buildings are judged by the *building official* to not constitute a distinct life safety hazard.

Reason: This proposal is entirely editorial. At ICC discretion, some of the proposed edits should preferably be addressed as errata. Explanations for proposed edits:

- 3404.1: Match similar wording in 3403.1.
- 3405.1: No need for self-reference. The purpose of this item is to point to 3401.2 re coordination of repairs with maintenance.
- 3405.2.3: Errata
- 3405.5: Edit second paragraph to match first paragraph. Because of the definitions of substantial repair and substantial improvement, this proposed change has no substantive effect and is editorial only.

Cost Impact: The proposed changes will not increase the cost of construction.

3404.1-G-BONOWITZ.doc

<u>Public Hearing Results</u>

This code change was heard by the IBC Structural code development committee.

Committee Action: **Approved as Modified**

Modify proposal as follows:

3405.1 (IEBC [B] 404.1) General. Buildings and structures, and parts thereof, shall be repaired in compliance with Section <u>3405 and</u> 3401.2. Work on nondamaged components that is necessary for the required *repair* of damaged components shall be considered part of the *repair* and shall not be subject to the requirements for *alterations* in this chapter. Routine maintenance required by Section 3401.2, ordinary repairs exempt from *permit* in accordance with Section 105.2, and abatement of wear due to normal service conditions shall not be subject to the requirements for *repairs* in this section.

(Portions of proposal not shown remain unchanged)

Committee Reason: Agreement with the proponent's reason which indicated the proposal is entirely editorial in nature. The modification retains the reference to Section 3405 to clarify that it remains applicable.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Ingargiola and Gregory Wilson, representing Department Homeland Security, Federal Emergency Management Agency, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3405.5 (IEBC [B] 404.5) Flood hazard areas. For buildings and structures in *flood hazard areas* established in Section 1612.3, any *repair* that constitutes substantial improvement or repair of substantial damage of the existing structure, as defined in Section 1612.2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in *flood hazard areas* established in Section 1612.3, any *repairs* that do not constitute substantial improvement or repair of substantial damage of the existing structure, as defined in Section 1612.2, are not required to comply with the flood design requirements for new construction.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification restores the phrase "or repair of substantial damage" in the second paragraph of 3405.5 and adds the same phrase to the first paragraph. The code includes definitions for both terms, and both definitions are required for consistency with the definitions in the federal regulations for the National Flood Insurance Program (44 CFR § 59.1). Although the term "substantial improvement" is defined to include "repairs," it is clearer and more intuitive to include "repair of substantial damage" in a section specifically about repairs.

G212-12

Final Action: AS AM AMPC____ D

G213-12, Part II
202, 907.2 (New), 907.2.1 (NEW), 907.2.2 (New)

Proposed Change as Submitted

Proponent: David Bonowitz, S.E., representing self (dbonowitz@att.net)

THIS IS A 2 PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

PART II – IEBC

Add new definition as follows:

202
DEFINITIONS

PRIORITY BUILDING. A building designated by Section 907.2.1 for special consideration during alteration projects, based on its risk category, seismic design category, occupancy, size, structural system(s), location, and/or other readily known attributes.

Add new text as follows:

907.2 Priority buildings. Priority buildings undergoing Level 3 alterations shall comply with this section.

907.2.1 Designation. Unless specifically designated in this section, no building is considered a priority building.

907.2.2 Triggered seismic scope and criteria. The seismic force-resisting system of the altered building shall comply with reduced IBC level seismic forces.

Reason: This proposal offers a uniform means to encourage local seismic mitigation efforts through code-based triggers.

Clearly, the success of the I-codes as national model codes has improved the practice of building regulation. Paradoxically, however, the same success may have weakened the ability of jurisdictions to tailor the building code to local needs. The more reliable the model codes become, the more state adoption boards are implementing “no amendment” policies. If it’s good enough for the national model, the thinking goes, it’s good enough for us. This is a convenient policy, and perhaps cost-effective in the short term, but it is flawed, as no solution can be right all the time for the full diversity of the country’s buildings, communities, and natural hazards. At the same time, if a new idea is only applicable to a few markets or local conditions, it has a hard time getting into the national code. Thus the need for local amendments remains, while the ability to enact them diminishes.

What’s needed is a mechanism within the model code to facilitate local amendments in response to a jurisdiction’s particular building stock and performance goals. This proposal offers such a mechanism for triggering seismic retrofits of “priority buildings” when major alterations are made. (Similar provisions could be developed for other load types and project triggers, but this initial proposal has a limited scope by design.)

Currently, alteration projects call for seismic considerations only when they impact the seismic force-resisting system (Sections 807.5 and 907.4) or involve the most dangerous structure types (Sections 706.3, 907.4.4, and 907.4.5). Even then, because the basic alteration provision is based on the *change* of demand-capacity ratios, not their absolute values, highly deficient structures are often allowed to remain unimproved while major architectural or building services improvements are implemented. The apparently easy fix to this problem is simply to trigger seismic retrofit when a high DCR is found. But such an approach is naïve and ineffective, and the current provisions were clarified in recent cycles precisely to avoid this misapplication. Since a standard seismic evaluation will find some seismic deficiency in almost any existing building more than, say, twenty years old, such a trigger would discourage basic modernization projects. More important, such a generic trigger applicable to all building and structure types would not result in predictable mitigation. No public policy objective is served by such a scattershot approach.

Instead, this proposal would allow a jurisdiction to target certain buildings for alteration-triggered retrofits. Not only does this limit the cost to building owners as a group, it focuses the mitigation where it will best serve the community. This is especially important for evolving policies that promote earthquake resilience – the ability of a community to recover from a damaging earthquake. Resilience is not only about avoiding deaths; it is about restoring functions and services in a timely way, maintaining community stability. From this perspective, building regulation is not merely about safety. Regulatory policy will also need to prioritize certain occupancies and certain subsets of the building stock that are most likely to delay recovery. This proposal makes that possible within the context of the building code, which, after all, is a building department’s principal regulatory tool.

The idea of identifying certain buildings for special consideration is not new. Many of our existing building provisions are based on seismic design category, which prioritizes some combinations of occupancy and hazard level over others. Similarly, the IEBC includes specific mitigation provisions that target unreinforced masonry parapets and concrete or masonry wall structures (Sections 706.3, 907.4.4, and 907.4.5). These buildings are targeted because of their historic performance as life-threatening collapse hazards. For many jurisdictions, mitigating just those risks is enough. Lately, however, more jurisdictions are looking beyond mere safety toward resilience. They will use the proposed provisions to target, perhaps, weak story multi-family housing, schools or assembly halls that serve as backup emergency centers, private social service organizations, large non-ductile concrete buildings, buildings in near-fault or liquefiable zones, etc. The priorities can be different – as they should be – for each jurisdiction.

We know that effective mitigation requires the right mix of incentives and legislation. But there is certainly a role for triggered retrofit as well, especially where proactive mandates are unfeasible and voluntary effort is limited. The proposal facilitates the planning and enforcement of triggered retrofits by providing a uniform code-based framework.

The proposed provision would work as follows:

- A jurisdiction would amend proposed Section 907.2.1 to designate its priority buildings. Ideally, this would occur after initial planning studies identify the sectors of the building stock of greatest concern. A jurisdiction that makes no designation loses nothing relative to the provisions of the model code.
- With the buildings designated, any Level 3 Alteration project to a priority building would necessarily invoke at least a seismic evaluation, and possibly a retrofit. The choice of triggering projects is also amendable by a jurisdiction. For example, priority buildings could be slated for retrofit based on certain types of Level 2 or Level 3 alterations or based on metrics other than work area.

Some features of the proposal:

- Priority buildings will be designated based on “readily known attributes.” That is, a potential priority building is identifiable in advance, without the need for a detailed engineering evaluation or analysis. Priority status is also not a function of the proposed alteration project. This means that owners, tenants, lenders, building officials, planners, and others can know in advance what the provision’s effects might be.
- Designation of priority buildings is entirely at the jurisdiction’s option. The default condition is that no buildings are designated at all. In this case, the jurisdiction has in effect the building code it would have had if this provision did not exist.
- As proposed, the provision would apply only reduced seismic loads, consistent with traditional allowances for existing buildings and with similar provisions throughout the IEBC. This, too, is adaptable by a jurisdiction.
- An owner can still avoid a retrofit by modifying the scope of her project to avoid the trigger level. This aspect of triggered retrofit provisions makes them more politically feasible and less disruptive than outright mandates.
- By being part of the building code, the proposed provisions bring with them all the advantages of the I-codes: the consensus of professional communities, administrative provisions, an authority and accountability structure, a full array of technical provisions and reference standards, etc. Otherwise, a special ordinance outside the building code would have to incorporate or specifically cite all these items.

Cost Impact: None.

3404.3 (NEW)-G-BONOWITZ.doc

Public Hearing Results

Parts I and II of this code change were heard by the IBC Structural code development committee.

PART II - IEBC
Committee Action: Disapproved

Committee Reason: This proposal was disapproved based upon the action on G213-12, Part I.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

APPENDIX D
Supplemental Seismic Provisions for Priority Buildings

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION D101
GENERAL

D101.1 Purpose. This appendix supplements the provisions of Section 907. The appendix requires improvements to the seismic force resisting systems of certain buildings undergoing certain alterations regardless of the structural scope or effect of those alterations. Its purpose is to promote seismic mitigation of key sectors of the building stock, which can vary from jurisdiction to jurisdiction.

D101.2 Implementation. To implement these provisions, the authority having jurisdiction shall adopt this chapter and shall establish one or more types of priority buildings by setting forth their defining attributes in Table D103, adding rows as necessary.

D101.2.1 Completing Table D103.1. For each type of priority building, the jurisdiction shall provide content for each column of Table D103.1. Content for the column labeled Priority Building Type shall be any descriptive text or distinct identifier. Each of the other columns represents a readily known attribute of the priority building type. For any attribute that does not contribute to the description of a given priority building type, the content of the corresponding table cell shall be "Any." At the jurisdiction's discretion, other attributes consistent with the definition of priority building shall be provided as content for the column labeled Other.

SECTION D102
DEFINITIONS

PRIORITY BUILDING. A building designated by Section D103 for special consideration during alteration projects, based on its risk category, seismic design category, occupancy, size, structural systems, age and other attributes not requiring a structural evaluation to determine.

SECTION D103
DESIGNATION OF PRIORITY BUILDINGS

D103.1 Priority building types. A building described by one or more rows of Table D103.1 shall be deemed a priority building.

TABLE D103.1
DESIGNATION OF PRIORITY BUILDINGS[a, b]

PRIORITY BUILDING TYPE	RISK CATEGORY	SEISMIC DESIGN CATEGORY	OCCUPANCY	SIZE	STRUCTURAL MATERIAL OR SYSTEM	AGE	OTHER

[a] Upon adoption of this chapter, the jurisdiction shall complete one row of Table D103.1 for each type of building it seeks to designate as a priority building, adding rows as necessary. See Section D101.2.
[b] Where the triggering alteration is associated with a change of occupancy, the risk category, seismic design category, and occupancy shall be taken as those of the new occupancy.

SECTION D104
SEISMIC IMPROVEMENT TRIGGER, SCOPE, AND CRITERIA

D104.1 Trigger. A priority building undergoing a Level 3 alteration shall comply with Sections D104.2 and D104.3 in addition to the applicable provisions of Chapters 7, 8, and 9.

D104.2 Scope. The seismic force-resisting system of the altered building shall be made to satisfy the criteria given in Section D104.3. Existing nonstructural components and their bracing or anchorage are not be required to be altered.

D104.3 Criteria. Seismic forces and design criteria for seismic improvements triggered by Section D104.1 shall be, not less than those specified in Section 301.1.4.2.

Commenter's Reason: Proposal G213 calls for provisions to support locally customizable seismic upgrade triggers for "priority buildings". At the code development hearings, the ICC Structural Committee supported this idea but made two recommendations regarding presentation in the code. This public comment follows the committee's advice and implements the two recommendations.

First, the committee suggested that these optional provisions be introduced through an appendix, instead of within IEBC Chapter 9. This comment does just that.

Second, the ROH notes that the proposal's definition of priority building is vague. That note actually represents support for an idea brought forward at the hearings as a proposed floor modification that would help a jurisdiction describe its priority building types. The proposed floor modification was discussed at the hearings, but it was not voted on because of the committee's more general preference to locate the proposed provisions in an appendix. This comment re-introduces the key idea of that floor modification: Table D103.

As an example, if a jurisdiction wants to designate pre-1997 tilt-up buildings as a priority building type, it could complete the table as follows:

- Priority Building Type: "Pre-1997 Tilt-up", or similar. (Or, more simply per D101.2.1, just "Type 1".)

- Structural Material or System: “Precast Concrete Tilt-Up Shear Walls”.
- Other: “Permitted for construction before January 1, 1997” (or similar).
- All other columns of Table D103: “Any,” indicating that occupancy, size, etc. do not affect the definition of this priority building type.

Otherwise, this comment does not affect the intent or scope of the original proposal. Even in the original proposal, implementation of these supplemental upgrade triggers was optional. As an appendix, the optional nature is clearer, and Table D103 can be added without as much aesthetic disruption to the flow of Chapter 9.

The main benefit of the proposal remains: Seismic upgrade priorities should involve considerations of occupancy and significance within the local building stock, so proposal G213 (as proposed or as modified) adds provisions that let jurisdictions make such considerations.

Please see the original proposal or contact the proponent for a detailed reason statement. In brief, the justification for this proposal follows this logic:

- Local jurisdictions, especially those attempting to address questions of disaster resilience, need locally tailored mitigation programs that account for a community’s particular mix of building types and uses.
- Code-based upgrade triggers can play an important role within broader mitigation plans.
- Currently, IBC and IEBC alteration provisions are not customizable to a local building stock or mitigation policy.
- Currently, IBC and IEBC alteration provisions only require seismic evaluation or upgrade when the intended alteration would significantly worsen a building’s lateral system. Thus, major alterations involving multiple systems throughout the building and costing well over half of a building’s replacement cost, may be done without even considering the structure’s earthquake resistance.
- The solution: The code should provide a consistent means for jurisdictions to implement simple, customizable seismic upgrade triggers suited to their building stock and local priorities. These upgrade triggers would be optional and would only supplement, not replace, the code’s current uniform provisions.

Some features of the proposal:

- Priority buildings will be designated based on “readily known attributes.” Thus, a potential priority building is identifiable in advance, without the need for a detailed engineering evaluation or analysis. Priority status also does not depend on the nature of the proposed Level 3 alteration project. This means that owners, tenants, lenders, building officials, planners, and others can know in advance what the provision’s effects might be.
- Designation of priority buildings is entirely at the jurisdiction’s option. The default condition is that no buildings are designated at all. In this case, the jurisdiction has in effect the building code it would have had if these provisions did not exist.
- As proposed, the provisions would apply only reduced seismic loads, consistent with traditional allowances for existing buildings and with similar provisions throughout the IEBC.
- An owner can still avoid a retrofit by modifying the scope of her project to avoid the trigger level. This aspect of triggered retrofit provisions makes them more politically feasible and less disruptive than outright mandates.
- By being part of the building code, the proposed provisions bring with them all the advantages of the I-codes: the consensus of professional communities, administrative provisions, an authority and accountability structure, a full array of technical provisions and reference standards, etc. Otherwise, a special ordinance outside the building code would have to incorporate or specify all these items.

G213, Part II-12

Final Action: AS AM AMPC____ D

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

PART I – IBC STRUCTURAL
202, 3404.3 through 3404.3.3 (NEW) (IEBC [B] 403.3 through 403.3.3(NEW))

PART I – IBC STRUCTURAL

Add new text as follows:

<u>**3404.3 (IEBC [B] 403.3) Priority buildings.** Priority buildings undergoing alteration shall comply with this section.</u>

<u>**3404.3.1 (IEBC [B] 403.3.1) Designation.** Unless specifically designated in this section, no building is considered a priority building.</u>

<u>**3404.3.2 (IEBC [B] 403.3.2) Triggering alteration.** Where the portion of a priority building undergoing the intended alteration exceeds 50 percent of the aggregate area of the building, the alteration work shall include retrofit measures as needed to satisfy Section 3404.3.3. Calculation of the portion undergoing alteration shall include all reconfigured spaces as indicated on the construction documents and, at the discretion of the code official, all spaces served by extended or renovated building systems. The portion undergoing alteration shall be permitted to exclude other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is required by this code.</u>

<u>**3404.3.3 (IEBC [B] 403.3.3) Triggered seismic scope and criteria.** The seismic force-resisting system of the altered building shall comply with the earthquake design provisions of this code. For purposes of this section, the earthquake loads need not be taken larger than 75 percent of the loads that would be required for the design of a new building of similar structure, purpose, and location.</u>

Add new definition as follows:

PRIORITY BUILDING. A building designated by Section 3404.3.1 for special consideration during alteration projects, based on its risk category, seismic design category, occupancy, size, structural system(s), location, and/or other readily known attributes.

Public Hearing Results

Parts I and II of this code change were heard by the IBC Structural code development committee.

PART I – IBC STRUCTURAL
Committee Action: **Disapproved**

Committee Reason: The proposed definition of priority building is vague. Technical triggers are preferable. These provisions should be in an appendix where local options reside.

Assembly Action: **None**

G220-12

3405.1.1 (New) [IEBC [B] 404.1.1 (New)

Proposed Change as Submitted

Proponent: Dan Casella, Chair, ICC 300 Development Committee, Standard for Bleachers, Folding and Telescopic Seating and Grandstands

Add new text as follows:

3405.1.1 (IEBC [B] 404.1.1) Bleacher systems. Existing bleachers, folding and telescopic seating and grandstands being repaired shall comply with ICC 300.

Reason: Directs the code user to the applicable ICC 300 Chapter 5 that specifically deals with gap, guard, repair and maintenance requirements of existing bleachers, folding and telescopic seating and grandstands. Provisions include inspections, maintenance and repairs, guard and openings between the floor boards and the seats. There will be a correlative change to IEBC Section 601.4.

The purpose of the ICC 300 standard is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, and safety to life and property relative to the construction, alteration, repair, operation, and maintenance of new and existing temporary and permanent bench bleachers, folding and telescopic seating, and grandstands. Information can be downloaded from the following website: http://www.iccsafe.org/cs/standards/IS-BLE/Pages/default.aspx.

Cost Impact: The proposed changes will not increase the cost of construction.

3405.1.1 (NEW)-G-CASELLA-ADHOC.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The exception to section 3401.1 already addresses the application of this standard and a new reference was not felt necessary.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dan Casella, ICC 300 – Bleacher Safety Committee, requests Approval as Submitted.

Commenter's Reason: The general reference to the ICC 300 standard at the beginning of the chapter is lost when someone is looking for repairs or relocations. When existing buildings are repaired, there are issue of safety and liability tied to changes in configuration, loads and weathering. The reference to the ICC 300 to let users know that this standard does address this issue is important. The ICC 300 committee also has a code change in Group B to add this requirement in IEBC Chapter 6, Repair.

The purpose of the ICC 300 standard is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, and safety to life and property relative to the construction, alteration, repair, operation, and maintenance of new and existing temporary and permanent bench bleachers, folding and telescopic seating, and grandstands. Information can be downloaded from the following website: http://www.iccsafe.org/cs/standards/IS-BLE/Pages/default.aspx.

G220-12

Final Action: AS AM AMPC____ D

G222-12
3405.2.2, 3405.4 (IEBC [B] 404.2.2, 404.4)

Proposed Change as Submitted

Proponent: David Bonowitz, David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

3405.2.2 (IEBC [B] 404.2.2) Extent of repair for compliant buildings. If the evaluation establishes compliance of the pre-damage building in accordance with Section 3405.2.1, then repairs shall be permitted that restore the building to its pre-damage state, based on material properties and design strengths applicable at the time of ~~original~~ the most recently permitted construction.

3405.4 (IEBC [B] 404.4) Less than substantial structural damage. For damage less than *substantial structural damage*, *repairs* shall be allowed that restore the building to its pre-damage state, based on material properties and design strengths applicable at the time of ~~original~~ the most recently permitted construction. New structural members and connections used for this repair shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

Reason: In both provisions, the intent is to refer back to the pre-damage condition. In many cases this is not the “original” condition of the building when it was first erected. The “most recently permitted” condition better conveys the intent.

Cost Impact: The proposed changes will not increase the cost of construction.

3405.2.2-G-BONOWITZ

Public Hearing Results

This code change was heard by the IBC Structural code development committee.

Committee Action: **Disapproved**

Committee Reason: In referring to a building’s pre-damaged condition, “original construction” may at time be misunderstood, but the proposed revision to “most recently permitted” raises questions. For one, this could refer you to unrelated non-structural work or even an unattached accessory structure. It would be more relevant to refer to the particular element being repaired.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David Bonowitz, David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3405.2.2 Extent of repair for compliant buildings. If the evaluation establishes compliance of the pre-damage building in accordance with Section 3405.2.1, then repairs shall be permitted that restore the building to its pre-damage state~~, based on~~

~~material properties and design strengths applicable at the time of original construction~~.

3405.4 Less than substantial structural damage. For damage less than *substantial structural damage*, *repairs* shall be allowed that restore the building to its pre-damage state~~, based on material properties and design strengths applicable at the time of original construction~~. New structural members and connections used for this repair shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

Commenter's Reason: In both provisions, the intent is to refer back to the pre-damage condition. In many cases this is not the "original" condition of the building when it was first erected. The "most recently permitted" condition better conveys the intent.

However, the ICC Structural committee did not like the revised wording originally proposed. This comment solves the problem in an even simpler and cleaner way – and in a way that the ICC committee has already approved in IEBC sections 606.2.1 and 606.2.2.2.

G222-12

Final Action: AS AM AMPC____ D

G224-12, Part I
3405.3.1 (IEBC [B] 404.3.1)

<u>Proposed Change as Submitted</u>

Proponent: Paul Bennett, Knott Laboratory, LLC, representing Colorado Chapter of ICC (pbennett@knottlab.com)

THIS IS A 2 PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

PART I- IBC STRUCTURAL

Revise as follows:

3405.3.1 (IEBC [B] 404.3.1) Lateral force-resisting elements. Regardless of the level of damage to vertical elements of the lateral force-resisting system, if *substantial structural damage* to gravity load-carrying components was caused primarily by wind or earthquake effects, then the building shall be evaluated in accordance with Section 3405.2.1 and, if noncompliant, rehabilitated in accordance with Section 3405.2.3.

Exceptions:

1. One- and two-family dwellings need not be evaluated or rehabilitated for load combinations that include earthquake effects.
2. Buildings assigned to Seismic Design Category A, B, or C whose *substantial structural damage* was not caused by earthquake need not be evaluated or rehabilitated for load combinations that include earthquake effects.
3. <u>Buildings damaged solely by vehicle impact or fire.</u>

Reason: Older structures may be damaged by vehicle impacts or fires, triggering a “substantial structural damage” threshold assessment and subsequent structural evaluation. When substantial structural damage has been caused by wind, snow or seismic forces, it is recognized that structural strengthening of undamaged building elements is warranted and prudent for life safety purposes. When damage has been caused by vehicle impact or fire, it is unreasonable to require the structural evaluation and likely upgrades to undamaged building elements. This effectively penalizes a building owner for unintended damage that was not initiated as the result of an inherently weak or inadequate structure.

Structural evaluations typically reveal that older structures (pre 1940) will require extensive strengthening, to undamaged building elements to satisfy the current code provisions. This is particularly true for older masonry structures.

Often the property owner’s insurance will provide law and ordinance coverage (building code upgrade coverage) for a value equal to 10% of the policy limits. In many instances, this coverage amount is insufficiently adequate to cover the required upgrades. Ultimately the building owner must pay for the building upgrades on their own.

This change allows a building damaged solely by fire or a vehicle impact to be repaired in accordance with the current code requirements, but not mandate that undamaged components be evaluated and potentially be upgraded or replaced.

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

3405.3.1-G-BENNETT.doc

Public Hearing Results

Both parts of this code change was heard by the IBC Structural code development committee.

PART I – IBC STRUCTURAL
Committee Action: Disapproved

Committee Reason: Disapproval of this proposal is also consistent with the committee's action on G221-12. It is unclear what vehicle impacts have to do with the building's lateral system. Without a threshold it is not when or if the exception would apply.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Paul Bennett, Knott Laboratory. LLC, representing Colorado Chapter of the ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3405.3 Substantial structural damage to gravity load-carrying components. Gravity load-carrying components that have sustained *substantial structural damage* shall be rehabilitated to comply with the applicable provisions of this code for dead and live loads. Snow loads shall be considered if the *substantial structural damage* was caused by or related to snow load effects. Existing gravity load-carrying structural elements shall be permitted to be designed for live loads *approved* prior to the damage. Nondamaged gravity load-carrying components that receive dead, live or snow loads from rehabilitated components shall also be rehabilitated or shown to have the capacity to carry the design loads of the rehabilitation design. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

Exceptions:

1. One- and two-family dwellings need not be evaluated or rehabilitated for load combinations that include earthquake effects.
2. Buildings assigned to Seismic Design Category A, B, or C whose *substantial structural damage* was not caused by earthquake need not be evaluated or rehabilitated for load combinations that include earthquake effects.
3. Buildings damaged solely by vehicle impact <u>or an individual structure</u> fire <u>in which the damage does not constitute *substantial damage*</u>.

Commenter's Reason: Based on feedback from the structural committee, this modification proposes a threshold. It is recognized that a threshold in the code is prudent. However, by utilizing the *substantial structural damage* definition as a threshold for damage caused by fire or vehicle impact creates dilemmas. For instance, a vehicle impact or individual structure fire could damage a significant column or a corner shear wall wherein the cost and scope of repair is relatively minor but *substantial structural damage* has been triggered. Thus, the cost of repair could change substantially, particularly for unreinforced masonry structures. For these reasons, the code change has been modified to include a threshold that is not based on the percent of damage to the lateral or gravity force carrying system, rather, the threshold is based on the cost of the repair. Thresholds based on the cost of damage have existed in the codes for years and have been successfully been used to enforce upgrades to flood plain and accessibility provisions for existing buildings. The *substantial damage* definition which currently exists in the code is better than the *substantial structural damage* threshold for structures damaged by a individual structure fire or vehicle impacts. Hence, this modification proposes utilizing the existing *substantial damage* definition as the threshold. By utilizing the *substantial damage* threshold, as opposed to the *substantial structural damage* threshold, it requires structures that have been substantially damaged by fire or vehicle or impact to be evaluated but it solves the current dilemma in which a fire or vehicle impact could cause minimal damage (financially speaking) and then the entire structure has to be evaluated and upgraded. By adding the term "individual structure" fire, this code change does not apply to damage caused by a wild fire.

G224-12
Final Action: AS AM AMPC____ D

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

PART II – IEBC [B] 606.2.3.1

BOTH PARTS WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE.

PART II – IEBC

IEBC [B] 606.2.3.1 Lateral force-resisting elements. Regardless of the level of damage to gravity elements of the lateral force-resisting system, if substantial structural damage to gravity load-carrying components was caused primarily by wind or seismic effects, then the building shall be evaluated in accordance with Section 606.2.2.1 and, if noncompliant, rehabilitated in accordance with Section 606.2.2.3.

Exceptions:

1. Buildings assigned to Seismic Design Category A, B, or C whose substantial structural damage was not caused by earthquake need not be evaluated or rehabilitated for load combinations that include earthquake effects.
2. One- and two-family dwellings need not be evaluated or rehabilitated for load combinations that include earthquake effects.
3. <u>Buildings damaged solely by vehicle impact or fire.</u>

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

Committee Reason: This proposal was disapproved based upon the action taken on G224-12, Part I.

Assembly Action: **None**

G225-12
3407, 3407.1, 3407.2 (New) [IEBC [B] 406, 406.1, 406.2 (New)]

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE Chair, ICC Code Technology Committee (CTC)

Revise as follows:

SECTION 3407 (IEBC 406)
GLASS REPLACEMENT AND EXISTING WINDOWS

3407.1 (IEBC [B] 406.1) ~~Conformance~~ Replacement glass. The installation or replacement of glass shall be as required for new installations.

3407.2 (IEBC 406.2) Replacement Windows. All windows in Group R-2 or R-3 buildings containing dwelling units, window opening control devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all the following apply to the replacement window:

1. The window is operable;
2. The window replacement includes replacement of the sash and the frame;
3. The top of the sill of the window opening is at a height less than 36 inches (915 mm) above the finished floor;
4. The window will permit openings that will allow passage of a 4-inch diameter (102 mm) sphere when the window is in its largest opened position; and
5. The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2.

Exceptions:

1. Operable windows where the top of the sill of the window opening is located more than 75 feet (22.86 m) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F 2006.
2. Operable windows with openings that are provided with window fall prevention devices that comply with ASTM F2090.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

The CTC Study Group on Child Window Safety has been fostering changes to the code over the past few cycles to clarify the application and specify the appropriate standards to be included in the code regarding child window safety. Suring the last cycle changes to incorporate those changes were successful in both the IBC and IRC. One of the areas that had not been the focus of CTC was existing windows in existing windows.

This code change incorporates parallel requirements to Section 1013.8 when an existing window is replaced, including the sash and the frame in an R-2 or R-3 building containing dwelling units. By incorporating this section in Chapter 34 and a companion change to the IEBC we can achieve a higher level of safety for children with minimum cost impact.

Cost Impact: The proposed changes will increase the cost of construction.

3407-G-BALDASSARRA-CTC.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was felt necessary to improved child safety in existing buildings where windows are being replaced.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 3407 (IEBC 406)
GLASS REPLACEMENT AND ~~EXISTING~~ <u>REPLACEMENT</u> WINDOWS

3407.1 (IEBC [B] 406.1) Replacement glass. The installation or replacement of glass shall be as required for new installations.

3407.2 (IEBC 406.2) Replacement Window <u>Opening Control Devices</u>. ~~All windows~~ In Group R-2 or R-3 buildings containing dwelling units, window opening control devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all the following apply to the replacement window:

1. The window is operable;
2. The window replacement includes replacement of the sash and the frame;
3. The top of the sill of the window opening is at a height less than 36 inches (915 mm) above the finished floor;
4. The window will permit openings that will allow passage of a 4-inch diameter (102 mm) sphere when the window is in its largest opened position; and
5. The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2.

Exceptions:

1. Operable windows where the top of the sill of the window opening is located more than 75 feet (22.86 m) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F 2006.
2. Operable windows with openings that are provided with window fall prevention devices that comply with ASTM F2090.

Commenter's Reason: The committee noted in its reason for approval that this will improve child safety in existing building which is of paramount importance. The public comment clarifies in Section 3407.2 that not all windows must be installed with window opening control devices but rather only those that meet the 5 criteria noted. In addition there are two editorial revisions to clarify that we are dealing with replacement windows and not all existing windows (title to 3407) and that in Section 3407.2, the subject matter of the section is the opening control devices.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Child Window Safety". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/ChildWindowSafety.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

G225-12

Final Action: AS AM AMPC____ D

G227-12
3408 (New) (IEBC [B] 407 (New))

Proposed Change as Submitted

Proponent: Jeff Inks, Window and Door Manufacturers Association (jinks@wdma.com)

Add new text as follows:

SECTION 3408 (IEBC 407)
REPLACEMENT WINDOW OPENINGS

3408.1 (IEBC [B] 407.1) Replacement window openings. Where windows are required to provide *emergency escape and rescue openings* in Group R-2 and R-3 occupancies, replacement windows shall be exempt from the requirements of Sections 1029.2, 1029.3 and 1029.5 provided the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement of the window is not part of a change of occupancy.

Reason: The intent of this proposal is to ensure that the IBC does not discourage or prevent improvements in fire safety in older residential occupancies by requiring replacement windows meet all of the provisions of Section 1029 when doing so would require increasing the size of the rough opening or altering the interior wall. Because many of these older buildings were constructed under codes that did not include the same emergency escape and rescue opening provisions that the IBC now requires for new construction, the only way to fully meet all of the requirements of Section 1029 for new construction if required when windows are replaced is to enlarge the rough opening and/or make significant alterations to the interior wall in order to accommodate any increase in window size or lowering of a sill.

At the very least, the significant cost and design challenges of altering the rough opening or interior wall can discourage window replacement and at worst can prevent the replacement of older windows that are harder to operate or inoperable all together because of their age and, that are significantly less energy efficient. When that happens, safety in compromised.

On the whole, while older bedroom windows in older buildings may not provide the full clear opening that is required for new construction or may have a sill height above 44 inches, they nonetheless still provide a viable emergency and escape rescue opening which is the primary intent of the code. Replacement of these windows with the same type of operating window or other type that can provide an equal or greater clear opening than the existing window -- even if they do not fully meet the clear opening or sill height requirements of Section 1029 – is always an improvement in safety, especially when a replacement opening can provide a larger clear opening than the existing window. Such improvements in safety should not be discouraged or prevented by overly onerous requirements for replacement windows.

This proposal is intended to ensure that doesn't happen by providing limited exceptions to the requirements of Section 1029 that can only be applied when certain conditions are met. The requirements that emergency escape and rescue openings be provided and the operational requirements for windows providing them are maintained for replacement windows as for new construction.

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

3408 (NEW)-G-INKS.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal allows the installation of new windows without additional burden and at the same time increases energy efficiency. Clarification of Item 1 of proposed Section 3408.1 is necessary although the intent to prevent window openings from becoming smaller is understood.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~SECTION 3408 (IEBC 407)~~
~~REPLACEMENT WINDOW OPENINGS~~

~~3408.1 (IEBC [B] 407.1) Replacement window openings~~ **3407.3 Replacement Window Emergency Escape and Rescue Openings.** Where windows are required to provide *emergency escape and rescue openings* in Group R-2 and R-3 occupancies, replacement windows shall be exempt from the requirements of Sections 1029.2, 1029.3 and 1029.5 provided the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement of the window is not part of a change of occupancy.

Commenter's Reason: This is purely a correlative revision with the approved action on code change G225-12. G225 was approved to address replacement windows in Groups R-2 and R-3 in order to improve child safety from the standpoint of children falling out of windows in existing buildings. As noted by the committee it is approval of G227, this proposal relieves the burden on replacement windows and thus will encourage replacement with safer windows. The public comment, in turn, meshes these two approved proposals by consolidating them in a single section dealing with replacement windows.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Child Window Safety". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/ChildWindowSafety.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

G227-12
Final Action: AS AM AMPC____ D

G229-12
3408.1 (IEBC [B] 407.1)

Proposed Change as Submitted

Proponent: Maureen Traxler, City of Seattle Dept. of Planning & Development, representing Washington Association of Building Officials Technical Code Development (maureen.traxler@seattle.gov)

Revise as follows:

3408.1 (IEBC [B] 407.1) Conformance. No change shall be made in the use or occupancy of any building ~~that would place the building in a different division of the same group of occupancies or in a different group of occupancies,~~ or portion thereof unless such building is made to comply with the requirements of this code for ~~such division or group of occupancies.~~ the occupancy. Changes in use or occupancy in a building or portion thereof shall be such that the existing building is no less complying with the provisions of this code than the existing building or structure was prior to the change. Subject to the approval of the *building official*, the use or occupancy of existing buildings shall be permitted to be changed and the building is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use. Change of tenants will be permitted without complying with this Section 3408 so long as the use is not changed.

Reason: This code change updates the charging language for change of occupancy. The term "division of occupancy" is deleted because the term is only used once elsewhere in the Code (Section 111.2), and its meaning is vague. When a building changes to a use that has special Building Code requirements, the building, or the portions of the building where the new use is located, should be made to comply with those code requirements. For example, if an ambulatory care facility expands from treatment of 3 patients to treatment of 6, Section 903.2.2 would require a sprinkler system to be installed. If an S-1 occupancy changes from the storage of clothing to storage of furniture, Section 903.2.9 would require sprinklers. Hazardous materials storage might not be allowed to move to a higher floor. There are many other similar examples. Even though the code official would not always be aware of these changes, this proposal would provide authority to require compliance when changed conditions are known, and prohibits changes in use that reduce a building's compliance.

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

3408.1-G-TRAXLER.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal does not add clarification to the change of occupancy requirements.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler, City of Seattle, representing Department of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3408.1 (IEBC [B] 407.1) Conformance. No change shall be made in the use or occupancy of any building or portion thereof unless such building is made to comply with the requirements of this code for the use or occupancy. Changes in use or occupancy in a building or portion thereof shall be such that the existing building is no less complying with the provisions of this code than the existing building or structure was prior to the change. Subject to the approval of the *building official*, the use or occupancy of existing buildings shall be permitted to be changed and the building is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use. ~~Change of tenants will be permitted without complying with this Section 3408 so long as the use is not changed.~~

Commenter's Reason: The published reason for disapproval misses the main point of this code change proposal. The primary objective of the proposal is to require compliance with code requirements for new uses when a change of use occurs. When the use of a building changes to a use that is subject to special code requirements, the building should comply with those requirements.

We are proposing to modify the proposal by removing the last sentence because it is not necessary, and may be confusing. The sentence merely states an example of how the section would be applied, and is an interpretation that would be more appropriate to appear in the Commentary.

G229-12

Final Action: AS AM AMPC____ D

G231-12
202, 3408.1.1 (New) [IEBC [B] 202, 407.1.1 (New)]

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering (al.godwin@aon.com)

Add new text as follow:

3408.1.1 (IEBC [B] 407.1.1) Change of Character. A change in occupancy with no change of occupancy classification shall not be made to any structure that will subject the structure to any special provisions of the applicable *International Codes*, without approval of the *building official*. Compliance shall be only as necessary to meet the specific provisions and is not intended to require the entire building be brought into compliance.

Add new definition as follows:

CHANGE OF OCCUPANCY. A change in the purpose or level of activity within a building that involves a change in application of the requirements of this code.

Reason: In the last code cycle, Code Change EB27-09/10 added "10. Ambulatory health care facilities" to IEBC Section 902.1 (now 1002.1) under the classification of "change of character. This section in the IEBC, along with The IEBC definition of Change of Use, in general verbiage, recognizes that there are changes of use that do not involve changing occupancy groups.

IEBC Section 1001.2 states:

> "**1001.2 Change in occupancy with no change in occupancy classification.** A change in occupancy, as defined in Section 202, with no *change of occupancy* classification shall not be made to any structure that will subject the structure to any special provisions of the applicable *International Codes*, including the provisions of Section 1002 through 1011, without the approval of the code official."

This proposal is to bring those provisions from IEBC Section 1001.2 over into Chapter 34 of the IBC.

As noted in the IEBC, it is possible to change a use without changing the occupancy classification. Some examples are as follows:

1. Group A-2 bar with an occupant load of 275 to a Group A-2 bar with an occupant load of 350. Increasing occupant loads is permitted under Section 1004.2.
2. Group B office to Group B Ambulatory Health Care
3. Group B office to Group B café
4. Group F-1 factory to a Group F-1 woodworking shop.
5. Group H-3 Oxidizing gases to Group H-3 Flammable solids
6. Group M retail to Group M retail of upholstered furniture
7. Group S-1 warehouse to Group S-1 tire warehouse over 20,000 cubic feet
8. Group S-1 warehouse to Group S-1 motor vehicle repair garage
9. Group R-2 apartment to Group R-2 Live/Work unit.

Each of these classifications has particular code provisions that would apply if the occupancy had been originally identified. Some items might be fire protection, alarms, fresh air, restroom facilities, accessibility, smoke barriers, etc. The IBC currently does not specifically address these changes since they do not change Groups or change Divisions within Groups.

When making a change of character, it is not necessary to totally re-evaluate the building. Only the new applicable provisions should be addressed.

For example:

Group A-2 bar with an occupant load of 275 to a Group A-2 bar with an occupant load of 350.

Items that might require review:

Means of egress – 1004.2, to the public way
Sprinklers – 903.2.1.2, only in this space
Alarms – 907.2.1, only in this space
Restrooms – Chapter 29
Fresh air – IMC

Accessibility – see Section 3411
If food – upgrade of interceptor provisions of the IPC

Items that might not require a new review:

Height and area
Exterior walls and openings

As this is a confusing issue, the code official will need to define what items of correction are appropriate. While the wording may be new, code officials have performed this service for years. This proposal just puts it in the code.

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

3408.1.1 (NEW)-G-GODWIN

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed language needs to be revised with terminology such as "change in the character of use." There was some discussion that the definition proposed could be beneficial in the IBC. Some committee members felt that this language was unnecessary.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Al Godwin, CBO, CPM, Aon Fire Protection Engineering Corporation, requests Approval as Submitted.

Commenter Reason: The Committee made the comment that the wording should be changed to "change in the character of use." Therefore the title of Section 3408.1.1 has been amended to reflect the new provision. This provision already exists in IEBC Section 1001.2. However, according to IEBC Section 301.1 compliance can be achieved by one of the three methods. The provision for Change of Character only exists in the Work Area Method of Section 301.1.2. Change of Character should also occur under the Prescriptive Compliance Method of Chapter 4 which is IBC Section 3408.1.1.

Therefore, this provision is a good change. It merely duplicates an existing IEBC provision and copies it in IEBC 407.1.1, which is also IBC 3408.1.1.

G231-12

Final Action: AS AM AMPC____ D

G232-12
3409.1, 3409.2 [IEBC [B] 408.1, 408.2 (New)]

Proposed Change as Submitted

Proponent: David Bonowitz, David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

Revise as follows:

SECTION 3409 (IEBC [B] 408)
HISTORIC BUILDINGS

3409.1 (IEBC [B] 408.1) ~~Historic buildings~~ General. The provisions of this code that require improvements relative to a building's existing condition or, in the case of repairs, that require improvements relative to a building's pre-damage condition, shall not be mandatory for historic buildings unless specifically required by this Section. ~~relating to the construction, repair, alteration, addition, restoration and movement of structures, and change of occupancy shall not be mandatory for historic buildings where such buildings are judged by the building official to not constitute a distinct life safety hazard.~~

3409.2 (IEBC [B] 408.2) Life safety hazards. The provisions of this code shall apply to historic buildings judged by the building official to constitute a distinct life safety hazard.

~~3409.2~~ 3409.3 (IEBC [B] ~~408.2~~ 408.3) Flood hazard areas. Within flood hazard areas established in accordance with Section 1612.3, where the work proposed constitutes substantial improvement as defined in Section 1612.2, the building shall be brought into compliance with Section 1612.

Exception: Historic buildings that are:

1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places;
2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or
3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

Reason: This proposal clarifies what we believe to be the intent of the code with respect to historic buildings: they should be maintained, and new work should be to code standards (with allowances for historic materials already in 3401.4), but upgrades normally triggered in non-historic buildings generally should not be triggered in historic buildings.

The current provision waives all of the code's Existing Buildings provisions for any historic building. We believe this is too broad a waiver, and likely unintended. The better approach, consistent with the more lengthy and detailed IEBC provisions, is to enforce maintenance provisions but to waive triggered upgrades.

Specifically, the proposal maintains the current provisions regarding "distinct life safety hazards" and flood hazard areas" but does the following:

- Editorially changes the title of Section 3409.1 to avoid duplication of title of whole Section 3409.
- Modifies Section 3409.1 to exempt only "improvements" relative to the existing condition before an addition, alteration, repair, change of occupancy, or relocation project begins.
- Moves the current provision regarding "distinct life safety hazards" to its own subsection and rewords it to remove a confusing double negative. Note that in doing so the proposal has the effect of saying that an historic building is *not* a distinct life safety hazard unless it is explicitly judged to be one. This is a change relative to the current provision.
- Renumbers 3409.2 to 3409.3 but otherwise leave the flood provisions untouched.

Note to ICC: A similar change is appropriate for IEBC Section 408. As in past cycles, we expect this to be made as an automatic coordination change, so we have not submitted a corresponding proposal to the IEBC.

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

3409.1-G-BONOWITZ

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because it does not provide further clarification for historic buildings and would possibly be considered more restrictive.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee, requests Approval as Submitted.

Commenter's Reason: This proposal clarifies the intent of the code with respect to historic buildings: they should be maintained, and new work should be to code standards (with allowances for historic materials already in 3401.4), but upgrades normally triggered in non-historic buildings generally should not be triggered in historic buildings.

The current provision waives *all* of the code's Existing Building provisions for any historic building. This is too broad a waiver, and not the one intended. The better approach, consistent with the more lengthy and detailed IEBC provisions, is to enforce maintenance provisions but to waive triggered upgrades.

The ICC Structural Committee's reason for disapproving the proposal, from the ROH, reads, in its entirety, "The proposal was disapproved because it does not provide further clarification for historic buildings and would possibly be considered more restrictive."

With respect, this does not make sense. It suggests that the committee either did not understand the proposal or does not understand the preferred approach taken by the IEBC. The committee's reason has two parts:

- "The proposal … does not provide further clarification for historic buildings …" As the proponents we do not know what this means. Presumably it means either that even more revisions to the 2012 text are needed or that the proposal would have no effect at all and therefore is of no value. Neither of these objections is valid. The first interpretation is invalid because no clarification beyond that proposed is necessary for the proposal to be seen as an improvement relative to the existing 2012 provision. The second interpretation does not make sense because it directly conflicts with the balance of the committee's reason, as explained in the next bullet.
- "The proposal … would possibly be considered more restrictive." Yes, that's correct, but not more restrictive than intended. On the contrary, it is the existing language that is *less* restrictive than almost any code user would want or reasonably expect it to be. The existing language says that the whole of Chapter 34 can be ignored for any historic building that isn't already – that is, prior to the intended project – "a distinct life safety hazard." Can that really be the intent? Additions, alterations, and changes of occupancy can be made without restriction to any historic building? If that's truly the intent, then ICC members should uphold the committee's disapproval. But if members agree with us that the intent is to relax the *upgrade* requirements but otherwise to maintain the existing level of safety in an historic building, then ICC members should approve proposal G232 as submitted.

G232-12

Final Action: AS AM AMPC____ D

G233-12
3410.2(New) [IEBC [B] 409.2 (New)]

Proposed Change as Submitted

Proponent: Dan Casella, Chair, ICC 300 Development Committee, Standard for Bleachers, Folding and Telescopic Seating and Grandstands

Revise as follows:

3410.1 (IEBC [B] 409.1) Conformance. Structures moved into or within the jurisdiction shall comply with the provisions of this code for new structures.

<u>**3410.2 (IEBC [B] 409.2) Bleacher systems.** Bleachers, folding or telescopic seating or grandstands that are being relocated shall comply with ICC 300.</u>

Reason: The purpose is for coordination with ICC 300 Section 505. There is also a correlative change to IEBC Section 1301. Directs code users to the ICC-300 for correct rules on relocation of an existing bleacher (due to floor replacement or gym layout redesign or other conditions) and other related rules on seating that may apply during building repairs or remodeling. Sections 305, 309 and 311 are addressed in Chapter 5. Section 310, Accessibility, is required when the alteration would require movement of major structural elements for the bleacher.

ICC 300 text is indicated below.

SECTION 505
SEATING RELOCATION

Section 505.1 Relocating existing bleachers. Relocating existing bleachers to a new location shall be permitted provided the existing bleacher complies with Sections 303.6, 304, 306, 307, 308 and 310 and Chapter 5.

> **Exception:** Where full compliance with Sections 310.1 and 501.4 is *technically infeasible*, the relocated existing bleachers shall provide access in compliance with the building code to the maximum extent technically feasible.

The purpose of the ICC 300 standard is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, and safety to life and property relative to the construction, alteration, repair, operation, and maintenance of new and existing temporary and permanent bench bleachers, folding and telescopic seating, and grandstands. Information can be downloaded from the following website: http://www.iccsafe.org/cs/standards/IS-BLE/Pages/default.aspx.

Cost Impact: The proposed changes will not increase the cost of construction.

3410.2 (NEW)-G-CASELLA-ADHOC.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based upon the action taken on G220-12. An additional reference to the ICC 300 was not felt necessary.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dan Casella, ICC 300 – Bleacher Safety Committee, requests Approval as Submitted.

Commenter's Reason: The general reference to the ICC 300 standard at the beginning of the chapter is lost when someone is looking for repairs or relocations. When existing buildings are relocated, there are issue of safety and liability tied to changes in configuration, loads and weathering. The reference to the ICC 300 to let users know that this standard does address this issue is important. The ICC 300 committee also has a code change in Group B to add this requirement in IEBC, Chapter 13, Relocation.

The purpose of the ICC 300 standard is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, and safety to life and property relative to the construction, alteration, repair, operation, and maintenance of new and existing temporary and permanent bench bleachers, folding and telescopic seating, and grandstands. Information can be downloaded from the following website: http://www.iccsafe.org/cs/standards/IS-BLE/Pages/default.aspx.

G233-12

Final Action: AS AM AMPC____ D

G234-12
3411.3 (IEBC [B] 410.3)

Proposed Change as Submitted

Proponent: Clare Ray Allshouse AIA, CBO, City of Shoreline, WA, representing Washington Association of Building Officials Technical Code Development Committee (rallshouse@shorelinewa.gov)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE.

Revise as follows:

3411.3 (IEBC [B] 410.3) Extent of application. An *alteration* of an existing facility shall not impose a requirement for greater accessibility than that which would be required for new construction. Alterations shall not reduce or have the effect of reducing accessibility of a *facility* or portion of a *facility* <u>to less than that which would be required for new construction</u>.

Reason: The current specific requirement to restrict any reduction of existing accessibility has the unintended consequence of not allowing for a lesser level of accessibility otherwise allowed by current code. This is inconsistent with the code language in the first sentence of this section that prohibits imposing a requirement for greater accessibility than that which be required for new construction. In addition, current ADA and ABA Accessibility Guidelines for Buildings and Facilities Section 202.3.1 Prohibited Reduction in Access, as published in the Federal Register, states: "An alteration that decreases or has the effect of decreasing the accessibility of a building or facility below the requirements for new construction at the time of the alteration is prohibited." To be consistent with this standard, an alteration to an existing fully accessible space should be allowed to have an area that is not accessible provided that such area would not be required to be accessible in new construction.

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

3411.3-G-ALLSHOUSE

Public Hearing Results

This code change was heard by the IBC Means of Egress code development committee.

Committee Action: Disapproved

Committee Reason: The proposed language does not appear to address the concern brought up in the reason statement. The added language could be read to require the elements being repaired to upgrade to new construction rather than just maintain the level of accessibility required at the time of initial construction. If something was constructed to exceed current requirements, the existing language would already let the designer use new construction requirements.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Clare Ray Allshouse AIA, CBO, City of Shoreline, WA representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

3411.3 (IEBC [B] 410.3) Extent of application. An *alteration* of an existing facility shall not <u>reduce or have the effect of reducing accessibility of a *facility* or portion of a *facility* and shall not </u>impose a requirement for greater accessibility than that which would be required for new construction. ~~Alterations shall not reduce or have the effect of reducing accessibility of a *facility* or portion of a *facility.*~~

Commenter's Reason: The Committee action reason statement accurately pointed out that the original proposal wording would have the unintended consequence of retroactively requiring that all accessibility features would have to be brought up to no less than that required for new construction. This modification corrects this discrepancy and achieves the intended result of this change to remove the apparent restriction against adding less accessible features through alteration, otherwise allowed by current code, merely by joining these two existing code requirements into a single statement.

G234-12

Final Action: AS AM AMPC____ D

G236-12
3411.4 [IEBC [B] 410.4], 3411.6 [IEBC [B] 410.6], 3411.8.9 [IEBC [B] 410.8.9]

Proposed Change as Submitted

Proponent: Ron Nickson, National Multi Housing Council (rnickson@nmhc.org)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE.

Revise as follows:

3411.4 (IEBC [B] 410.4) Change of occupancy. Existing buildings that undergo a change of group or occupancy shall comply with this section.

> **Exception:** Type B *dwelling units* or *sleeping units* required by Section 1107 of this code are not required to be provided in existing buildings and facilities~~ undergoing a change of occupancy in conjunction with *alterations* where the work area is 50 percent or less of the aggregate area of the building~~.

3411.6 (IEBC [B] 410.6) Alterations. A *facility* that is altered shall comply with the applicable provisions in Chapter 11 of this code, unless *technically infeasible*. Where compliance with this section is *technically infeasible*, the *alteration* shall provide access to the maximum extent technically feasible.

> **Exceptions:**
>
> 1. The altered element or space is not required to be on an *accessible* route, unless required by Section 3411.7.
> 2. *Accessible means of egress* required by Chapter 10 are not required to be provided in existing facilities.
> 3. The *alteration* to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a *Type B dwelling unit*.
> 4. *Type B dwelling or sleeping units* required by Section 1107 of this code are not required to be provided in existing buildings and facilities <u>that were first occupied prior to March 13, 1991.</u> ~~undergoing a change of occupancy in conjunction with alterations where the work area is 50 percent or less of the aggregate area of the building~~.

3411.8.9 (IEBC [B] 410.8.9) Type B dwelling or sleeping units. Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 *dwelling* or *sleeping units* are being added, the requirements Section 1107 for *Type B units* apply only to the quantity of the spaces being added. Where Group I-1, I-2, R-1, R-2, R-3 or R-4 *dwelling or sleeping units* <u>in buildings first occupied March 13, 1991 or later</u> are being altered and where the work area is greater than 50 percent of the aggregate area of the building, the requirements Section 1107 for *Type B units* apply only to the quantity of the spaces being altered.

Reason: To revise Section 3411.6, Exception 4 to comply with the Fair Housing Act as it applies to existing construction. The Fair Housing Act specifically applies to new buildings for first occupancy after March 13, 1991 and the requirement of Section 3411.6, Exception 4, should not apply to buildings constructed and occupied prior to the effective date of the Fair Housing Act. The section as written would place an undue burden on renovation of existing buildings as costly structural changes and other building modification needed to accommodate the accessibility provisions of the Fair Housing Act could impact the feasibility of upgrading apartments and other existing buildings that are modified to R occupancy.

Cost Impact: The proposed changes will not increase the cost of construction. Reduce the cost of construction.

3411.6-G-NICKSON.doc

Public Hearing Results

This code change was heard by the IBC Means of Egress code development committee.

Committee Action: **Disapproved**

Committee Reason: Change of occupancy should comply with new construction requirements. The term "first occupied", while used in the Fair Housing Act, is too variable for good code language. The March 13, 1991 date is a concern because of issues with vesting dates, start of construction, and shell buildings for as-built units. The current requirement is beneficial for housing constructed in violation of the Fair Housing Act.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ron Nickson and Steve Orlowski, representing National Multi Housing Council and National Association of Home Builders, requests Approval as Submitted.

Commenter's Reason: Approval as submitted of G236 will align the ICC codes with the provisions of the Fair Housing Accessible Guidelines (FHAG) as the act was initially intended to apply to residential buildings constructed and first occupied March 13, 1991 or later. Compliance with the current code places a costly burden on upgrading of existing apartments that were constructed prior to the implication of the FHAG. The provisions of the current code also place a costly requirement on buildings when an existing structure is converted to an R-occupancy. The cost burden for compliance with the ICC codes, for properties that were never intended to have accessibility provision, as now required for compliance with the FHAG is a detriment to upgrading of existing housing and may in fact be blight on existing neighborhoods.

G236-12

Final Action: AS AM AMPC____ D

G237-12

1007.1, 3411.5, 3411.6, 3411.7, 3411.8 (New), 3411.8.1 (New) [IFC [B] 1007.1, IEBC [B] 410.5, 410.6, 410.7, 410.8 (New), 410.8.1(New)]

Proposed Change as Submitted

Proponent: Gene Boecker, AIA, Code Consultants, Inc, representing himself

THIS CODE CHANGE PROPOSAL WILL BE HEARD BY THE IBC MEANS OF EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE.

Revise as follows:

3411.5 (IEBC [B] 410.5) Additions. Provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, a primary function shall comply with the requirements in Section 3411.7 and 3411.8.

3411.6 (IEBC [B] 410.6) Alterations. A facility or element that is altered shall comply with the applicable provisions in Chapter 11 of this code, unless technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent technically feasible. Accessible means of egress complying with Section 1007 shall be provided as required in Section 3411.8.

Exceptions:

1. The altered element or space is not required to be on an accessible route, unless required by Section 3411.7.
~~2. Accessible means of egress required by Chapter 10 are not required to be provided in existing buildings and facilities.~~
~~3~~ 2. The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a Type B dwelling unit.
~~4~~ 3. Type B dwelling or sleeping units required by Section 1107 of this code are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with alterations where the work area is 50 percent or less of the aggregate area of the building.

3411.7 (IEBC [B] 410.7) Alterations affecting an area containing a primary function. Where an alteration affects the accessibility to, or contains an area of primary function, the route to the primary function area shall be accessible. The accessible route to the primary function area shall include toilet facilities or drinking fountains serving the area of primary function.

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function.
2. ~~This provision does not apply to alterations~~ Alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. ~~This provision does not apply to alterations~~ Alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
4. ~~This provision does not apply to alterations~~ Alterations undertaken for the primary purpose of increasing the accessibility of an existing building, facility or element.

5. ~~This provision does not apply to altered~~ Altered areas limited to Type B dwelling and sleeping units.

3411.8 (IEBC [B] 410.8) Accessible means of egress. Not less than one accessible means of egress shall be provided in accordance with Section 1007 and 3411.8.1 in alterations affecting an area containing a primary function and in additions.

Exceptions:

1. Existing buildings where the alterations are less than 50 percent of the aggregate building area.
2. Historic buildings.
3. Accessible means of egress is not required to exceed 20 percent of the costs of the alterations including any costs associated with compliance for Section 3411.7. Where the costs to provide accessibility cannot accommodate compliance with both this Section and Section 3411.7, Section 3411.7 shall take precedence.
4. Alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
5. Alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
6. Alterations undertaken for the primary purpose of increasing the accessibility of a facility.
7. Altered areas limited to Type B dwelling and sleeping units

3411.8.1 (IEBC [B] 410.8.1) Means of egress through the existing building. Where the accessible means of egress from an portion of a building being altered, undergoing a change of occupancy or addition requires occupants to egress through portions of the existing building, compliance with Section 1007 is required through the existing building, unless technically infeasible. Where compliance with this provision is technically infeasible, the accessible means of egress through the existing building shall provide access to the maximum extent technically feasible.

1007.1 (IFC [B] 1007.1) Accessible means of egress required. Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress are required by Section 1015.1 or 1021.1 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. Accessible means of egress ~~are not required in alterations to~~ for existing buildings shall be provided as required in Section 3411.8.
2. One accessible means of egress is required from an accessible mezzanine level in accordance with Section 1007.3, 1007.4 or 1007.5.
3. In assembly areas with ~~sloped~~ ramped or stepped aisles, one accessible means of egress is permitted where the common path of travel is accessible and meets the requirements in Section 1028.8.

Reason: During last code change cycle, a proposal similar to this was presented. The committee felt it was too confusing and that it did not address the concept of disproportionate cost effectively. This proposal seeks to address those issues more clearly. Where possible the language was changed to be uniform among the various codes and sections.

Common sense should dictate that where major alterations occur consideration for at least one accessible means of egress should be provided. Additionally, the simple idea that an accessible means of egress should be intentionally denied to a segment of the population does not seem appropriate. As the codes now stand, a building can be completely gutted with only the facades remaining and no accessible means of egress must be provided.

It is important to remember that the new construction requirements in the IBC only require a maximum of two accessible means of egress as noted in Section 1007.1 (assuming travel distance compliance is accommodated).

This proposal affects sections in both eth IBC and the IEBC with the intent that the changes in the IBC are reflected in the IEBC as well.

1007.1: The first exception to the section is changed to indicate that existing building provisions are noted in Chapter 34. This is the proper scoping location for issues dealing with existing buildings – not Chapter 10. A language change is provided to the third exception based on consistency with the term usage elsewhere in the code.
3411.5/410.5: A cross reference to the section addressing accessible means of egress is added. The addition is required to comply with new construction in every other aspect. It makes sense to reference this aspect as well.
3411.6/410.6: Under the current code, the exception makes reference to Chapter 10 but the main text does not. This closes that loop. Where accessible means of egress are required, it is necessary to direct the code user to the proper section. The reference to 1007 does that. Additionally, the word "element" is included in the charging language. It was unclear previously what should be done for the specific element under an alteration. For example, if a door is being replaced with one that has a vision lite, the door surface, hardware and vision lite location are subject to the "element" portion of the requirement but the accessible route to and maneuverable approach to the door are not part of the element so they would not be required to be altered. Similarly, if new electrical controls are installed, they are subject to the mounting height requirements but the entire space is not required to be altered for any other accessible elements not being altered. This is consistent with the approach taken in the Federal 2010 ADA Standards for Accessible Design. On the other hand, if an exterior stairway is being replaced in a non-sprinklered building then the clear width between handrails should be taken into consideration in the design.
3411.6/410.6, exception #2: The exception states that nothing is required for the existing building relative to accessible means of egress. However, an addition impacts the existing building to which it is attached. Egress through the existing building from an addition is more similar to an alteration of the existing egress system. The revised text points to the new code text in 3411.8.1 for what must be done for these conditions.
3411.7/410.7: (No change)
3411.8/410.8: A new section is added to specifically address accessible means of egress. Rather than the blanket statement in Section 1007.1 of the building code, this section will address the scope and extent of work necessary to address accessible means of egress for existing buildings. It directs the code user to Section 1007 for the technical requirements when an accessible means of egress is necessary as well as clearly delineate that when an alteration occurs affecting an area containing a primary function, an accessible means of egress must be provided. This is similar to the general requirements in 3404.1/403.1 which require alterations to meet "new code." The threshold is limited to alterations affecting a primary function because that threshold relates to the importance of changes to an area and is understood due to its relationship with the Federal accessibility regulations for the past 20 years. The intent is to provide at least one accessible means of egress.
3411.8/410.8, exception #1: Alterations with some magnitude should address accessible means of egress; if the alteration is relatively small then there is reason to limit the requirement. The threshold of 50% of the building area is intended to correspond to IEBC Alterations – Level 3. Alterations with less than 50% would not require an accessible means of egress to be provided. Even if the accessible means of egress would not be a disproportionate cost (exception #2), in small alterations the area required to create the accessible means of egress may be disproportionate to the space allowed for the alteration. If so, it may "steal" too much space from an otherwise small area and would not be appropriate.
3411.8/410.8, exception #2: The exception makes it clear that an accessible means of egress is not required for alterations to historic buildings. To do so, may alter the historic character. While an accessible means of egress should be provided wherever possible, the exception recognizes that in historic buildings the ability to make the necessary changes to comply may be detrimental to the historic integrity.
3411.8/410.8, exception #3: Existing buildings come in all shapes and sizes and the work proposed for creating an accessible means of egress can be a small part or major portion of the effort. This exception identifies that and uses the same 20% rule for the accessible route relative to the primary use area. The exception also clarifies that where funds cannot provide the accessible route *and* an accessible means of egress, it is more important to provide the accessible route. This maintains consistency with the Federal requirements for alterations affecting an area containing a primary function.
3411.8/410.8, exceptions #4, #5, #6, #7: These are the same as exceptions #2, #3, #4 and #5 in Section 3411.7 for alterations affecting an area containing a primary function. These are included here for consistency.
3411.8.1/410.8.1: If an addition is designed such that the means of egress must enter the existing building then the general rule is that the egress design in the existing building must meet the requirements for egress as it passes through the existing building. This is simply the continuation of the means of egress from the addition for egress width, panic hardware (as applicable) and similar concerns. The same should be true for the design of the accessible means of egress. If one of the accessible egress paths leads through the existing building, it too needs to meet/continue the level of protection as designed in the addition. The limitation to this is that if the effort to make the existing means of egress accessible is "technically infeasible" then work should be done to what is possible. One example of this may be making sure that the slopes along the egress path in the existing building's corridor are proper even if the width cannot be altered to allow the proper maneuverability approach to the exit door.

The codes identify the minimums necessary for life safety. These proposed changes provide the disabled community with similar levels of life safety to the general public and still sets reasonable thresholds based on the extent of work for the project. With the adoption of the new 2010 ADA Standards for Accessible Design, it is clear that the IBC will set the standard for accessible means of egress. This organization has a responsibility to act in the best interests of the general public and all its diversity. Where major changes are proposed to an existing building due to a large alteration or an addition, it should be the desire of the ICC to incorporate appropriate accessible means of egress where possible.

Cost Impact: The code change proposal will increase the cost of construction in many situations but may have no effect in others.

It is not easy to address what costs could be affecting this due to the myriad possible configurations for a building. A building that is a single story at grade may have no additional cost. Because an accessible entrance would be required, it would function as the accessible means of egress. Hence, a single story building with a total gut renovation may be unaffected cost-wise by this proposal.

The main costs are those involving an elevator of adequate size on emergency standby power and a two-way communications system. If the elevator is too small, the costs to alter that would be disproportionate and it would not be required according to IBC Section 3411.8, exception 2 or IEBC Section 905.4, exception #3.

At the opposite end of the spectrum could be a nine story high-rise building that is being gutted on five floors. It would be required to have an accessible route to the upper floors. The IFC would require the emergency power for fire fighter operation so that cost for that part of the accessible means of egress is covered. In that situation only the two-way communication systems costs would apply.

Buildings without elevators would likely similarly fall into the category of disproportionate costs since the addition of an elevator can be costly. Moreover, the accessible means of egress is tied into alterations that affect an area containing a primary function. This already has accessibility requirements for access such as toilet room and accessible route renovations. If the costs to add an elevator are within the 20 percent cap but the cost to add emergency standby power would be beyond the 20 percent, the exceptions in IBC Section 3411.8, exception 2 and IEBC Section 905.4, exception #3 make it clear that the costs for access take precedence over the costs for egress and that combined they are not required to exceed the 20 percent figure.

In many cases the 20 percent cap will be met by the required access features and there may be no funds remaining for an accessible egress. The important thing is that we should recognize the need to provide a means of egress for all of the occupants within the building to the greatest extent possible. No definitive numbers can be provided because the variations are so many. This discussion attempts to address the possibilities only.

Staff Note: A correlative change was proposed to IEBC Chapters 7, 9, 10 and 11.

1007.1 #1-E-Boecker.doc

Public Hearing Results

This code change was heard by the IBC Means of Egress code development committee.

Committee Action: Disapproved

Committee Reason: While the committee applauds the idea of providing accessible means of egress in existing buildings, there are concerns for misunderstanding with the proposed language. Designers should do what they can in alterations as part of their concerns for proper general building evacuations.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gene Boecker, AIA, Code Consults, Inc. (CCI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3411.8 (IEBC [B] 410.8) Accessible means of egress. Not less than one accessible means of egress shall be provided in accordance with Section 1007 and 3411.8.1 in alterations affecting an area containing a primary function and in additions.

Exceptions:

1. Existing buildings where the alterations are less than 50 percent of the aggregate building area.
2. Historic buildings <u>in conformance with Section 3409.1.</u>
3. Accessible means of egress is not required to exceed 20 percent of the costs of the alterations including any costs associated with compliance for Section 3411.7. Where the costs to provide accessibility cannot accommodate compliance with both this Section and Section 3411.7, Section 3411.7 shall take precedence.
4. Alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
5. Alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
6. Alterations undertaken for the primary purpose of increasing the accessibility of a facility.
7. Altered areas limited to Type B dwelling and sleeping units

(Portions of proposal not shown remain unchanged)

Commenter's Reason: It is not clear from the committee's comments how the proposed language can lead to misunderstanding. They committee's stated position is vague and not consistent with their vote. It is true that designers should do all that they can in alterations to address concerns for general evacuation. That sentiment is valid. However, it falls short of reality. An accessible means of egress will not be intentionally created for many buildings unless there is a requirement to address it. The proposed language places a responsibility on designers to address the issue. It avoids this nebulous "good idea" approach and is therefore an improvement to the code.

To recap, Sections 3411.8 and 3411.8.1 are new and deal with the issue of an accessible means of regress in existing buildings. The other text is clearing up language or pointing toward the new section. The threshold is for major alterations, additions and alterations affecting a primary function. Where alterations affect a primary area, one of the requirements is an accessible route to the area. This is not new and has been a requirement in the ADA as well as the IBC for some time. If the accessible route "to" the area is provided, it can often be designed to coincide with the accessible means of egress. In additions, the new work must be designed to comply with the new requirements so an accessible means of egress is already required. The added text is informative with regard to how the juncture with the existing building is to be treated if it involves the accessible means of egress. The current code is lacking in that area, so this provides improvement.

For buildings that are one story, the requirement will be met because the accessible route in will be the accessible route out. Therefore, one accessible means of egress will be provided. For high-rise buildings, the elevator must be on standby power so an accessible egress is assured as well. The concern is what happens for the mid-rise and low-rise buildings. The threshold is set at major renovations. A clause is added to limit accessibility expenses to 20 percent of the overall cost.

The proposed language change to 3411.8 is intended to make a more specific reference to the section on historic buildings already present in the code. This modification should add clarity and address some of the committee's concern regarding language.

The ICC is responsible for establishing what the minimum level of safety is for new and existing buildings. The codes contain requirements for access for the disabled and egress for everyone when it has to do with new buildings. But when the issue is about existing buildings, the code seems lacking is concern for the safety of those in the disabled community. With over 20 years of the ADA and many more years of accessibility provision in the legacy codes, it is now time to include at least some language regarding accessible means of egress for existing buildings to address that segment of the population. To do otherwise is to ignore the life safety of an entire group of the public as well as employees.

G237-12

Final Action: AS AM AMPC____ D

G240-12
3411.7.1 (New) [IEBC [B] 410.7.1 (New)]

<u>Proposed Change as Submitted</u>

Proponent: Gene Boecker, AIA, Code Consultants, Inc., representing self

THIS PROPOSAL IS ON THE AGENDA OF THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC MEANS OF EGRESS CODE DEVELOPMENT COMMITTEE.

Add new text as follows:

3411.7 (IEBC [B] 410.7) Alterations affecting an area containing a primary function. Where an alteration affects the accessibility to, or contains an area of primary function, the route to the primary function area shall be accessible. The accessible route to the primary function area shall include toilet facilities or drinking fountains serving the area of primary function.

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function.
2. This provision does not apply to alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to alterations undertaken for the primary purpose of increasing the accessibility of an existing building, facility or element.
5. This provision does not apply to altered areas limited to Type B dwelling and sleeping units.

<u>**3411.7.1 (IEBC [B] 410.7.1) Priorities.** In choosing which accessible elements to provide, subject to exception #1 above, priority should be given to those elements that will provide the greatest access, in the following order:</u>

1. <u>An accessible entrance;</u>
2. <u>An accessible route to the altered area;</u>
3. <u>At least one accessible restroom for each sex or a single unisex restroom;</u>
4. <u>Accessible telephones;</u>
5. <u>Accessible drinking fountains; and</u>
6. <u>When possible, additional accessible elements such as parking, storage, and alarms.</u>

Reason: The recent adoption of the 2010 ADA Standards for Accessible Design includes the list of priorities noted in the proposal where disproportionate cost is an issue (Subpart D of 28 CFR Section 36.403(g)(2)). Disproportionate cost is what is described in exception #1 for all of the main sections noted above.

This proposal is to coordinate with the Federal Standard. It makes sense to provide this information to the Design Professional to help in prioritizing efforts and helps the Code Official in reviewing and inspecting to verify that the most important elements are provided.

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

Staff Note: A correlative change was proposed to IEBC Section 705.2 to add a new section 705.2.1.

3411.7.1-G-Boecker.doc

Public Hearing Results

This code change was heard by the IBC Means of Egress code development committee.

Committee Action: Approved as Modified

Modify proposal as follows:

3411.7.1 (IEBC [B] 410.7.1) Priorities. In choosing which accessible elements to provide, subject to Exception #1 ~~above~~ <u>of Section 3411.7</u>, priority should be given to those elements that will provide the greatest access, in the following order:

1. An accessible entrance;
2. An accessible route to the altered area;
3. At least one accessible restroom for each sex or a single unisex restroom;
4. Accessible telephones;
5. Accessible drinking fountains; and
6. When possible, additional accessible elements such as parking, storage, and alarms.

Committee Reason: The modification was to clarify the specific section referenced. The proposed language matches guidance language from the Department of Justice regulations for Title II and Title III that is difficult to find in their document. While the committee felt the guidance was needed for code officials and designers, it may be necessary to strengthen that this is guidance language, not mandatory language. There is a concern that it needs to be made clearer that this list would be elements tied to the area being altered, not the entire building. The order of the list is also a concern. For example: should the accessible parking not be associated with the accessible entrance as the main way of accessing a building?

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Clare Ray Allshouse AIA, CBO, City of Shoreline, WA representing Washington Association of Building Officials Technical Code Development Committee; Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee; requests Disapproval.

Commenter's Reason (Allshouse): The Committee's reason for approval of G240 as modified reads as though they had disapproved it as not yet ready for inclusion in the code. It is therefore proposed that the approval be overturned based on the later portion of the same reason statement provided by the Committee. Namely, "While the committee felt the guidance was needed for code officials and designers, it may be necessary to strengthen that this is guidance language, not mandatory language. There is a concern that it needs to be made clearer that this list would be elements tied to the area being altered, not the entire building. The order of the list is also a concern. For example: should the accessible parking not be associated with the accessible entrance as the main way of accessing a building?" Furthermore, we submit that the proposal reads like commentary rather than code language.

Commenter's Reason (Baldassarra) : The Department of Justice has this list as recommendations only. It is definitely not intended to be a mandatory priority list. There are many times where the cost of the project, or the effects of the alterations would have influence on what would be the most effective use of resources. As a recommendation, this language belongs in the commentary and not in building code text. Non-mandatory language does not belong in codes. Interpretation and enforcement would not be consistent between jurisdictions

In addition, the order of the list is not always logical. What is the logic for parking and fire alarms to be behind telephones?

The existing commentary addresses this issue and expands to clarify the intent of these provisions as guidance that depends on the facility being altered.

G240-12

Final Action: AS AM AMPC____ D

G244-12
3412 (IEBC [B] Chapter 14)

Proposed Change as Submitted

Proponent: David S. Collins, The Preview Group, Inc., representing the American Institute of Architects (dcollins@preview-group.com); Michael A. Crowley, P.E., FSFPE, RJA Group (mcrowley@rjagroup.com)

Revise as follows:

3412.2 (IFC [B] 1401.2) Applicability. Structures existing prior to [DATE TO BE INSERTED BY THE JURISDICTION. NOTE: IT IS RECOMMENDED THAT THIS DATE COINCIDE WITH THE EFFECTIVE DATE OF BUILDING CODES WITHIN THE JURISDICTION], in which there is work involving *additions*, *alterations* or changes of occupancy shall be made to comply with the requirements of this section or the provisions of Sections 3403 through 3409. The provisions in Sections 3412.2.1 through 3412.2.5 shall apply to existing occupancies that will continue to be, or are proposed to be, in Groups A, B, E, F, I-2, M, R, S and U. These provisions shall not apply to buildings with occupancies in Group H or ~~I.~~ I-1, I-3 or I-4.

3412.6 (IFC [B] 1401.6) Evaluation process. The evaluation process specified herein shall be followed in its entirety to evaluate existing buildings in Groups A, B, E, F, M, R, S and U. For existing buildings in Group I-2, the evaluation process specified herein shall be followed and applied to each and every individual smoke compartment. Table 3412.7 shall be utilized for tabulating the results of the evaluation. References to other sections of this code indicate that compliance with those sections is required in order to gain credit in the evaluation herein outlined. In applying this section to a building with mixed occupancies, where the separation between the mixed occupancies does not qualify for any category indicated in Section 3412.6.16, the score for each occupancy shall be determined and the lower score determined for each section of the evaluation process shall apply to the entire building, or to each smoke compartment for Group I-2 occupancies.

Where the separation between mixed occupancies qualifies for any category indicated in Section 3412.6.16, the score for each occupancy shall apply to each portion, or smoke compartment of the building based on the occupancy of the space.

3412.6.2 (IFC [B] 1401.6.2) Building area. The value for building area shall be determined by the formula in Section 3412.6.2.2. Section 503 and the formula in Section 3412.6.2.1 shall be used to determine the allowable area of the building. This shall include any allowable increases due to frontage and automatic sprinklers as provided for in Section 506. Subtract the actual *building area* in square feet from the allowable area and divide by 1,200 square feet. Enter the area value and its sign (positive or negative) in Table 3412.7 under Safety Parameter 3412.6.2, Building Area, for fire safety, means of egress and general safety. In determining the area value, the maximum permitted positive value for area is 50 percent of the fire safety score as *listed* in Table 3412.8, Mandatory Safety Scores. Group I-2 occupancies shall be scored zero.

3412.6.4 (IFC [B] 1401.6.4) Tenant and dwelling unit separations. Evaluate the *fire-resistance rating* of floors and walls separating tenants, including *dwelling units*, and not evaluated under Sections 3412.6.3 and 3412.6.5. Group I-2 occupancies shall evaluate the rating of the separations between patient sleeping rooms.

Under the categories and occupancies in Table 3412.6.4, determine the appropriate value and enter that value in Table 3412.7 under Safety Parameter 3412.6.4, Tenant and Dwelling Unit Separations, for fire safety, means of egress and general safety.

TABLE 3412.6.4 (IFC [B] TABLE 1401.6.4)
SEPARATION VALUES

OCCUPANCY	CATEGORIES				
	a	**b**	**c**	**d**	**e**
A-1	0	0	0	0	1
I-2	0	1	2	3	4

(Portions of table not shown remain unchanged)

3412.6.5 (IFC [B] 1401.6.5) Corridor walls. Evaluate the *fire-resistance rating* and degree of completeness of walls which create *corridors* serving the floor, and constructed in accordance with Section 1018. This evaluation shall not include the wall elements considered under Sections 3412.6.3 and 3412.6.4. Under the categories and groups in Table 3412.6.5, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.5, Corridor Walls, for fire safety, means of egress and general safety.

TABLE 3412.6.5 (IFC [B] TABLE 1401.6.5)
CORRIDOR WALL VALUES

OCCUPANCY	CATEGORIES			
	a	**b**	**c**[a]	**d**[a]
A-1	-10	-4	0	2
I-2	-10	0	1	2

(Portions of table not shown remain unchanged)

3412.6.7 (IFC [B] 1401.6.7) HVAC systems. Evaluate the ability of the HVAC system to resist the movement of smoke and fire beyond the point of origin. Under the categories in Section 3412.6.7.1, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.7, HVAC Systems, for fire safety, means of egress and general safety. Facilities in Group I-2 occupancies meeting Categories a, b or c shall be considered to fail the evaluation.

3412.6.8 (IFC [B] 1401.6.8) Automatic fire detection. Evaluate the smoke detection capability based on the location and operation of *automatic fire detectors* in accordance with Section 907 and the *International Mechanical Code*. Under the categories and occupancies in Table 3412.6.8, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.8, Automatic Fire Detection, for fire safety, means of egress and general safety. Facilities in Group I-2 occupancies meeting Categories a, b or c shall be considered to fail the evaluation.

TABLE 3412.6.8 (IFC [B] TABLE 1401.6.8)
AUTOMATIC FIRE DETECTION VALUES

OCCUPANCY	CATEGORIES					
	a	**b**	**c**	**d**	**e**	**f**
A-1, A-3, F, M, R, S-1	-10	-5	0	2	6	-
A-2	-25	-5	0	5	9	-
A-4,B,E,S-2	-4	-2	0	4	8	-
I-2	NP	NP	0	4	5	2

3412.6.8.1 (IFC [B] 1401.6.8.1) Categories. The categories for automatic fire detection are:

1. Category a—None.
2. Category b—Existing *smoke detectors* in HVAC systems and maintained in accordance with the *International Fire Code*.
3. Category c—*Smoke detectors* in HVAC systems. The detectors are installed in accordance with the requirements for new buildings in the *International Mechanical Code*.
4. Category d—*Smoke detectors* throughout all floor areas other than individual *sleeping units*, tenant spaces and *dwelling units*.
5. Category e—*Smoke detectors* installed throughout the floor area.

6. Category f – Smoke detectors in corridors only.

3412.6.9 (IFC [B] 1401.6.9) Fire alarm systems. Evaluate the capability of the *fire alarm system* in accordance with Section 907. Under the categories and occupancies in Table 3412.6.9, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.9, Fire Alarm Systems, for fire safety, means of egress and general safety.

TABLE 3412.6.9 (IFC [B] TABLE 1401.6.9)
FIRE ALARM SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a	b[a]	c	d
A-1, A-2, A-3, A-4, B, E, R	-10	-5	0	5
F, M, S	0	5	10	15
I-2	-4	1	2	5

a. For buildings equipped throughout with an automatic sprinkler system, add 2 points for activation by a sprinkler water flow device.

3412.6.10 (IFC [B] 1401.6.10) Smoke control. Evaluate the ability of a natural or mechanical venting, exhaust or pressurization system to control the movement of smoke from a fire. Under the categories and occupancies in Table 3412.6.10, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.10, Smoke Control, for means of egress and general safety.

TABLE 3412.6.10 (IFC [B] TABLE 1401.6.10)
SMOKE CONTROL VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-2, A-3	0	1	2	3	6	6
A-4, E	0	0	0	1	3	5
B, M, R	0	2(a)	3(a)	3(a)	3(a)	4(a)
F, S	0	2(a)	2(a)	3(a)	3(a)	3(a)
I-2	-4	0	0	0	3	0

a. This value shall be 0 if compliance with Category d or e in Section 3412.6.8.1 has not been obtained.

3412.6.11 (IFC [B] 1401.6.11) Means of egress capacity and number. Evaluate the *means of egress* capacity and the number of exits available to the building occupants. In applying this section, the *means of egress* are required to conform to the following sections of this code: 1003.7, 1004, 1005, 1014.2, 1014.3, 1015.2, 1021, 1024.1, 1027.2, 1027.5, 1028.2, 1028.3, 1028.4 and 1029. The number of exits credited is the number that is available to each occupant of the area being evaluated. Existing fire escapes shall be accepted as a component in the *means of egress* when conforming to Section 3406.

Under the categories and occupancies in Table 3412.6.11, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.11, Means of Egress Capacity, for means of egress and general safety.

TABLE 3412.6.11 (IFC [B] TABLE 1401.6.11)
MEANS OF EGRESS VALUES

OCCUPANCY	CATEGORIES				
	a[a]	b	c	d	e
A-1, A-2, A-3, A-4, E	-10	0	2	8	10
M	-3	0	1	2	4
B, F, S	-1	0	0	0	0
R	-3	0	0	0	0
I-2	-10	0	2	8	10

a. The values indicated are for buildings six stories or less in height. For buildings over six stories above grade plane, add an additional -10 points.

3412.6.12 (IFC [B] 1401.6.12) Dead ends. In spaces required to be served by more than one *means of egress*, evaluate the length of the *exit* access travel path in which the building occupants are confined to a single path of travel. Under the categories and occupancies in Table 3412.6.12, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.12, Dead Ends, for means of egress and general safety.

TABLE 3412.6.12 (IFC [B] TABLE 1401.6.12)
DEAD-END VALUES

OCCUPANCY	CATEGORIES			
	a	**b**	**c**	**d**
A-1, A-3, A-4, B, E, F, M, R, S	-2	0	2	-
A-2, E	-2	0	2	-
I-2	-2	0	2	-6

a. For dead-end distances between categories, the dead-end value shall be obtained by linear interpolation.

3412.6.12.1 (IFC [B] 1401.6.12.1) Categories. The categories for dead ends are:

1. Category a—Dead end of 35 feet (10 670 mm) in nonsprinklered buildings or 70 feet (21 340 mm) in sprinklered buildings.
2. Category b—Dead end of 20 feet (6096 mm); or 50 feet (15 240 mm) in Group B in accordance with Section 1018.4, exception 2.
3. Category c—No dead ends; or ratio of length to width (l/w) is less than 2.5:1.
4. Category d – Dead ends exceeding Category a.

3412.6.16 (IFC [B] 1401.6.16) Mixed occupancies. Where a building has two or more occupancies that are not in the same occupancy classification, the separation between the mixed occupancies shall be evaluated in accordance with this section. Where there is no separation between the mixed occupancies or the separation between mixed occupancies does not qualify for any of the categories indicated in Section 3412.6.16.1, the building shall be evaluated as indicated in Section 3412.6 and the value for mixed occupancies shall be zero. Under the categories and occupancies in Table 3412.6.16, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.16, Mixed Occupancies, for fire safety and general safety. For buildings without mixed occupancies, the value shall be zero.

3412.6.16.1 (IFC [B] 1401.6.16.1) Categories. The categories for mixed occupancies are:

1. Category a—Occupancies separated by minimum 1-hour *fire barriers* or minimum 1-hour *horizontal assemblies*, or both.
2. Category b—Separations between occupancies in accordance with Section 508.4.
3. Category c—Separations between occupancies having a *fire-resistance rating* of not less than twice that required by Section 508.4.4.

TABLE 3412.6.16 (IFC [B] TABLE 1401.6.16)
MIXED OCCUPANCY VALUES[a]

OCCUPANCY	CATEGORIES		
	a	**b**	**c**
A-1, A-2, R	-10	0	10
A-3, A-4, B, E, F, M, S	-5	0	5
I-2	NP	0	5

a. For fire-resistance ratings between categories, the value shall be obtained by linear interpolation.

3412.6.17 (IFC [B] 1401.6.17) Automatic sprinklers. Evaluate the ability to suppress a fire based on the installation of an *automatic sprinkler system* in accordance with Section 903.3.1.1. “Required sprinklers” shall be based on the requirements of this code. Under the categories and occupancies in Table 3412.6.17, determine the appropriate value and enter that value into Table 3412.7 under Safety

Parameter 3412.6.17, Automatic Sprinklers, for fire safety, means of egress divided by 2 and general safety.

TABLE 3412.6.17 (IFC [B] TABLE 1401.6.17)
SPRINKLER SYSTEM VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-3, F, M, R, S-1	-6	-3	0	2	4	6
A-2	-4	-2	0	1	2	4
A-4, B, E, S-2	-12	-6	0	3	6	12
I-2	NP	NP	NP	8	10	NA

NP not permitted
NA not applicable

3412.6.18 (IFC [B] 1401.6.18) Standpipes. Evaluate the ability to initiate attack on a fire by making a supply of water available readily through the installation of standpipes in accordance with Section 905. Required standpipes shall be based on the requirements of this code. Under the categories and occupancies in Table 3412.6.18, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.18, Standpipes, for fire safety, means of egress and general safety.

TABLE 3412.6.18 (IFC [B] TABLE 1401.6.18)
STANDPIPE SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a[a]	b	c	d
A-1, A-3, F, M, R, S-1	-6	0	4	6
A-2	-4	0	2	4
A-4, B, E, S-2	-12	0	6	12
I-2	-2	0	1	2

a. This option cannot be taken if Category a or b in Section 3412.6.17 is used.

3412.6.20 (IFC [B] 1401.6.20) Smoke Compartmentation. Evaluate the smoke compartments for compliance with Section 417.5. Using Table 3412.6.20, determine the appropriate smoke compartmentation value (*SCV*) and enter that value into Table 3412.7 under Safety Parameter 3412.6.20, Smoke Compartmentation, for fire safety, means of egress and general safety.

TABLE 3412.6.20 (IFC [B] TABLE 1401.6.20)
SMOKE COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES[a]		
	a Compartment size equal to or less than 22,500 square feet	b Compartment size greater than 22,500 square feet	c No smoke Compartment
A, B, E, F, M, R and S	0	0	0
I-2	0	NP	NP

For SI: 1 square foot = 0.093 m^2.
a. For areas between categories, the smoke compartmentation value shall be obtained by linear interpolation.

3412.6.21 (IFC [B] 1401.6.21) Patient ability, concentration, smoke compartment location and ratio to attendant. In I-2 occupancies, the ability of patients, their concentration and ratio to attendants shall be evaluated and applied per this section. Evaluate each smoke compartment using the categories in Sections 3412.6.21.1, 3412.6.21.2 and 3412.6.21.3 and enter the value in Table 3412.8. To determine the safety factor, multiply the three values together, if the sum is 9 or greater, compliance has failed.

3412.6.21.1 (IFC [B] 1401.6.21.1) Patient ability for self-preservation. Evaluate the ability of the patients for self-preservation in each smoke compartment in an emergency. Under the categories and occupancies in Table 3412.6.21.1 determine the appropriate value and enter that value in Table 3412.7

under Safety Parameter 3412.6.21.1, Patient Ability for Self-Preservation, for means of egress and general safety.

3412.6.21.1.1 (IFC [B] 1401.6.21.1.1) Categories: The categories for patient ability for self-preservation are:

1. Category a – (mobile) Patients are capable of self preservation without assistance.
3. Category c – (not mobile) Patients rely on assistance for evacuation or relocation.
4. Category d – (not movable) Patients cannot be evacuated or relocated

TABLE 3412.6.21.1 (IFC [B] TABLE 1401.6.21.1)
PATIENT ABILITY VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	1	2	3

3412.6.21.2 (IFC [B] 1401.6.21.2) Patient Concentration. Evaluate the concentration of patients in each smoke compartment under Section 3412.6.21.2. Under the categories and occupancies in Table 3412.6.21.2 determine the appropriate value and enter that value in Table 3412.7 under Safety Parameter 3412.6.21.2, Patient Concentration, for means of egress and general safety.

3412.6.21.2.1 (IFC [B] 1401.6.21.2.1) Categories: The categories for patient concentration are:

1. Category a – smoke compartment has 1 to 10 patients.
2. Category b – smoke compartment has more than 10 to 40 patients
3. Category d – smoke compartment has greater than 40 patients

TABLE 3412.6.21.2 (IFC [B] TABLE 1401.6.21.2)
PATIENT CONCENTRATION VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	1	2	3

3412.6.21.3 (IFC [B] 1401.6.21.3) Attendant-to-Patient Ratio. Evaluate the attendant-to-patient ratio for each compartment under Section 3412.6.21.3. Under the categories and occupancies in Table 3412.6.21.3 determine the appropriate value and enter that value in Table 3412.7 under Safety Parameter 3412.6.21.3, Attendant-to-Patient Ratio, for means of egress and general safety.

3412.6.21.3.1 (IFC [B] 1401.6.21.3.1) Categories: The categories for attendant-to-patient concentrations are:

1. Category a – attendant-to-patient concentrations is 1:5.
3. Category b – attendant-to-patient concentrations is 1:6 to 1:10.
4. Category c – attendant-to-patient concentrations is greater than 1:10 or no patients

TABLE 3412.6.21.3 (IFC [B] 1401.6.21.3)
ATTENDANT-TO-PATIENT RATIO VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	1	2	3

TABLE 3412.7 (IFC [B] 1401.7)
SUMMARY SHEET – BUILDING CODE

Existing occupancy		____________________________________
Proposed occupancy		____________________________________
Year building was constructed		____________________________________
Number of stories		____________________________________
Height in feet		____________________________________
Type of construction		____________________________________
Area per floor		____________________________________
Percentage of open perimeter increase		___________%
Completely suppressed:		Yes________ No ______
Type		____________________________________
Corridor wall rating		____________________________________
Compartmentation:		Yes________ No ______
Required door closers:		Yes________ No ______
Fire-resistance rating of vertical opening enclosures		____________________________________
Type of HVAC system:		____________________________________
Serving number of floors		__________________
Automatic fire detection:		Yes________ No ______
Type and location		____
Fire alarm system:		Yes________ No ______
Type		____
Smoke control:		Yes________ No ______
Type		____
Adequate exit routes:		Yes________ No ______
Dead ends:		Yes________ No ______
Maximum exit access travel distance		______________________
Elevator controls:		Yes________ No ______
Means of egress emergency lighting:		Yes________ No ______
Mixed occupancies:		Yes________ No ______
Standpipes:		Yes________ No ______
Incidental Use:		Yes________ No ______
Smoke Compartmentation less than 22,500		Yes________No______
Patient Ability for Self-preservation:		______________________
Patient Concentration:		______________________
Attendant-to-Patient Ratio:		______________________

3412.8 (IFC [B] 1401.8) Safety scores. The values in Table 3412.8 are the required mandatory safety scores for the evaluation process listed in Section 3412.6.

TABLE 3412.8 (IFC [B] 1401.8)
MANDATORY SAFETY SCORES[a]

OCCUPANCY	FIRE SAFETY (MFS)	MEANS OF EGRESS (MME)	GENERAL SAFETY (MGS)
I-2	19	34	34

a.
MFS = Mandatory Fire Safety;
MME = Mandatory Means of Egress;
MGS = Mandatory General Safety.

(Portions of table not shown remain unchanged)

Reason: When initially developed, Chapter 34 did not include provisions for I-2 or H occupancies. The rationale was that the life safety system developed by NFPA was adequate for those I-2 occupancies and H occupancies were not likely to be a part of a building renovation, nor were the drafters of the original code change comfortable with development of values for an H occupancy.

Recently, ICC and ASHE have begun working together to develop changes to the IBC to remove some of the conflicts that exist between the I-Codes and the licensing and funding standards used for hospitals. Part of that effort included discussion of the process for evaluation of an existing I-2. A small group of volunteers has developed this code change to incorporate I-2 into Chapter 34's compliance alternatives.

The ongoing issue is how to identify the appropriate levels of performance and how to integrate the criteria in in Chapter 34. The following is an approach identified by the volunteers demonstrating how this can best be achieved. The original Chapter 34 used "risk factors" as an element of the analysis. Chapter 34 was developed using risk factors that formed the basis for development of the BOCA building code and the criteria in NYC Local Law 5 for high-rise business occupancies. Other occupancies were extrapolated using those numbers.

When the IBC was developed a "zero based" revision was undertaken to establish compliance as a zero in all categories of compliance in Chapter 34's compliance alternatives. Values have been inserted into the categories where Chapter 34 is silent. Additional text has been developed to describe how these categories will be satisfied and some categories have been added to address specific elements of an existing I-2 occupancy which should play a role in achieving compliance.

Because the building is an existing I-2, elements that would not be known in a new building such as the ability of the patients or the number of persons providing care are documented as part of the ongoing licensing for these facilities. (WHAT DO WE DO ABOUT CHANGE OF OCCUPANCY?)

Evaluations were performed on several existing buildings to determine the appropriateness of the scoring. Areas of evaluation which would be untenable for typical patients and other persons in an I-2 occupancy were found and successful changes to upgrade the facility were identified, although not all would pass.

Cost Impact: The increased utility of Chapter 34 to address an I-2 occupancy will significantly reduce the cost of design and review.

3412.2-G-COLLINS-CROWLEY.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposal was approved as it provides another option for evaluation of Group I-2 occupancies in existing buildings. It should be noted that in Sections 3412.6.16, 3412.6.17 and 3412.6.20 it was suggested that verbiage related to the buildings that fall in a "NP" category should be noted as failing as is done in 3412.6.8.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David S. Collins, FAIA, The Preview Group, Inc., representing The American Institute of Architects, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 3412.6.8
AUTOMATIC FIRE DETECTION VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-3, F, M, R, S-1	-10	-5	0	2	6	-
A-2	-25	-5	0	5	9	-
A-4,B,E,S-2	-4	-2	0	4	8	-
I-2	NP	NP	~~0~~ NP	4	5	2

TABLE 3412.6.12
DEAD-END VALUES

OCCUPANCY	CATEGORIES			
	a	b	c	d
A-1, A-3, A-4, B, E, F, M, R, S	-2	0	2	- -4
A-2, E	-2	0	2	- -4
I-2	-2	0	2	-6

3412.6.16 Mixed occupancies. Where a building has two or more occupancies that are not in the same occupancy classification, the separation between the mixed occupancies shall be evaluated in accordance with this section. Where there is no separation between the mixed occupancies or the separation between mixed occupancies does not qualify for any of the categories indicated in Section 3412.6.16.1, the building shall be evaluated as indicated in Section 3412.6 and the value for mixed occupancies shall be zero. Under the categories and occupancies in Table 3412.6.16, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.16, Mixed Occupancies, for fire safety and general safety. For buildings without mixed occupancies, the value shall be zero. Facilities in Group I-2 occupancies meeting Categories a shall be considered to fail the evaluation.

3412.6.17 Automatic sprinklers. Evaluate the ability to suppress a fire based on the installation of an automatic sprinkler system in accordance with Section 903.3.1.1. “Required sprinklers” shall be based on the requirements of this code. Under the categories and occupancies in Table 3412.6.17, determine the appropriate value and enter that value into Table 3412.7 under Safety Parameter 3412.6.17, Automatic Sprinklers, for fire safety, means of egress divided by 2 and general safety. Facilities in Group I-2 occupancies meeting Categories a, b, c, or f shall be considered to fail the evaluation.

TABLE 3412.6.17
SPRINKLER SYSTEM VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-3, F, M, R, S-1	-6	-3	0	2	4	6
A-2	-4	-2	0	1	2	4
A-4, B, E, S-2	-12	-6	0	3	6	12
I-2	NP	NP	NP	8	10	~~NA~~ NP

NP not permitted
~~NA not applicable~~

3412.6.20 Smoke Compartmentation. Evaluate the smoke compartments for compliance with Section 417.5. Using Table 3412.6.20, determine the appropriate smoke compartmentation value (*SCV*) and enter that value into Table 3412.7 under Safety Parameter 3412.6.20, Smoke Compartmentation, for fire safety, means of egress and general safety. Facilities in Group I-2 occupancies meeting Categories b or c shall be considered to fail the evaluation.

(Portions of proposal not shown remain unchanged)

Reason: During the hearing committee members pointed out that there were some inconsistencies in the way the provisions were incorporated into the code when something was shown as not permitted. This comment clarifies that where the tables indicate that an I-2 is not permitted to use that category, if the building is found to be in that category the building has failed the evaluation.

In Table 3412.6.12, a new line was created to address dead ends beyond the 35 and 70 foot limits for I-2, but similar provisions for the other occupancies were not included. This comment adds negative points for those occupancies based on a relative risk of -4 points.

There are no changes to the other tables shown, they are simply included to show how the text relates to the provisions in them.

G244-12

Final Action: AS AM AMPC____ D

G254-12
Appendix N (New)

Proposed Change as Submitted

Proponent: Barry Greive, Target Corporation (barry.greive@Target.com)

Add new text as follows:

APPENDIX N
REPLICABLE BUILDINGS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION N101
GENERAL

N101.1 Scope. The purpose of this appendix shall establish the minimum requirements for a replicable building review and approval process.

N101.2 Design. Buildings and facilities shall be designed and constructed in accordance with all applicable provisions of this code and referenced standards.

SECTION N102
DEFINITIONS

N102.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein.

QUALIFIED AGENCY. A qualified individual, company, or jurisdiction approved by the code official.

REPLICABLE BUILDINGS. A building whose construction plans have been reviewed and deemed code compliant by an *approved* designated third party.

REPLICABLE BUILDING DESIGN. A proposed design, whether it be a new building or remodel, that is based on a given prototype to be built it in a variety of locations but that maintains consistent overall design parameters.

SECTION N103
SCOPING REQUIREMENTS

N103.1. General Design Requirements. A *replicable building* shall be based on a prototype design and several building elements that must be considered.

1. The building shall have the same use, occupancy, construction type, fire resistance, fire protection system, means of egress, and accessibility regardless of location.
2. The building form shall be consistent height and square footage with variations complying with Section N103.2
3. The building shall incorporate the same general *approved* structural design and address various regional conditions such as wind, hurricane, snow, and seismic loads.
4. The building shall have consistent basic mechanical, electrical and plumbing systems.

5. The building shall include *approved* options for various exterior of finish materials, veneers and details based on regional architectural styles. Changes to the façade shall have no impact on the operation, function or life safety requirement of the building.
6. Where the interior décor is different, the same materials, or materials of the same Class in accordance with their flame spread and smoke-developed indexes shall be used.
7. The building plans shall be reviewed and *approved* within the context of the site and other applicable, locally adopted development regulations and standards.

N103.2 Allowable Variations to the Replicable Design. The following are allowable variations to a *replicable building design*.

1. Reductions to the design height or square footage that have no impact on egress requirements.
2. Increases of no more than 5 percent to the design height or square footage to accommodate local requirements such as planning/zoning, development agreements and design image issues.
3. Modifications to the building envelope and mechanical, electrical and plumbing systems to accommodate local conditions and requirements, such as energy efficiency, ventilation, climate and local codes.

SECTION N104
REPLICABLE BUILDING REVIEW

N104.1 General. *Replicable buildings* shall be-reviewed by an approved third party agency or-the local jurisdiction.

N104.2. Qualified Agency Requirements. When using a third party agency or other qualified individuals the desired level of expertise provided for the review shall be approved by the code official and in accordance with one or more of the following.

1. Any *qualified agency* involved in the review shall be certified by *International Code Council* or equivalent organization for every code discipline reviewed.
2. Acceptable professional individuals, including but not limited to registered engineers or licensed architects shall have a minimum number of years of experience as determined by the jurisdiction.
3. A peer review process shall be in place requiring a registered design professional or certified building official to provide oversight of the final replicable review.
4. A uniform checklist similar to the ICC plan review records shall be used to maintain consistency in the review process.

Reason: August 2010 the International Code Council published a document titled the "IGG G1-2010 Guideline for Replicable Buildings". The intent of this guideline is to give jurisdictions a tool that they could adopt to help streamline their document review process to ensure code compliance. This code change proposal adds it to an Appendix chapter so jurisdictions have an easy way of adding this concept into their building code adoption process. The intent is to streamline the plan review process at the local level allowing the plan reviewer to focus on any state and local amendments to the International Family of Codes.

Bibliography: ICC G1 – 2010 Guideline for Replicable Buildings

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

APPENDIX N (NEW)-G-GRIEVE

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved with concerns related to the potential level of variations potentially taking away the prototypical intent of the buildings. There was also a concern that many small communities would not have a list of approved agencies and some states do not have state building codes. It was suggested that such provisions may be better suited for an appendix and perhaps this is more a planning department issue than building department.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Barry Greive, Target Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

N103.2 Allowable Variations to the Replicable Design. The following are allowable variations to a *replicable building design*.

~~1. Reductions to the design height or square footage that have no impact on egress requirements.~~
1.~~2.~~ Increases of no more than 5 percent to the design height or square footage to accommodate local requirements such as planning/zoning, development agreements and design image issues.
2.~~3.~~ Modifications to the building envelope and mechanical, electrical and plumbing systems to accommodate local conditions and requirements, such as energy efficiency, ventilation, climate and local codes.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: During the Committee Hearings there were two similar proposals heard, G254 and G255, these proposals brought forth a document to be inserted as a new appendix chapter, this document is published by the International Code Council and titled the "ICC G1–2010 Guideline for Replicable Buildings".

The development of this Guideline was a collaborative effort, with representation from Building Officials representing large and small jurisdictions from across the country, ICC representatives, and at least 5 different stakeholders who are end users of the code and utilize the "proto-type concept".

The two proposals were heard concurrently with G254 heard first; this proposal took a condensed approach to converting the Guideline, while G255 was more comprehensive. The Committee noted that G255 was more detailed, and subsequently disapproved G254 on the basis that G255 would be heard in more detail. . Both proposals in the end were disapproved.

The Committee's main concern was over the variations allowed within the proposals, the one subjective item that would have given the owner/designer some latitude has been removed by this public comment, the other two items in N103.2 remain to address any locally required minor changes. This public comment addresses the committee's concerns regarding any variations. One concern was that small communities may not have a list of approved agencies to do the initial prototype plan review. There are many nationally known consulting firms that could do the review as well as the ICC or a state agency. Given the internet as a viability tool this information is readily available with a simple search.

Another item that was brought forth was that in many cases delays in permitting are caused by the planning departments and that having timely plan approval is not a building department issue thus this is not needed. While that issue may be the case in some jurisdictions, it is not for all. This proposal is to establish an appendix chapter; in most situations this would need to be adopted separately to become an enforceable code. This is a great addition to the code for communities that already have a concept such as this, or for a community thinking of drafting similar local ordinance.

Public Comment 2:

Eirene Oliphant, MCP, BRR Architecture, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

APPENDIX N
REPLICABLE BUILDINGS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION N101
GENERAL

N101.1 Scope. The purpose of this appendix shall establish the minimum requirements for a replicable building review and approval process.

N101.2 Design. Buildings and facilities shall be designed and constructed in accordance with all applicable provisions of this code and referenced standards.

SECTION N102
DEFINITIONS

N102.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein.

QUALIFIED AGENCY. A qualified individual~~, company, or jurisdiction~~ or organization approved by the code official.

REPLICABLE BUILDINGS. A building ~~whose construction plans have been reviewed and deemed code compliant by an *approved* designated third party~~ utilizing a *replicable design*.

REPLICABLE ~~BUILDING~~ DESIGN. A proposed design, whether it be a new building or remodel, that is based on a given prototype to be built it in a variety of locations but that maintains consistent overall design parameters.

SECTION N103
SCOPING REQUIREMENTS

N103.1 General Design Requirements. ~~A *replicable building* shall be based on a prototype design and several building elements that must be considered.~~ Replicable buildings shall follow the provisions established in ICC G1, Guideline for Replicable Buildings.

1. ~~The building shall have the same use, occupancy, construction type, fire resistance, fire protection system, means of egress, and accessibility regardless of location.~~
2. ~~The building form shall be consistent height and square footage with variations complying with Section N103.2~~
3. ~~The building shall incorporate the same general *approved* structural design and address various regional conditions such as wind, hurricane, snow, and seismic loads.~~
4. ~~The building shall have consistent basic mechanical, electrical and plumbing systems.~~
5. ~~The building shall include *approved* options for various exterior of finish materials, veneers and details based on regional architectural styles. Changes to the façade shall have no impact on the operation, function or life safety requirement of the building.~~
6. ~~Where the interior décor is different, the same materials, or materials of the same Class in accordance with their flame spread and smoke-developed indexes shall be used.~~
7. ~~The building plans shall be reviewed and *approved* within the context of the site and other applicable, locally adopted development regulations and standards.~~

~~**N103.2 Allowable Variations to the Replicable Design.** The following are allowable variations to a *replicable building design*.~~

1. ~~Reductions to the design height or square footage that have no impact on egress requirements.~~
2. ~~Increases of no more than 5 percent to the design height or square footage to accommodate local requirements such as planning/zoning, development agreements and design image issues.~~
3. ~~Modifications to the building envelope and mechanical, electrical and plumbing systems to accommodate local conditions and requirements, such as energy efficiency, ventilation, climate and local codes.~~

~~**SECTION N104**~~
~~**REPLICABLE BUILDING REVIEW**~~

~~**N104.1 General.** *Replicable buildings* shall be reviewed by an approved third party agency or the local jurisdiction.~~

~~**N104.2. Qualified Agency Requirements.** When using a third party agency or other qualified individuals the desired level of expertise provided for the review shall be approved by the code official and in accordance with one or more of the following.~~

1. ~~Any *qualified agency* involved in the review shall be certified by *International Code Council* or equivalent organization for every code discipline reviewed.~~
2. ~~Acceptable professional individuals, including but not limited to registered engineers or licensed architects shall have a minimum number of years of experience as determined by the jurisdiction.~~
3. ~~A peer review process shall be in place requiring a registered design professional or certified building official to provide oversight of the final replicable review.~~
4. ~~A uniform checklist similar to the ICC plan review records shall be used to maintain consistency in the review process.~~

Commenter's Reason: The committee had several arguments for disapproving this code change. One of the reasons was that the committee felt that the matter of replicable buildings was more of a planning department issue than building department. While this may be true in many jurisdictions as the planning department will have concerns with aesthetics of the building, as far as building codes issues, prototypes are not going to vary greatly from jurisdiction to jurisdiction as the building code will vary strictly on local amendments.

It was also suggested that the provisions be better suited for an appendix. The proposed code change was to be in the appendix, not in any other location.

Another concern was that many small communities would not have a list of approved agencies and some states do not have state building codes. The proposed code change does not suggest that a jurisdiction develop a list of approved agencies but rather that the agency be approved by the code official. The code official already has the authority to determine what an "approved agency" is with regards to special inspections. Why should a "qualified agency" be any different? It would be up to the agency to prove to the code official they have the qualifications to perform the review just like it's up to the third party agency to prove their qualifications when it comes to special inspections.

The final concern expressed by the committee was the potential level of variations to the replicable design was potentially taking away from the prototypical intent of the buildings. By removing the language referencing the variations in design and in addition referencing the provisions established in ICC G1, Guideline to Replicable Buildings the concern should be addressed.

G254-12

Final Action: AS AM AMPC____ D

G255-12
Appendix N (New)

Proposed Change as Submitted

Proponent: Dru Meadows, the Green Team, Inc., representing Wal-Mart Stores, Inc. (dmeadows@thegreenteaminc.com)

Add new text as follows:

APPENDIX N
REPLICABLE BUILDINGS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION N101
GENERAL

N101.1 Scope. The provisions of this appendix shall apply to *replicable design* for new buildings and structures and for the alteration, repair, and addition of existing buildings and structures.

SECTION N102
DEFINITIONS

N102.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein.

APPROVED AGENCY. An independent person, firm or corporation, or other agency or organization, acceptable to the building official or authority having jurisdiction.

REPLICABLE BUILDING. Building or structure utilizing a *replicable design*.

REPLICABLE DESIGN. A prototypical design developed for application in multiple locations with minimal variation or modification.

SECTION N103
REPLICABLE DESIGN REQUIREMENTS

N103.1 Prototypical construction documents. A *replicable design* shall establish prototypical construction documents for application at multiple locations. The construction documents shall include details appropriate to each wind region, seismic design category, and climate zone for locations in which the *replicable design* is intended for application. Application of *replicable design* shall not vary with regard to the following, except for allowable variations in accordance with Section N106.1.1.

1. Use and occupancy classification
2. Building height and area limitations
3. Type of construction classification
4. Fire resistance ratings
5. Interior finishes
6. Fire protection system
7. Means of egress
8. Accessibility
9. Structural design criteria

10. Energy efficiency
11. Type of mechanical and electrical systems
12. Type of plumbing system and number of fixtures

SECTION N104
REPLICABLE DESIGN SUBMITTAL REQUIREMENTS

N104.1 General. A summary description of the *replicable design* and related construction documents shall be submitted. Where approval is requested for elements of the *replicable design* not within the scope of the *International Building Code*, the construction documents shall specifically designate the codes for which review is sought. Construction documents shall be signed, sealed and dated by the registered design professional.

N104.1.1 Architectural plans and specifications. Where approval of the architectural requirements of the *replicable design* is sought, the submittal documents shall include architectural plans and specifications as follows:

1. Description of uses and the proposed occupancy groups for all portions of the building.
2. Proposed type of construction of the building.
3. Fully dimensioned drawings to determine building areas and height.
4. Adequate details and dimensions to evaluate means of egress, including occupant loads for each floor, exit arrangement and sizes, corridors, doors, stairs.
5. Exit signs and means of egress lighting, including power supply.
6. Accessibility scoping provisions.
7. Description and details of proposed special occupancies such as a covered mall, high-rise, mezzanine, atrium, and public garage.
8. Adequate details to evaluate fire resistive construction requirements, including data substantiating required ratings.
9. Details of plastic, insulation, and safety glazing installation.
10. Details of required fire protection systems.

N104.1.2 Structural plans, specifications, and engineering details. Where approval of the structural requirements of the *replicable design* is sought, the submittal documents shall include details for each wind region, seismic design category and climate zone for which approval is sought; and, shall include the following:

1. Signed and sealed structural design calculations which support the member sizes on the drawings.
2. Design load criteria, including: frost depth; live loads; snow loads; wind loads; earthquake design data; other special loads.
3. Details of foundations and superstructure.
4. Provisions for required special inspections.
5. Material specifications demonstrating fire resistance criteria.

N104.1.3 Energy conservation details. Where approval of the energy conservation requirements of the *replicable design* is sought, the submittal documents shall include details for each climate zone for which approval is sought; and, shall include the following:

1. Climate zones for which approval is sought.
2. Building envelope details.
3. Building mechanical systems details.
4. Details of electrical power and lighting systems.
5. Provisions for system commissioning.

SECTION N105
REVIEW AND APPROVAL OF REPLICABLE DESIGN

N105.1 General. Proposed *replicable design* shall be reviewed by an *approved agency*. The review shall be applicable only to the *replicable design* features submitted in accordance with Section N104. The review shall determine compliance with this code and additional codes specified under Section N104.1.

N105.2 Documentation. The results of the review shall be documented indicating compliance with the code requirements.

N105.3 Deficiencies. Where the review of the submitted construction documents identifies elements where the design is deficient and will not comply with the applicable code requirements, the *approved agency* shall notify the proponent of the *replicable design*, in writing, of the specific areas of non-compliance and request correction.

N105.4 Approval. Where the review of the submitted construction documents determines that the design is in compliance with the codes designated in Section N104.1, and where deficiencies identified in Section N105.3 have been corrected, the *approved agency* shall issue a Summary Report of Approved Replicable Design. The Summary Report shall include a reference to the specific plans approved and shall include any limitations on the approved *replicable design* including, but not limited to climate zones, wind regions and seismic design categories.

SECTION N106
SITE SPECIFIC APPLICATION OF APPROVED REPLICABLE DESIGN

N106.1 General. Where site specific application of a *replicable design* which has been approved under the provisions of Section N105 is sought, the construction documents submitted to the jurisdiction shall comply with this section.

N106.1.1 Allowable Variations. Where an approved *replicable design* is proposed for use in a specific location, variations to the approved design shall be limited to the following:

1. Reductions in the building height that do not impact compliance with the means of egress requirements.
2. Reductions in the building area that do not impact compliance with the means of egress requirements.
3. Increases to height that do not exceed 5 percent of the approved replicable design or that are necessary to comply with local requirements.
4. Increases to area that do not exceed 5 percent of the approved replicable design or that are necessary to comply with local requirements.
5. Modifications to the exterior walls, roof assemblies, mechanical, electrical, or plumbing to accommodate local conditions such as climate and energy requirements of the jurisdiction.
6. Modifications *to interior finishes* which are of the same classification, or better, than those provided in the approved *replicable design.*
7. Modifications to the exterior walls which are of the same classification, or higher, than those provided in the approved *replicable design*.
8. Modifications to mechanical, electrical, or plumbing systems that increase efficiency and that do not alter type of system or fixture count.
9. Modifications as approved by the building official.

N106.2 Submittal Documents. A summary description of the *replicable design* and related construction documents shall be submitted. Construction documents shall be signed, sealed and dated by the registered design professional. Construction documents shall identify allowable variations to the *replicable design* reviewed by the *approved agency*. A statement, signed, sealed and dated by the registered design professional, that the *replicable design* submitted for local review is the same as the *replicable design* reviewed by the *approved agency* shall be submitted.

N106.2.1 Architectural plans and specifications. Architectural plans and specifications shall include the following:

1. Construction documents for variations from the *replicable design*.
2. Construction documents for portions of the building that are not part of the *replicable design*.
3. Documents for local requirements as identified by the building official.

N106.2.2 Structural plans, specifications, and engineering details. Structural plans, specifications, and engineering details shall include the following:

1. Construction documents for variations from the *replicable design*.
2. Construction documents for portions of the building that are not part of the *replicable design*.
3. Documents for local requirements as identified by the building official.
4. Soils report indicating the soil type and recommended allowable bearing pressure and foundation type.

N106.2.3 Site plans. Site plans shall include the following:

1. Size and location of all new construction and all existing structures on the site.
2. Distances from lot lines and existing buildings or structures.
3. Established street grades and proposed finish grades.

SECTION N107
SITE SPECIFIC REVIEW AND APPROVAL OF REPLICABLE DESIGN

N107.1 General. Proposed site specific application of *replicable design* shall be submitted for permit in accordance with the provisions of Chapter 1 and Appendix N.

N107.2 Site specific review and approval of *replicable design*. The building official shall verify that the *replicable design* submitted for site specific application is the same as the approved *replicable design* reviewed by the *approved agency*. In addition, the building official shall review the following for code compliance:

1. Variations, other than allowable variations, from *replicable design*.
2. Portions of the building that are not part of the *replicable design*.
3. Local requirements as identified by the building official.

Reason: This proposed code change is intended to provide the specific requirements for replicable building review, consistent with the ICC GI-2010 Guideline for Replicable Buildings. Replicable buildings use a prototypical design developed for application in multiple locations with minimal variation or modification.

ICC GI-2010 was developed to "help state and local jurisdictions—as well as owners, architects, builders and engineers—to streamline a building document review process to examine and verify replicable construction documents; thus eliminating repetitive code compliance reviews."

The ICC guideline outlines the principles of a centralized or "global" review for prototypical design elements. However, it does not provide specific requirements.

This addition is needed to provide specific requirements. This addition will expand on the objectives of the ICC guideline.

- It responds to changing technology and capabilities. As owners, architects, builders and engineers continue to utilize technology and systems to increase their efficiencies, regulatory efficiency must also continue to advance.
- It promotes efficiency. A centralized review of prototypical design elements can save considerable state and local resources and time by eliminating repetitive code-compliance reviews. Local jurisdictions can then utilize their resources to focus on reviews of complex and high-risk projects.
- It supports quality control. By coupling centralized review of prototypical design elements with a local review of unique jurisdictional requirements, replicable buildings that utilize this process can be constructed with greater consistency.

Bibliography: ICC GI-2010 Guideline for Replicable Buildings

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

APPENDIX X (NEW)-G-MEADOWS.doc

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon the previous action on G254 and with the continued concerns for variations from the prototype buildings.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

Dru Meadows, theGreen Team, Inc., representing Walmart Stores, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Appendix N
REPLICABLE BUILDINGS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION N101
GENERAL

N101.1 Scope. <u>Where approved by the *building official*</u> the provisions of this appendix shall apply to *replicable design* for new buildings and structures and for the alteration, ~~repair,~~ and addition of existing buildings and structures.

SECTION N102
DEFINITIONS

N102.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein.

~~**APPROVED AGENCY.** An independent person, firm or corporation, or other agency or organization, acceptable to the building official or authority having jurisdiction.~~

REPLICABLE BUILDING. Building or structure utilizing a *replicable design*.

REPLICABLE DESIGN. A prototypical design developed for application in multiple locations with minimal variation or modification.

SECTION N103
REPLICABLE DESIGN REQUIREMENTS

N103.1 Prototypical construction documents. A *replicable design* shall establish prototypical construction documents for application at multiple locations. The construction documents shall include details appropriate to each wind region, seismic design category, and climate zone for locations in which the *replicable design* is intended for application. Application of *replicable design* shall not vary with regard to the following~~, except for allowable variations in accordance with Section N106.1.1.~~

1. Use and occupancy classification
2. Building height and area limitations
3. Type of construction classification
4. Fire resistance ratings
5. Interior finishes
6. Fire protection system
7. Means of egress
8. Accessibility
9. Structural design criteria
10. Energy efficiency
11. Type of mechanical and electrical systems
12. Type of plumbing system and number of fixtures

SECTION N104
REPLICABLE DESIGN SUBMITTAL REQUIREMENTS

N104.1 General. A summary description of the *replicable design* and related construction documents shall be submitted to an *approved agency*. Where approval is requested for elements of the *replicable design* not within the scope of the International Building Code, the construction documents shall specifically designate the codes for which review is sought. Construction documents shall be signed, sealed and dated by the registered design professional.

N104.1.1 Architectural plans and specifications. Where approval of the architectural requirements of the *replicable design* is sought, the submittal documents shall include architectural plans and specifications as follows:

1. Description of uses and the proposed occupancy groups for all portions of the building.
2. Proposed type of construction of the building.
3. Fully dimensioned drawings to determine building areas and height.
4. Adequate details and dimensions to evaluate means of egress, including occupant loads for each floor, exit arrangement and sizes, corridors, doors, stairs.
5. Exit signs and means of egress lighting, including power supply.
6. Accessibility scoping provisions.
7. Description and details of proposed special occupancies such as a covered mall, high-rise, mezzanine, atrium, and public garage.
8. Adequate details to evaluate fire resistive construction requirements, including data substantiating required ratings.
9. Details of plastic, insulation, and safety glazing installation.
10. Details of required fire protection systems.
11. Material specifications demonstrating fire resistance criteria.

N104.1.2 Structural plans, specifications, and engineering details. Where approval of the structural requirements of the *replicable design* is sought, the submittal documents shall include details for each wind region, seismic design category and climate zone for which approval is sought; and, shall include the following:

1. Signed and sealed structural design calculations which support the member sizes on the drawings.
2. Design load criteria, including: frost depth; live loads; snow loads; wind loads; earthquake design data; other special loads.
3. Details of foundations and superstructure.
4. Provisions for required special inspections.
5. ~~Material specifications demonstrating fire resistance criteria.~~

SECTION N106
SITE SPECIFIC APPLICATION OF APPROVED REPLICABLE DESIGN

N106.1 General. Where site specific application of a *replicable design* which has been approved under the provisions of Section N105 is sought, the construction documents submitted to the ~~jurisdiction~~ building official shall comply with this section.

~~**N106.1.1 Allowable Variations.** Where an approved *replicable design* is proposed for use in a specific location, variations to the approved design shall be limited to the following:~~

~~1. Reductions in the building height that do not impact compliance with the means of egress requirements.~~
~~2. Reductions in the building area that do not impact compliance with the means of egress requirements.~~
~~4. Increases to height that do not exceed 5 percent of the approved replicable design or that are necessary to comply with local requirements.~~
~~4. Increases to area that do not exceed 5 percent of the approved replicable design or that are necessary to comply with local requirements.~~
~~5. Modifications to the exterior walls, roof assemblies, mechanical, electrical, or plumbing to accommodate local conditions such as climate and energy requirements of the jurisdiction.~~
~~6. Modifications *to interior finishes* which are of the same classification, or better, than those provided in the approved *replicable design*.~~
~~7. Modifications to the exterior walls which are of the same classification, or higher, than those provided in the approved *replicable design*.~~
~~8. Modifications to mechanical, electrical, or plumbing systems that increase efficiency and that do not alter type of system or fixture count.~~
~~10. Modifications as approved by the building official.~~

N106.2 Submittal Documents. A summary description of the *replicable design* and related construction documents shall be submitted. Construction documents shall be signed, sealed and dated by the registered design professional. ~~Construction documents shall identify allowable variations to the *replicable design* reviewed by the *approved agency*.~~ A statement, signed, sealed and dated by the registered design professional, that the *replicable design* submitted for local review is the same as the *replicable design* reviewed by the *approved agency* shall be submitted.

N106.2.1 Architectural plans and specifications. Architectural plans and specifications shall include the following:

1. Construction documents for variations from the *replicable design*.

2. Construction documents for portions of the building that are not part of the *replicable design*.
3. Documents for local requirements as identified by the building official.
4. Construction documents detailing the foundation system.

SECTION N107
SITE SPECIFIC REVIEW AND APPROVAL OF REPLICABLE DESIGN

N107.1 General. Proposed site specific application of *replicable design* shall be submitted ~~for permit~~ to the building official in accordance with the provisions of Chapter 1 and Appendix N.

N107.2 Site specific review and approval of *replicable design*. The building official shall verify that the *replicable design* submitted for site specific application is the same as the approved *replicable design* reviewed by the *approved agency*. In addition, the building official shall review the following for code compliance:

1. Variations~~, other than allowable variations,~~ from *replicable design*.
2. Portions of the building that are not part of the *replicable design*.
3. Local requirements as identified by the building official.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: Many areas already have some form of expedited review process for replicable buildings. The basic approach is captured in the ICC GI-2010 *Guideline for Replicable Buildings*. This proposed new Appendix provides a model process, consistent with the ICC Guidelines.

The proposal was disapproved due to concerns for variations from the prototype buildings.
--- This modification deletes the allowable variations.

Additionally, the proposal was disapproved due to concerns that it may not be useful in some jurisdictions. Small communities, for example may not have a list of approved agencies. Or, areas that already have a process may elect not to adopt this language.
--- This is proposed as an Appendix. As such, it allows flexibility in adoption as may (or may not) be appropriate for a particular jurisdiction.

Finally, this modification incorporates several revisions that respond to specific suggestions offered at the Public Hearing and subsequently. It:
--- Adds language to the scope to clarify that the building official maintains full control.
--- Deletes the definition for "approved agency" to avoid redundancy or conflict with the current IBC definition.
--- Relocates submittal requirements for fire resistance criteria.
--- Identifies submittal requirements for foundation details.
--- Clarifies to whom submissions are made.

This proposed new Appendix provides a model expedited review process. The intent is to expedite the time in permitting. Only the time. There is no intent to alter compliance requirements or circumvent the authority of the local building official.

Bibliography: ICC GI-2010 Guideline for Replicable Buildings

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

G255-12
Final Action: AS AM AMPC____ D

E1-12

202, 1006 (New), 1007 (New), 1014.3, 1015, 1020.1, 1021 (IFC [B] 1006 (New), 1007 (New), 1014.3, 1015, 1020.1, 1021)

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee

Revise as follows:

SECTION 202
DEFINITIONS

COMMON PATH OF EGRESS TRAVEL. That portion of the exit access travel distance measured from the most remote point within a story to that point where ~~which~~ the occupants ~~are required to traverse before two~~ have separate and distinct ~~paths of egress travel~~ access to two exits or exit access doorways ~~are available. Paths that merge are common paths of travel. Common paths of egress travel shall be included within the permitted travel distance.~~

Revise as follows:

~~**1014.3 (IFC [B] 1014.3) Common path of egress travel.** The common path of egress travel shall not exceed the common path of egress travel distances in Table 1014.3.~~

~~**TABLE 1014.3 (TABLE [B] 1014.3)**~~
~~**COMMON PATH OF EGRESS TRAVEL**~~

~~OCCUPANCY~~	~~WITHOUT SPRINKLER SYSTEM (feet)~~		~~WITH SPRINKLER SYSTEM (feet)~~
	~~Occupant Load~~		
	~~OL ≤ 30~~	~~OL > 30~~	
~~B, S[d]~~	~~100~~	~~75~~	~~100[a]~~
~~U~~	~~100~~	~~75~~	~~75[a]~~
~~F~~	~~75~~	~~75~~	~~100[a]~~
~~H-1, H-2, H-3~~	~~Not Permitted~~	~~Not Permitted~~	~~25[a]~~
~~R-2~~	~~75~~	~~75~~	~~125[b]~~
~~R-3[e]~~	~~75~~	~~75~~	~~125[b]~~
~~I-3~~	~~100~~	~~100~~	~~100[a]~~
~~All others[c]~~	~~75~~	~~75~~	~~75[a,b]~~

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

- ~~a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~
- ~~b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.~~
- ~~c. For a room or space used for assembly purposes having fixed seating, see Section 1028.8.~~
- ~~d. The length of a common path of egress travel in a Group S-2 open parking garage shall not be more than 100 feet (30 480 mm)~~
- ~~e. The length of a common path of egress travel in a Group R-3 occupancy located in a mixed occupancy building.~~
- ~~f. For the distance limitations in Group I-2, see Section 407.4.~~

SECTION ~~1015~~ 1006 (IFC [B] ~~1015~~ 1006)
NUMBERS OF EXITS AND EXIT ACCESS DOORWAYS

~~1015.1~~ 1006.1 (IFC [B] ~~1015.1~~ 1006.1) General ~~Exits or exit access doorways from spaces~~. The number of exits or exit access doorways required within the means of egress system shall comply with the provisions of Section 1006.2 for spaces and Section 1006.3 for stories. ~~Two exits or exit access doorways from any space shall be provided where one of the following conditions exists:~~

~~1. The *occupant load* of the space exceeds one of the values in Table 1015.1.~~

~~**Exceptions:**~~

1. ~~In Group R-2 and R-3 occupancies, one *means of egress* is permitted within and from individual dwelling units with a maximum *occupant load* of 20 where the dwelling unit is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.~~
2. ~~Care suites in Group I-2 occupancies complying with Section 407.4.3.~~

~~2. The *common path of egress travel* exceeds one of the limitations of Section 1014.3.~~
~~3. Where required by Section 1015.3, 1015.4, 1015.5, or 1015.6.~~

~~Where a building contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.~~

~~**TABLE 1015.1 (IFC [B] TABLE 1015.1)**~~
~~**SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY**~~

~~**OCCUPANCY**~~	~~**MAXIMUM OCCUPANT LOAD**~~
~~A, B, E, F, M, U~~	~~49~~
~~H-1, H-2, H-3~~	~~3~~
~~H-4, H-5, I-1, I-2, I-3, I-4, R~~	~~10~~
~~S~~	~~29~~

1006.2 (IFC [B] 1006.2) Egress from spaces. Rooms, areas or spaces, including mezzanines, within a story or basement shall be provided with the number of exits or access to exits in accordance with this section.

1006.2.1 (IFC [B] 1006.2.1) Egress based on occupant load and common path of egress travel distance. Two exits or exit access doorways from any space shall be provided where the design occupant load or the common path of egress travel distance exceeds the values listed in Table 1006.2.1.

Exceptions:

1. In Group R-2 and R-3 occupancies, one *means of egress* is permitted within and from individual dwelling units with a maximum *occupant load* of 20 where the dwelling unit is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and the common path of egress travel does not exceed 125 feet (38 100 mm).
2. Care suites in Group I-2 occupancies complying with Section 407.4.

TABLE 1006.2.1 (IFC [B] 1006.2.1)
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	**MAXIMUM OCCUPANT LOAD OF SPACE**	**MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)**		
		WITHOUT SPRINKLER SYSTEM		**WITH SPRINKLER SYSTEM**
		Occupant Load		
		OL ≤ 30	**OL > 30**	
A[a], E, M, U	49	75	75	75[b]
B	49	100	75	100[b]
F	49	75	75	100[b]
H-1, H-2, H-3	3	NP	NP	25[b]

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		WITHOUT SPRINKLER SYSTEM		WITH SPRINKLER SYSTEM
		Occupant Load		
		OL ≤ 30	OL > 30	
H-4, H-5, I-1, I-2, I-4, R-1, R-3, R-4	10	NP	NP	75[b]
I-3	10	NP	NP	100[b]
R-2	10	NP	NP	125[c]
R-3	10	NP	NP	125[d]
S	29	100	75[e]	100[b]
U	49	100	75	75[b]

For SI: 1 foot = 304.8 mm.
NP – Not Permitted

a. For a room or space used for assembly purposes having fixed seating, see Section 1028.8.
b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.
d. The length of common path of egress travel distance in a Group R-3 occupancy located in a mixed occupancy building shall be not more than 125 feet (38 100 mm).
e. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet (30 480 mm).

~~1015.1.1~~ 1006.2.1.1 (IFC [B] ~~1015.1.1~~ 1006.2.1.1) Three or more exits or exit access doorways. Three exits or exit access doorways shall be provided from any space with an occupant load of 501-1,000. Four exits or exit access doorways shall be provided from any space with an occupant load greater than 1,000.

~~1015.2 (IFC [B] 1015.2) Exit or exit access doorway arrangement.~~ *(relocated to new Section 1007)*

~~1015.2.1 (IFC [B] 1015.2.1) Two exits or exit access doorways.~~ *(relocated to new Section 1007)*

~~1015.2.2 (IFC [B] 1015.2.2) Three or more exits or exit access doorways.~~ *(relocated to new Section 1007)*

1006.2.2 (IFC [B] 1006.2.2) Egress based on use. The numbers of exits or access to exits shall be in accordance with this section.

~~1015.3~~ 1006.2.2.1 (IFC [B] ~~1015.3~~ 1006.2.2.1) Boiler, incinerator and furnace rooms. Two *exit access doorways* are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m^2) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu) (422 000 KJ) input capacity. Where two *exit access doorways* are required, one is permitted to be a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.

~~1015.4~~ 1006.2.2.2 (IFC [B] ~~1015.4~~ 1006.2.2.2) Refrigeration machinery rooms. Machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two *exits* or *exit access* doors. Where two *exit access doorways* are required, one such doorway is permitted to be served by a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of room.

All portions of machinery rooms shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway*. An increase in travel distance is permitted in accordance with Section 1016.1.

Doors shall swing in the direction of egress travel, regardless of the *occupant load* served. Doors shall be tight fitting and self-closing.

~~1015.5~~ 1006.2.2.3 (IFC [B] ~~1015.5~~ 1006.2.2.3) Refrigerated rooms or spaces. Rooms or spaces having a floor area larger than 1,000 square feet (93 m^2), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two *exits* or *exit access* doors.

Travel distance shall be determined as specified in Section 1016.1, but all portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an *exit* or *exit access* door where such rooms are not protected by an *approved automatic sprinkler* system. Egress is allowed through adjoining refrigerated rooms or spaces.

Exception: Where using refrigerants in quantities limited to the amounts based on the volume set forth in the *International Mechanical Code*.

~~1015.6~~ 1006.2.2.4 (IFC [B] ~~1015.6~~ 1006.2.2.4) Day care facilities. Day care facilities, rooms or spaces where care is provided for more than 10 children that are 2-1/2 years of age or less, shall have access to not less than two exits or exit access doorways.

~~SECTION 1021 (IFC [B] 1021)~~
~~NUMBER OF EXITS AND EXIT CONFIGURATION~~

~~1021.3.1 (IFC [B]1021.3.1)~~ 1006.3 (IFC [B] 1006.3) ~~Access to exits at adjacent levels.~~ Egress from stories or occupied roofs The means of egress system serving any story or occupied roof shall be provided with the number of exits or access to exits based on the aggregate occupant load served in accordance with this section. Access to exits at other levels shall be by stairways or ramps. Where access to exits occurs from adjacent building levels, the horizontal and vertical exit access travel distance to the closest exit shall not exceed that specified in Section 1016.1. Access to exits at other levels shall be from an adjacent story.

Each story above the second story of a building shall have a minimum of one interior or exterior exit stairway, or interior or exterior exit ramp. Where a minimum of three or more exits, or access to exits are required, a minimum of 50 percent of the required exits shall be interior or exterior exit stairways or ramps.

~~**Exception:** Landing platforms or roof areas for helistops that are less than 60 feet (18 288 mm) long, or less than 2,000 square feet (186 m^2) in area, shall be permitted to access the second exit by a fire escape, alternating tread device or ladder leading to the story or level below.~~

Exceptions:

1. Interior exit stairways and interior exit ramps are not required in open parking garages where the means of egress serves only the open parking garage.
2. Interior exit stairways and interior exit ramps are not required in outdoor facilities where all portions of the means of egress are essentially open to the outside.

~~1021.1 (IFC [B] 1021.10)~~ 1006.3.1 (IFC [B] 1006.3.1) ~~General.~~Egress based on occupant load. Each story and occupied roof shall have the minimum number of exits, or access to exits, as specified in Table 1006.3.1 ~~this section~~. A single exit or access to a single exit shall be permitted in accordance with Section 1006.3.3. The required number of exits, or exit access stairways or ramps providing access to exits, from any story shall be maintained until arrival at the exit discharge ~~grade~~ or ~~a~~ public way. ~~Exits or access to exits from any story shall be configured in accordance with this section. Each story above the second story of a building shall have a minimum of one interior or exterior exit stairway, or interior or exterior exit ramp. At each story above the second story that requires a minimum of three or more exits, or access to exits, a minimum of 50 percent of the required exits shall be interior or exterior exit stairways, or interior or exterior exit ramps.~~

~~**Exceptions:**~~

1. ~~Interior exit stairways and interior exit ramps are not required in open parking garages where the means of egress serves only the open parking garage.~~
2. ~~Interior exit stairways and interior exit ramps are not required in outdoor facilities where all portions of the means of egress are essentially open to the outside.~~

TABLE 1006.3.1 (IFC [B] TABLE 1006.9.3.1)
MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY

OCCUPANT LOAD PER STORY	**MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM STORY**
1-500	2
501-1,000	3
More than 1,000	4

~~**1021.2.4 (IFC [B] 1021.2.4) Three or more exits.** Three *exits*, or *exit access stairways* or *ramps* providing access to *exits* at other stories, shall be provided from any story or occupied roof with an *occupant load* from 501 to and including 1,000. Four *exits*, or *exit access stairways* or *ramps* providing access to *exits* at other stories, shall be provided from any story or occupied roof with an *occupant load* greater than 1,000.~~

~~1021.2.5~~ 1006.3.2 (IFC [B] ~~1021.2.5~~ 1006.3.2) Additional exits. In buildings over 420 feet in height, additional exits shall be provided in accordance with Section 403.5.2.

~~1021.2~~ 1006.3.3 (IFC [B] ~~1021.2~~ 1006.3.3) Single exits ~~Exits from stories.~~ ~~Two exits, or exit access stairways or ramps providing access to exits, from any story or occupied roof shall be provided~~ A single exit or access to a single exit shall be permitted from any story or occupied roof, where one of the following conditions exists:

1. The occupant load or number of dwelling units ~~exceeds one of~~ and common path of egress travel distance does not exceed the values in Table 1006.3.3(1) or 1006.3.3(2) ~~1021.2(1) or 1021.2(2).~~
2. ~~The exit access travel distance exceeds that specified in Table 1021.2(1) or 1021.2(2) as determined in accordance with the provisions of Section 1016.1.~~
3. ~~Helistop landing areas located on buildings or structures shall be provided with two exits, or exit access stairways or ramps providing access to exits.~~

~~**Exceptions:**~~

~~1~~2. Rooms, areas and spaces complying with Table 1006.2.1 ~~Section 1015.1~~ with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.
~~2~~3. Group R-3 occupancy buildings shall be permitted to have one exit.
~~3~~4. Parking garages where vehicles are mechanically parked shall be permitted to have one exit or access to a single exit.
~~4~~5. Air traffic control towers shall be provided with the minimum number of exits specified in Section 412.3.
~~5. Individual dwelling units in compliance with Section 1021.2.3.~~
6. Group R-3 and R-4 congregate residences shall be permitted to have one exit.
~~7. Exits serving specific spaces or areas need not be accessed by the remainder of the story when all of the following are met:~~
   ~~7.1 The number of exits from the entire story complies with Section 1021.2.4;~~
   ~~7.2 The access to exits from each individual space in the story complies with Section 1015.1, and~~
   ~~7.3 All spaces within each portion of a story shall have access to the minimum number of approved independent exits based on the occupant load of that portion of the story, but not less than two exits.~~

~~**1021.2.3 (IFC [B] 1021.2.3) Single-story or multi-story dwelling units.**~~

7. Individual single-story or multi-story dwelling units shall be permitted to have a single exit or access to a single exit from the dwelling unit provided that all of the following criteria are met:
   - 7.1.~~1.~~ The dwelling unit complies with Section ~~1015.1~~ 1006.2.1 as a space with one means of egress and
   - 7.2.~~2.~~ Either the exit from the dwelling unit discharges directly to the exterior at the level of exit discharge, or the exit access outside the dwelling unit's entrance door provides access to not less than two approved independent exits.

~~TABLE 1021.2(1)~~ TABLE 1006.3.3(1) (IFC [B] ~~TABLE 1021.2(1)~~ TABLE 1006.3.3(1))
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM COMMON PATH OF EGRESS ~~EXIT ACCESS~~ TRAVEL DISTANCE (feet)
Basement, first, second or third story above grade plane	R-2[a, b]	4 dwelling units	125 ~~feet~~
Fourth story ~~and~~ above grade plane and higher	NP	NA	NA

For SI: 1 foot = 3048 mm.
NP – Not Permitted
NA – Not Applicable
a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1029.
b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.3(2) ~~1021.2(2)~~..

~~TABLE 1021.2(2)~~ TABLE 1006.3.3(2) (IFC [B] ~~TABLE 1021.2(2)~~ TABLE 1006.3.3(2))
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM OCCUPANT~~S~~ LOAD PER STORY	MAXIMUM COMMON PATH OF EGRESS ~~EXIT ACCESS~~ TRAVEL DISTANCE (feet)
First story above or ~~basement~~ below grade plane	A, B[a], E F[a], M, U, S[a]	49 ~~occupants~~	75 ~~feet~~
	H-2, H-3	3 ~~occupants~~	25 ~~feet~~
	H-4, H-5, I, R-1, R-2[b,c], R-4	10 ~~occupants~~	75 ~~feet~~
	S	29 ~~occupants~~	100 ~~feet~~
Second story above grade plane	B, F, M, S	29 ~~occupants~~	75 ~~feet~~
Third story ~~and~~ above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.
NP – Not Permitted
NA – Not Applicable
a. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum travel distance of 100 feet.
b. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1029.
c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.3(1) ~~1021.2(1)~~..

~~1021.2.1~~ 1006.3.3.1 (IFC [B] ~~1021.2.1~~ 1006.3.3.1) Mixed occupancies. Where one exit, or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1006.3.3(1) ~~1021.2(1)~~ or Table 1006.3.3(2) ~~1021.2(2)~~ for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants for each occupancy does not exceed one.

~~1021.2.2~~ 1006.3.4 (IFC [B] ~~1021.2.2~~ 1006.3.4) Basements. A basement provided with one exit shall not be located more than one story below grade plane.

~~**1021.3 (IFC [B] 1021.3) Exit configuration.** Exits, or exit access stairways or ramps providing access to exits at other stories, shall be arranged in accordance with the provisions of Section 1015.2 through 1015.2.2. Exits shall be continuous from the point of entry into the exit to the exit discharge.~~

~~1021.4~~ 1006.3.5 (IFC [B] ~~1021.4~~ 1006.3.5) Vehicular ramps. Vehicular ramps shall not be considered as an exit access ramp unless pedestrian facilities are provided.

1006.3.6 (IFC [B] 1006.3.6) Helistop Platforms. Helistop landing areas located on buildings or structures shall be provided with two exits, or exit access stairways or ramps providing access to exits.

> **Exception:** Landing platforms or roof areas for helistops that are less than 60 feet (18 288 mm) long, or less than 2,000 square feet (186 m^2) in area, shall be permitted to access the second exit by a fire escape, alternating tread device or ladder leading to the story or level below.

SECTION 1007(IFC [B] 1007)
EXIT AND EXIT ACCESS DOORWAY CONFIGURATION

~~1015.2~~ 1007.1 (IFC [B] ~~1015.2~~ 1007.1) General ~~Exit or exit access doorway arrangement~~. Exits and exit access doorways serving spaces, including individual building stories, shall be separated in accordance with the provisions of this section. ~~Required *exits* shall be located in a manner that makes their availability obvious. *Exits* shall be unobstructed at all times. *Exit* and *exit access doorways* shall be arranged in accordance with Sections 1015.2.1 and 1015.2.2.~~

~~1015.2.1~~ 1007.1.1 (IFC [B] ~~1015.2.1~~ 1007.1.1) Two exits or exit access doorways. Where two *exits* or *exit access doorways* are required from any portion of the *exit access*, the *exit* doors or *exit access doorways* shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the story or area to be served measured in a straight line between *exit* doors or *exit access doorways*. Interlocking or *scissor stairs* shall be counted as one *exit stairway*.

Exceptions:

1 ~~2~~. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the *exit* doors or *exit access doorways* shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

2 ~~1~~. Where interior exit stairways are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required exit separation shall be measured along the shortest direct line of travel within the corridor.

~~1015.2.2~~ 1007.1.2 (IFC [B] ~~1015.2.2~~ 1007.1.2) Three or more exits or exit access doorways. Where access to three or more *exits* is required, at least two *exit* doors or *exit access doorways* shall be arranged in accordance with the provisions of Section 1007.1.1. Additional required exits, or access to exits shall be located a reasonable distance apart such that if one becomes involved, the others will be available.

<u>1007.2 (IFC [B] 1007.2) Measurement.</u> <u>The required separation distance between exits or exit access doorways shall be measured in accordance with the following:</u>

1. <u>The separation distance to exit or exit access doorways shall be measured to the nearest point along the width of the doorway.</u>
2. <u>The separation distance to exit access stairways shall be measured to the closest riser.</u>
3. <u>The separation distance to exit access ramps shall be measured to the start of the ramp run.</u>

(Renumber remaining sections.)

SECTION 1020 (IFC [B] 1020)
EXITS

1020.1 (IFC [B] 1020.1) General. Exits shall comply with Sections 1020 through 1026 and the applicable requirements of Sections 1003 through 1013. An exit shall not be used for any purpose that interferes with its function as a means of egress. Once a given level of exit protection is achieved, such level of protection shall not be reduced until arrival at the exit discharge. <u>Exits shall be continuous from the point of entry into the exit to the exit discharge.</u>

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

This proposal is a continuation of Item E5-09/10 that was approved for inclusion in the 2012 IBC. That is, the proposal intends to clarify current IBC means of egress requirements resulting in greater user friendliness and increased uniformity in the application of these important provisions.

Currently, both Sections 1015 and 1021 contain provisions for the determination of the number of exits and exit access doorways. The relationship between the two sections is not particularly obvious to many code practitioners. This proposal combines the two sections and places their various provisions in technical context. This is partially achieved through formatting. Section 1015.2 prescribes the provisions for the determination of the number of required exits or exit access to exits from any individual space. Section 1015.3 provides the provisions for the determination of the number of required exits or access to exits from stories or occupied roofs.

Recognizing the importance of tables during the design/review process, improvements were made to improve understanding and consistency. Fundamental to the proper determination of the number of required exits is the consideration of design occupant loads and occupant remoteness. Currently, only Table 1021.2(2) includes both variables (number of occupants per story and exit access travel distance). Section 1015.1 currently addresses the occupant load in Table 1015.1; however, it requires the user to determine occupant remoteness requirements at Section 1014.3 that are indicated as "common path of egress travel." For the 2012 Edition of the IBC, common path of egress travel provisions have been consolidated into a tabular format. The only remaining text of Section 1014.3 states, "The common path of egress travel shall not exceed the common path of egress travel distances in Table 1014.3," without contextual reference to Section 1015.1 that requires that two exits or exit access doorways from any space shall be provided where the common path of egress travel exceeds one of the limitations of Section 1014.3. This technical disconnect is repaired through the consolidation of Tables 1015.1 and 1014.3 in a format already contained in Table 1021.1(2). The current difference in occupant remoteness terminology (exit access travel distance vs. common path of egress travel) was resolved in favor of common path of egress travel distance.

To increase consistency in interpretations and application, the definition of "COMMON PATH OF EGRESS TRAVEL" has been modified. The proposed language emphasizes that the common path of egress travel is initially measured identically to exit access travel distance; however, technically terminates at an earlier point (that point where an occupant has separate and distinct access to two exits or exit access doorways vs. to an entrance to an exit). The somewhat vague wording in the current definition results in inconsistent applications of this important provision. It should be noted that the *NFPA 101 Handbook* states that common path of egress travel is a portion of the exit access travel distance. Many rely on that document to interpret IBC requirements. Additionally, the merging provision has been deleted. This is a moot point because once a second exit or exit access doorway (to include any point where an occupant enters an intervening room, corridor, exit access stairway or exit access ramp) is required, it must be separated in accordance with Section 1015.2. In recent code development cycles, many definitions have been edited to more accurately describe means of egress design requirements in context with the IBC system philosophy. This is another example of more accurately describing what is intended.

The establishment of a single method and term for the determination of occupant remoteness will greatly benefit code practitioners. The resultant Table 1006.2.1 is consistent in format, terminology and application to Table 1006.3.3(2) and will result in more accurate and consistent determination of the required number of exits and access to exits.

This proposal deletes current Section 1021.2, Exception 7. This provision was new to the 2009 Edition of the IBC and, according to the proponent's reason statement, was intended to coordinate the fragmented requirements of Sections 1015 and 1021. The consolidation of the two sections eliminates the need for the provision. The exception can be considered moot because it represents an exception to a non-requirement. There is no requirement for specific spaces to be accessed by the remainder of the story. The performance nature of number of exits/exit access provisions allows each space to be designed based on its own technical merit on an individual and collective basis. The conditions of the exception simply restate fundamental means of egress provisions. Based on the stated requirements of this proposal, the deleted exception is unnecessary.

Formerly, both Sections 1015 and 1021 contained provisions for the determination of exit/exit access configuration/arrangement/separation. Inasmuch as this issue is a major means of egress design requirement, the provisions have been consolidated into a new stand-alone section, Section 1007. Additionally, separation measurement provisions have been clarified. Currently, there are no specific measurement points for the determination of exit/exit access separation. New Section 1007.2 provides guidance for measuring to doors, exit access stairways and exit access ramps. This will reduce subjectivity in the determination of exit/exit access configuration.

Numbers of exits/exit access doorways and exit/exit access doorway configuration provisions have been located in Sections 1006 and 1007 respectively. This creates a sectional sequence for occupant load based means of egress provisions. Section 1004 covers design occupant load determination. Means of egress sizing requirements based on occupant load are contained in Section 1005. Now, occupant load based numbers requirements are placed in Section 1006 with multiple exit/exit access doorway arrangement provisions following in Section 1007. This logical format should assist designers and enforcement officials alike.

It was also determined that a general exit provision addressing exit continuity is incorrectly located in current Section 1021.3. It has been properly located in Section 1020.1.

In summary, this proposal represents a continuing effort to improve means of egress provisions for the purposes of philosophical functionality, technical consistency and user friendliness. Approval of this proposal will simplify the interpretation and application of IBC means of egress provisions while maintaining the highest traditions of fire and life safety.

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

1015-E-BAJNAI-BCAC.docx

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Consolidation of information for number of exits from a space and floor (Section 1015 and 1022) reduces duplication of language and should simplify the code for the users. The understanding on the common path of travel requirements should be enhanced. In the definition for 'common path of travel', by the addition of 'exit access doorways', there is concern that where two exit access doorways are available, that this could be interpreted as ending the common path of travel. Adding back into the definition, "paths that merge are common path of travel" would address the issue. There may also be a problem with proposed travel distance measurements in new Section 1007.2.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

COMMON PATH OF EGRESS TRAVEL. That portion of ~~the~~ exit access travel distance measured from the most remote point <u>of each room, area or space</u> ~~within a story~~ to that point where the occupants have separate and distinct access to two exits or exit access doorways.

(Portions of code change remain unchanged)

Commenter's Reason: This public comment is intended to clarify the intent of the definition for common path of egress travel. The original proposal was based on the last sentence of the 2012 IBC definition, "Common paths of travel shall be included within the permitted travel distance." and the language in Section 1016.3, "Exit access travel distance shall be measured from the most remote point <u>within a story</u>…" The original E1-12 definition could be interpreted such that the common path or egress travel need be considered from only one point (the most remote) on a given story. Obviously, all potential paths of egress travel need to be considered when establishing occupant remoteness for the purposes of determining multiple exit or exit access doorway requirements. Clarifying that the path of travel originating from any room, area or space should be evaluated when determining common paths of egress travel will eliminate literal interpretations of the original definition. Additionally, the reference to a single story has been eliminated. Section 1021.3.1 allows for access to exits at an adjacent level. Common path of egress travel requirements could potentially apply to a multi-level design condition. Approval of this modification will clarify the definition of common path of egress travel for the benefit of all users. This modification is consistent with the 2012 means of egress requirements established by Item E5-09/10.

Public Comment 2:

William E. Koffel, P.E., Koffel Associates, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

COMMON PATH OF EGRESS TRAVEL. That portion of the exit access travel distance measured from the most remote point within a story to that point where the occupants have separate and distinct access to two exits or exit access doorways. <u>Paths that merge are common paths of travel.</u>

Commenter's Reason: I testified in opposition to the proposed change to the definition of "common path of egress travel" in Dallas since the language proposed in E1 would allow the common path of egress travel measurement to stop at a point where occupants have separate and distinct access to two exits. For example, if a room has two exit access doorways one could stop measuring common path of travel at a point in the room where access to the two doors is by a separate and distinct path. However, if those doors lead to a dead-end corridor and the occupant needs to travel in one direction in the corridor, there is still a common path of travel.

This issue was noted by the Committee in the Report of the Public Hearing:

> In the definition for 'common path of travel', by the addition of 'exit access doorways', there is concern that where two exit access doorways are available, that this could be interpreted as ending the common path of travel. Adding back into the definition, "paths that merge are common path of travel" would address the issue.

The Public Comment has been submitted to address the concern I raised by including the solution recommended by the Committee.

Public Comment 3:

Lee J. Kranz, City of Bellevue Washington representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 202
DEFINITIONS

COMMON PATH OF EGRESS TRAVEL. That portion of the exit access travel distance measured from the most remote point within a story to that point where the occupants have separate and distinct access to two exits or exit access doorways. <u>Paths that merge are common paths of travel. Common paths of egress travel shall be included within the permitted travel distance.</u>

1007.2 (IFC [B] 1007.2) Measurement. The required separation distance between exits or exit access doorways shall be measured in accordance with the following:

1. The separation distance to exit or exit access doorways shall be measured to the nearest point along the width doorway.
2. The separation distance to exit access stairways shall be measured to the <u>nearest point along the width of the</u> closest riser.
3. The separation distance to exit access ramps shall be measured to the <u>nearest point along the width of the</u> start of the ramp run.

Commenter's Reason: Code change E1-12 was approved by the Egress Committee in Dallas but there was discussion about the need to maintain the "Paths that merge are common paths of travel" text. This language is needed to clarify that merging paths are still counted as part of the common path of travel and the measurement continues until the point where two separated paths are available. The length of a common path of travel is limited to insure that occupants will not have to travel excessive distances to reach safety or to the point where if one path is compromised the other will be tenable.

Section 1007.2 provides a more specific and precise method of measuring the required separation between exits or exit access points. The proposed changes to items #2 and #3 create consistency with the methodology used in item #1 of Section 1007.2.

In the Hearings Results, the Committee action indicated that *"The understanding on the common path of travel requirements should be enhanced. In the definition for 'common path of travel', by the addition of 'exit access doorways', there is concern that where two exit access doorways are available, that this could be interpreted as ending the common path of travel. Adding back into the definition, "paths that merge are common path of travel" would address the issue. There may also be a problem with proposed* *travel distance measurements in new Section 1007.2."* This public comment addresses the issues discussed at the Code Development Hearings for E1-12.

Public Comment 4:

Dennis Richardson, PE, CBO, City of Salinas, representing Tri-Chapter (Peninsula, East Bay and Monterey Chapters, ICC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 202
DEFINITIONS

COMMON PATH OF EGRESS TRAVEL. That portion of the exit access ~~travel distance measured from the most remote point within a story to that point where~~ <u>which</u> the occupants are <u>required to traverse</u> <u>before two</u> ~~have~~ separate and distinct <u>paths of egress travel</u> ~~access~~ to two exits ~~or exist access doorways~~ <u>are available</u>. <u>Paths that merge are common paths of travel. Common paths of egress travel shall be included within the permitted travel distance.</u>

(Portions of code change remain unchanged)

Commenter's Reason: E1-12 makes improvements to clarify how the maximum occupant load in a space as well as the maximum common path of egress travel both contribute to determining whether or not a space needs two exits or exit access doors.

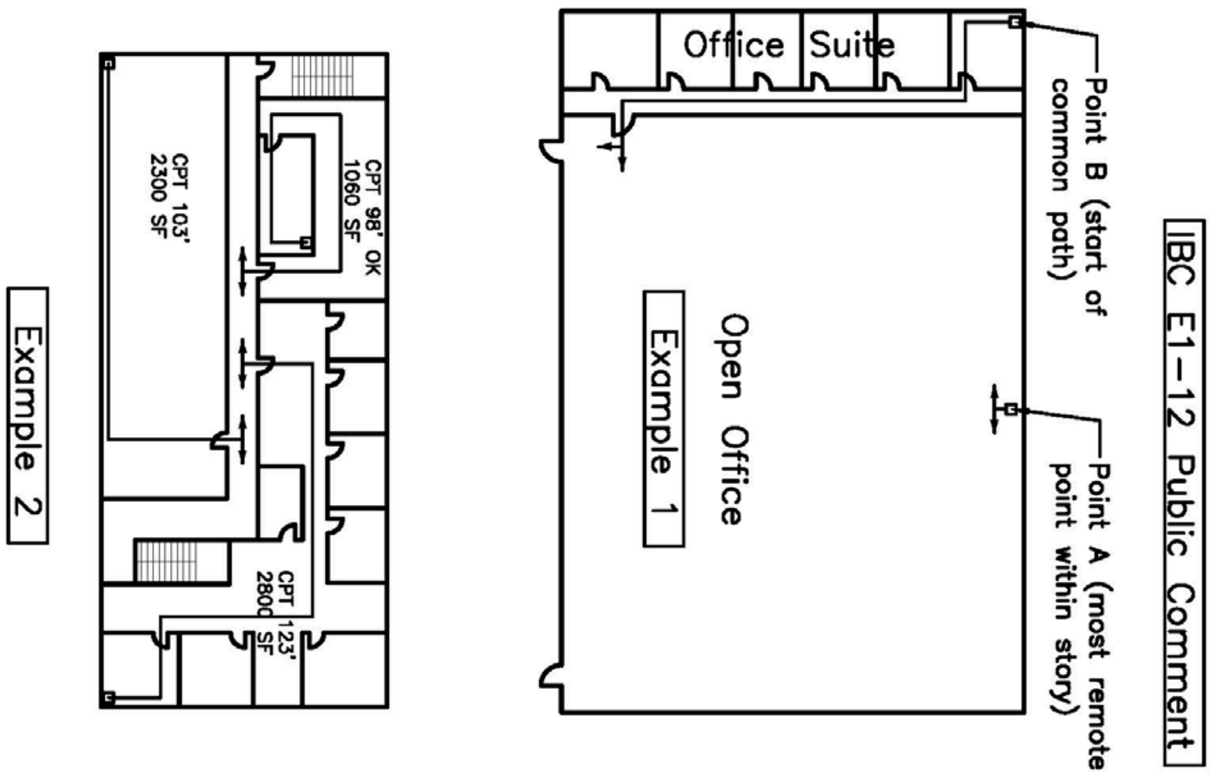
E1-12 also introduced a new definition for Common Path of Egress Travel which was intended to increase the consistency in interpretations and application of the definition as follows: "COMMON PATH OF EGRESS TRAVEL. That portion of the exit access travel distance measured from the most remote point within a story to that point where the occupants have separate and distinct access to two exits or exit access doorways."

This definition creates additional confusion and needs more work in the next code cycle. This public comment proposes to replace the new definition with the existing definition of common path of egress travel. The balance of E1-12 remains unchanged. It is felt the current definition will continue to serve until improvements are made to what was proposed.

The new definition approved as part of E1-12 will create more confusion as it refers to a specific instance within a story measured from the most remote point of the story as the only starting point to measure common path of egress travel (see point A in Example 1; E1-12 public comment example). This specific point could coincide with the common path of egress travel starting point but in most instances with different tenants or suites, the starting point to measure common path of travel from a space has nothing to do with the most remote point within a story (see point B in example 1; E1-12 public comment example). There often are multiple points in a story (different spaces) where the common path of egress travel could be critical (see Example 2; E1-12 public comment example).

The intent of the common path of egress travel is to look at the entire exit access not just along the exit access travel distance path from just the most remote point within the story. There is a fatal flaw in the new definition approved along with E1-12. The definition should revert back to the previous definition until a new definition can be proposed in the next code cycle or is successfully updated by public comment in this cycle.

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



Public Comment 5:

Hope Medina and Kirk Nagle, Town of Castle Rock and City of Arvada, representing selves, requests Disapproval.

Commenter's Reason: The new table is confusing, and lacking some clarity. In table 1006.2.1 there are several inconsistencies. R3 with a sprinkler has a maximum travel distance of 75 and a maximum travel distance of 100. I have no idea which one I should use. The original table 1015.1 was for the single exit requirement for mixed occupancies and table 1014.3 listed the common path of egress travel which was much less confusing. The R4 is listed with no values for maximum common travel distance with a sprinkler or without a sprinkler so I am assuming the distance is infinity. The R3 occupancy is only allowing a common path of egress when there is a sprinkler. The U occupancy is listing a without a sprinkler an occupant load of less than thirty a travel distance of 100 but with a sprinkler a travel distance of 75: not sure how to determine what occupant load to use here.. The values do not offer clarity and make this table unusable. In 1006.2.1 exception 1 has one means of egress with an occupant load of 20 when equipped with a fire sprinkler system list the common path of egress as 125 feet which conflicts with 1006.2.1 the maximum occupant load is 10 with a travel distance of 125 feet, and it also conflicts with a maximum occupant load of 10 with a travel distance of 75 feet. This code needs to be rewritten to be useful. This code change does not repair any current issues in fact it creates more confusion for the code user.

E1-12

Final Action: AS AM AMPC____ D

E2-12, Part III

PART III – INTERNATIONAL FIRE CODE

IFC 508.1.5, 905.3.3, 905.4, 905.4.1, 907.2.13.2, 907.5.2.2, 1104.5, 1104.6.1, 1104.9, 1104.10, 1104.10.1, 1104.12, 1104.16, 1104.16.1, 1104.16.2, 1104.16.3, 1104.16.4, 1104.16.5, 1104.16.5.1, 1104.16.6, 1104.16.7, 1104.20, 1104.21, 1104.23, 3313.1, 5704.2.9.4, 5706.5.1.12; (IBC [F] 911.1.5, 905.3.3, 905.4, 905.4.1, 907.2.13.2, 907.5.2.2, 3311.1

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

<u>Proposed Change as Submitted</u>

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

PART III – INTERNATIONAL FIRE CODE

Revise as follows:

IFC CHAPTER 5
FIRE SERVICE FEATURES

IFC SECTION 508 (IBC [F] 911)
FIRE COMMAND CENTER

IFC 508.1.5 (IBC [F] 911.1.5) Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communication system control unit.
2. The fire department communications system.
3. Fire detection and alarm system annunciator.
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. The fire-fighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking <u>interior exit</u> *stairway* doors simultaneously.
8. Sprinkler valve and waterflow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, *means of egress*, fire protection systems, fire-fighting equipment and fire department access and the location of *fire walls, fire barriers, fire partitions, smoke barriers* and smoke partitions.
13. An approved Building Information Card that contains, but is not limited to, the following information:
    - 13.1 General building information that includes: property name, address, the number of floors in the building (above and below grade), use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor), estimated building population (i.e., day, night, weekend);
    - 13.2 Building emergency contact information that includes: a list of the building's emergency contacts (e.g., building manager, building engineer, etc.) and their respective work phone number, cell phone number, email address;

13.3 Building construction information that includes: the type of building construction (e.g., floors, walls, columns, and roof assembly);

13.4 *Exit access and exit* ~~*stair*~~ *stairway* information that includes: number of *exit access and exit* ~~*stair*~~ *stairway* in building, each *exit access and exit* ~~*stair*~~ *stairway* designation and floors served, location where each *exit access and exit* ~~*stair*~~ *stairway* discharges, interior *exit* ~~*stairs*~~ *stairways* that are pressurized, *exit* ~~*stairs*~~ *stairways* provided with emergency lighting, each *exit* ~~*stairs*~~ *stairways* that allows reentry, *exit* ~~*stairs*~~ *stairways* providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve, location of elevator machine rooms, location of sky lobby, location of freight elevator banks;

13.5 Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator, location of natural gas service;

13.6 Fire protection system information that includes: locations of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers, location of different types of sprinkler systems installed (e.g., dry, wet, pre-action, etc.);

13.7 Hazardous material information that includes: location of hazardous material, quantity of hazardous material.

14. Work table.
15. Generator supervision devices, manual start and transfer features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1.
18. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

IFC CHAPTER 9
FIRE PROTECTION SYSTEMS

IFC SECTION 905
STANDPIPE SYSTEMS

IFC 905.3.3 (IBC [F] 905.3.3) Covered and open mall buildings. Covered mall and open mall buildings shall be equipped throughout with a standpipe system where required by Section 905.3.1. Mall buildings not required to be equipped with a standpipe system by Section 905.3.1 shall be equipped with Class I hose connections connected to the *automatic sprinkler system* sized to deliver water at 250 gallons per minute (946.4 L/min) at the most hydraulically remote hose connection while concurrently supplying the automatic sprinkler system demand. The standpipe system shall be designed to not exceed a 50 pounds per square inch (psi) (345 kPa) residual pressure loss with a flow of 250 gallons per minute (946.4 L/min) from the fire department connection to the hydraulically most remote hose connection. Hose connections shall be provided at each of the following locations:

1. Within the mall at the entrance to each *exit* passageway or *corridor*.
2. At each floor-level landing within ~~enclosed~~ interior exit stairways opening directly on the mall.
3. At exterior public entrances to the mall of a covered mall building.
4. At public entrances at the perimeter line of an open mall building.

IFC 905.4 (IBC [F] 905.4) Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required interior exit *stairway*, a hose connection shall be provided for each floor level above or below grade. Hose connections shall be located at an intermediate floor level landing between floors, unless otherwise *approved* by the fire code official.
2. On each side of the wall adjacent to the *exit* opening of a *horizontal exit*.

Exception: Where floor areas adjacent to a *horizontal exit* are reachable from an interior *exit stairway* hose connections by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the *horizontal exit*.

3. In every *exit* passageway, at the entrance from the *exit* passageway to other areas of a building.

   Exception: Where floor areas adjacent to an *exit* passageway are reachable from an interior *exit stairway* hose connections by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit* passageway to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit passageway or exit corridor to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit passageway or exit corridor to the mall.
5. Where the roof has a slope less than four units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of ~~a~~ an interior exit stairway with ~~stair~~ access to the roof provided in accordance with Section 1009.16.
6. Where the most remote portion of a nonsprinklered floor or *story* is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or *story* is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in *approved* locations.

IFC 905.4.1 (IBC [F] 905.4.1) Protection. Risers and laterals of Class I standpipe systems not located within an ~~enclosed~~ interior exit *stairway* ~~or pressurized enclosure~~ shall be protected by a degree of *fire resistance* equal to that required for vertical enclosures in the building in which they are located.

Exception: In buildings equipped throughout with an *approved automatic sprinkler system*, laterals that are not located within an ~~enclosed~~ interior exit *stairway* ~~or pressurized enclosure~~ are not required to be enclosed within fire-resistance- rated construction.

IFC SECTION 907 (IBC [F] 907)
FIRE ALARM AND DETECTION SYSTEMS

IFC 907.2.13.2 (IBC [F] 907.2.13.2) Fire department communication system. Where a wired communication system is *approved* in lieu of an emergency responder radio coverage system in accordance with Section 510 of the *International Fire Code*, the wired fire department communication system shall be designed and installed in accordance with NFPA 72 and shall operate between a fire command center complying with Section 911, elevators, elevator lobbies, emergency and standby power rooms, fire pump rooms, *areas of refuge* and inside ~~enclosed~~ *interior exit stairways*. The fire department communication device shall be provided at each floor level within the ~~enclosed~~ *interior exit stairway*.

IFC 907.5.2.2 (IBC [F] 907.5.2.2) Emergency voice/alarm communication systems. Emergency voice/alarm communication systems required by this code shall be designed and installed in accordance with NFPA 72. The operation of any automatic fire detector, sprinkler waterflow device or manual fire alarm box shall automatically sound an alert tone followed by voice instructions giving *approved* information and directions for a general or staged evacuation in accordance with the building's fire safety and evacuation plans required by Section 404 of the *International Fire Code*. In high-rise buildings, the system shall operate on a minimum of the alarming floor, the floor above and the floor below. Speakers shall be provided throughout the building by paging zones. At a minimum, paging zones shall be provided as follows:

1. Elevator groups.
2. Interior *Exit stairways*.
3. Each floor.
4. *Areas of refuge* as defined in Section 1002.1.

Exception: In Group I-1 and I-2 occupancies, the alarm shall sound in a constantly attended area and a general occupant notification shall be broadcast over the overhead page.

IFC CHAPTER 11
CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

IFC SECTION 1104
MEANS OF EGRESS FOR EXISTING BUILDINGS

IFC 1104.5 Illumination emergency power. The power supply for *means of egress* illumination shall normally be provided by the premises' electrical supply. In the event of power supply failure, illumination shall be automatically provided from an emergency system for the following occupancies where such occupancies require two or more *means of egress:*

1 and 2 *(No change)*
3. Group E in interior ~~stairs~~ <u>exit access and exit stairways and ramps</u>, *corridors,* windowless areas with student occupancy, shops and laboratories.
4 through 9 *(No change)*

IFC 1104.6.1 Height of guards. Guards shall form a protective barrier not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing guards on the open side of ~~*stairs*~~ <u>stairways</u> shall be not less than 30 inches (760 mm) high.
2. Existing guards within *dwelling units* shall be not less than 36 inches (910 mm) high.
3. Existing guards in assembly seating areas.

IFC 1104.9 Revolving doors. Revolving doors shall comply with the following:

1. A revolving door shall not be located within 10 feet (3048 mm) of the foot or top of ~~stairs~~ <u>stairways</u> or escalators. A dispersal area shall be provided between the ~~stairs~~ <u>stairways</u> or escalators and the revolving doors.
2. The revolutions per minute for a revolving door shall not exceed those shown in Table 1104.9.
3. Each revolving door shall have a conforming side hinged swinging door in the same wall as the revolving door and within 10 feet (3048 mm).

Exceptions:

1. A revolving door is permitted to be used without an adjacent swinging door for street-floor elevator lobbies provided a stairway, escalator or door from other parts of the building does not discharge through the lobby and the lobby does not have any occupancy or use other than as a means of travel between elevators and a street.
2. Existing revolving doors where the number of revolving doors does not exceed the number of swinging doors within 20 feet (6096 mm).

IFC 1104.10 Stair dimensions for existing ~~stairs~~ <u>stairways</u>. Existing ~~stairs~~ <u>stairways</u> in buildings shall be permitted to remain if the rise does not exceed 81/4 inches (210 mm) and the run is not less than 9 inches (229 mm). Existing ~~stairs~~ <u>stairways</u> can be rebuilt.

Exception: Other ~~stairs~~ <u>stairways</u> *approved* by the *fire code official*.

IFC 1104.10.1 Dimensions for replacement ~~stairs~~ stairways. The replacement of an existing *stairway* in a structure shall not be required to comply with the new *stairway* requirements of Section 1009 where the existing space and construction will not allow a reduction in pitch or slope.

IFC 1104.12 ~~Circular~~ Curved stairways. Existing ~~circular~~ ~~stairs~~ curved stairways shall be allowed to continue in use provided the minimum depth of tread is 10 inches (254 mm) and the smallest radius shall not be less than twice the width of the *stairway*.

IFC 1104.16 Fire escape ~~stairs~~ stairways. Fire escape ~~stairs~~ stairways shall comply with Sections 1104.16.1 through 1104.16.7.

IFC 1104.16.1 Existing means of egress. Fire escape ~~stairs~~ stairways shall be permitted in existing buildings but shall not constitute more than 50 percent of the required *exit* capacity.

IFC 1104.16.2 Protection of openings. Openings within 10 feet (3048 mm) of fire escape ~~stairs~~ stairways shall be protected by opening protectives having a minimum 3/4-hour *fire protection rating*.

> **Exception:** In buildings equipped throughout with an *approved automatic sprinkler system*, opening protection is not required.

IFC 1104.16.3 Dimensions. Fire escape ~~stairs~~ stairways shall meet the minimum width, capacity, riser height and tread depth as specified in Section 1104.10.

IFC 1104.16.4 Access. Access to a fire escape ~~stair~~ stairway from a *corridor* shall not be through an intervening room. Access to a fire escape ~~stair~~ stairway shall be from a door or window meeting the criteria of Section 1005.1. Access to a fire escape ~~stair~~ stairway shall be directly to a balcony, landing or platform. These shall be no higher than the floor or window sill level and no lower than 8 inches (203 mm) below the floor level or 18 inches (457 mm) below the window sill.

IFC 1104.16.5 Materials and strength. Components of fire escape ~~stairs~~ stairways shall be constructed of noncombustible materials. Fire escape ~~stairs~~ stairways and balconies shall support the dead load plus a live load of not less than 100 pounds per square foot (4.78 kN/m2). Fire escape ~~stairs~~ stairways and balconies shall be provided with a top and intermediate handrail on each side.

IFC 1104.16.5.1 Examination. Fire escape ~~stairs~~ stairways and balconies shall be examined for structural adequacy and safety in accordance with Section 1104.16.5 by a registered design professional or others acceptable to the *fire code official* every five years, or as required by the *fire code official*. An inspection report shall be submitted to the *fire code official* after such examination.

IFC 1104.16.6 Termination. The lowest balcony shall not be more than 18 feet (5486 mm) from the ground. Fire escape ~~stairs~~ stairways shall extend to the ground or be provided with counterbalanced ~~stairs~~ stairways reaching the ground.

> **Exception:** For fire escape ~~stairs~~ stairways serving 10 or fewer occupants, an *approved* fire escape ladder is allowed to serve as the termination.

IFC 1104.16.7 Maintenance. Fire escapes stairways shall be kept clear and unobstructed at all times and shall be maintained in good working order.

IFC 1104.20 Stairway discharge identification. An interior *exit stairway* or *ramp* which continues below its *level of exit discharge* shall be arranged and marked to make the direction of egress to a *public way* readily identifiable.

> **Exception:** ~~Stairs~~ Stairways that continue one-half story beyond their *levels of exit discharge* need not be provided with barriers where the *exit discharge* is obvious.

IFC 1104.21 Exterior stairway protection. Exterior *exit* ~~stairs~~ stairways shall be separated from the interior of the building as required in Section 1026.6. Openings shall be limited to those necessary for egress from normally occupied spaces.

Exceptions:

1. Separation from the interior of the building is not required for buildings that are two stories or less above grade where the *level of exit discharge* serving such occupancies is the first story above grade.
2. Separation from the interior of the building is not required where the exterior *stairway* is served by an exterior balcony that connects two remote exterior *stairways* or other *approved exits*, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be a minimum of 50 percent of the height of the enclosing wall, with the top of the opening not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the interior of the building is not required for an exterior *stairway* located in a building or structure that is permitted to have unenclosed interior *stairways* in accordance with Section 1022.
4. Separation from the interior of the building is not required for exterior *stairways* connected to open ended *corridors*, provided that:
   4.1. The building, including *corridors* and ~~stairs~~ stairways, is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
   4.2. The open-ended *corridors* comply with Section 1018.
   4.3. The open-ended *corridors* are connected on each end to an exterior *exit stairway* complying with Section 1026.
   4.4. At any location in an open-ended *corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3 m2) or an exterior *stairway* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

IFC 1104.23 Stairway floor number signs. Existing ~~stairs~~ stairways shall be marked in accordance with Section 1022.8.

IFC CHAPTER 33
FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

IFC SECTION 3313 (IBC [F] 3311; IEBC [F] 1506.1)
STANDPIPES

IFC 3313.1 (IBC [F] 3311.1; IEBC [F] 1506.1) Where required. In buildings required to have standpipes by Section 905.3.1, no fewer than one standpipe shall be provided for use during construction. Such standpipes shall be installed when the progress of construction is not more than 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access. Such standpipe shall be provided with fire department hose connections at accessible locations adjacent to usable ~~stairs~~ stairways. Such standpipes shall be extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring.

IFC CHAPTER 57
FLAMMABLE AND COMBUSTIBLE LIQUIDS

IFC SECTION 5704
STORAGE

IFC 5704.2.9.4 ~~Stairs~~ Stairways, platforms and walkways. ~~Stairs~~ Stairways, platforms and walkways shall be of noncombustible construction and shall be designed and constructed in accordance with NFPA 30 and the *International Building Code*.

IFC 5706.5.1.12 Loading racks. Where provided, loading racks, ~~stairs~~ stairways or platforms shall be constructed of noncombustible materials. Buildings for pumps or for shelter of loading personnel are allowed to be part of the loading rack. Wiring and electrical equipment located within 25 feet (7620 mm) of any portion of the loading rack shall be in accordance with Section 5703.1.1.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

The intent is for the consistent use of the defined terms for 'stair' and 'stairway' throughout the all the codes. Stair is used when talking about individual steps or stepped aisles. Stairway is used when the provisions are applicable to a series of steps, or flights and landings between stories. In addition, when terms such as 'exit access stairway' and 'exit access ramp' follow each other in a list, consistently eliminate a couple of words by saying 'exit access stairway and ramp.' When the provisions are equally appropriate for ramps and stairways, ramps is added.

Cost Impact: None

202-E-BALDASSARRA-CTC.DOC

Public Hearing Results

PART III – IFC
Committee Action: **Approved as Submitted**

Committee Reason: The proposal revised the use of 'stair' and 'stairway' throughout the code so that the application matches how the defined terms. This will clarify when requirements are intended for a change in elevation (i.e., stair) vs. a change in story (i.e., stairway). There was a question from the committee whether in Section 508.1.5, Item 7 should include 'exterior exit stairway'.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee, requests Approval as Modified by this Public Comment

Modify the proposal as follows:

IFC 508.1.5 (IBC [F] 911.1.5) Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

1. through 6. *(no change)*
7. Controls for unlocking ~~interior exit~~ *stairway* doors simultaneously.
8. through 18. *(no change)*

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: The modification to IFC Section 508.1.5 (IBC 911.1.5) Item 7 is due to a concern brought up by one of the Means of Egress Code Development committee regarding possible fire department access requirement from exterior exit stairways when dealing with locked exit stairway doors. The proposal is to not add the words "interior exit" so that the requirement for unlocking would be the same for interior exit stairways as exterior exit stairways.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Unenclosed exit stairways". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/UnenclosedExitStairs.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E_-12
Final Action: AS AM AMPC____ D

NOTE: PARTS I, II AND IV REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE

E2-12
PART I – INTERNATIONAL BUILDING CODE
IBC 202, 403.5.1, 403.5.2, 505.3, 707.6, 707.7.1, 713.1, Table 716.5, 718.2.4, Table 803.9, 909.20.1, 909.20.4.4, 909.20.5, 909.20.6, 909.20.6.2, 1007.7.2, 1008.1.4.1, 1008.1.9.11, 1009.3, 1009.7.4, 1009.9.3, 1010.2, 1011.4, 1012.6, 1013.2, 1015.2.1, 1019.2, 1021.1, 1022.1, 1022.7, 1022.9, Table 1028.6.2, 1028.7, 1205.4, 1207.1, 2110.1.1, 2308.12.7, 2406.4.6, 2406.4.7, 3406.1.3, 3406.4, 3411.8.4; (IFC [B] 1007.7.2, 1008.1.4, 1008.1.9.11, 1009.3, 1009.7.4, 1009.9.3, 1010.2, 1011.4, 1012.6, 1013.2, 1015.2.1, 1019.2, 1021.1, 1022.1, 1022.7, 1022.9, Table 1028.6.2, 1028.7; IEBC [B] 405.1.3, 405.4, 410.8.4);
PART II - INTERNATIONAL MECHANCIAL CODE
IMC 306.5.1, 1107.2; (IFGC [M] 306.5.1)
PART IV – INTERNATIONAL EXISTING BUILDING CODE
IEBC 804.1.1, 805.3.1.1, 805.3.1.2.1, 805.3.1.2.3, 805.4.3, 805.4.3.1, 805.9.1, 805.10.1, 806.2, 902.2.1, 1102.2, 1203.9, 1205.11

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

PART I – INTERNATIONAL BUILDING CODE

Revise as follows:

CHAPTER 2
DEFINITIONS

SECTION 202
DEFINITIONS

EQUIPMENT PLATFORM. An unoccupied, elevated platform used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, ~~*stairs*~~ <u>*stairways*</u>, *alternating tread devices* and ladders necessary to access the platform (see Section 505.3).

EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways*~~*, interior exit*~~ <u>and</u> *ramps, exit passageways, exterior exit stairways* and ~~*exterior exit*~~ *ramps and horizontal exits*.

EXIT ACCESS DOORWAY. A door or access point along the path of egress travel from an occupied room, area or space where the path of egress enters an intervening room, *corridor*, *exit access* ~~*stair*~~ <u>*stairway*</u> or ~~*exit access*~~ *ramp*.

FLOOR AREA, GROSS. The floor area within the inside perimeter of the *exterior walls* of the building under consideration, exclusive of vent *shafts* and *courts*, without deduction for *corridors*, *stairways*, <u>ramps</u>, closets, the thickness of interior walls, columns or other features. The floor area of a building, or portion thereof, not provided with surrounding *exterior walls* shall be the usable area under the horizontal projection of the roof or floor above. The gross floor area shall not include *shafts* with no openings or interior *courts.*

FLOOR AREA, NET. The actual occupied area not including unoccupied accessory areas such as *corridors*, *stairways,* <u>ramps</u> toilet rooms, mechanical rooms and closets.

SCISSOR ~~STAIR~~ <u>STAIRWAY</u>. Two interlocking *stairways* providing two separate paths of egress located within one ~~stairwell~~ <u>exit</u> enclosure.

~~STAIR~~ <u>STAIRWAY</u>, SCISSOR. See "Scissor ~~stair~~ <u>stairway</u>."

Revise as follows:

CHAPTER 4
SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

SECTION 403
HIGHRISE BUILDINGS
403.5.1 Remoteness of interior exit stairways. Required *interior exit stairways* shall be separated by a distance not less than 30 feet (9144 mm) or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the *interior exit*

stairways. In buildings with three or more *interior exit stairways,* no fewer than two of the *interior exit stairways* shall comply with this section. Interlocking or *scissor* ~~*stairs*~~ *stairways* shall be counted as one *interior exit stairway.*

403.5.2 Additional exit stairway. For buildings other than Group R-2 that are more than 420 feet (128 000 mm) in *building height*, one additional *exit stairway* meeting the requirements of Sections 1009 and 1022 shall be provided in addition to the minimum number of *exits* required by Section 1021.1. The total width of any combination of remaining *exit stairways* with one *exit stairway* removed shall be not less than the total width required by Section 1005.1. *Scissor* ~~*stairs*~~ *stairways* shall not be considered the additional *exit stairway* required by this section.

Exception: An additional *exit stairway* shall not be required to be installed in buildings having elevators used for occupant self-evacuation in accordance with Section 3008.

Revise as follows:

CHAPTER 5
GENERAL BUILDING HEIGHTS AND AREAS

SECTION 505
MEZZANINES AND EQUIPMENT PLATFORMS

IBC 505.3 Equipment platforms. *Equipment platforms* in buildings shall not be considered as a portion of the floor below. Such *equipment platforms* shall not contribute to either the *building area* or the number of *stories* as regulated by Section 503.1. The area of the *equipment platform* shall not be included in determining the *fire area* in accordance with Section 903. *Equipment platforms* shall not be a part of any *mezzanine* and such platforms and the walkways, ~~*stairs*~~ *stairways*, *alternating tread devices* and ladders providing access to an *equipment platform* shall not serve as a part of the *means of egress* from the building.

Revise as follows:

CHAPTER 7
FIRE AND SMOKE PROTECTION FEATURES

SECTION 707
FIRE BARRIERS

707.6 Openings. Openings in a fire barrier shall be protected in accordance with Section 716. Openings shall be limited to a maximum aggregate width of 25 percent of the length of the wall, and the maximum area of any single opening shall not exceed 156 square feet (15 m2). Openings in enclosures for exit access stairways and ramps, interior exit stairways and ramps and exit passageways shall also comply with Sections 1022.3 and 1023.5, respectively.

Exceptions:

1. Openings shall not be limited to 156 square feet (15 m^2) where adjoining floor areas are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Openings shall not be limited to 156 square feet (15 m2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a fire door serving enclosures for exit access stairways~~, exit access~~ and ramps, and interior exit stairways and ~~interior exit~~ ramps.
3. Openings shall not be limited to 156 square feet (15 m2) or an aggregate width of 25 percent of the length of the wall where the opening protective has been tested in accordance with ASTME 119 or UL263 and has a minimum fire-resistance rating not less than the fire-resistance rating of the wall.
4. Fire window assemblies permitted in atrium separation walls shall not be limited to a maximum aggregate width of 25 percent of the length of the wall.
5. Openings shall not be limited to 156 square feet (15 m2) or an aggregate width of 25 percent of the length of the wall where the opening protective is a fire door assembly in a fire barrier separating an enclosures for exit access stairways~~, exit access~~ and ramps, and interior exit stairways and ~~interior exit~~ ramps from an exit passageway in accordance with Section 1022.2.1.

707.7.1 Prohibited penetrations. Penetrations into enclosures for exit access stairways~~, exit access~~ and ramps, interior exit stairways~~, interior exit~~ and ramps or an exit passageway shall be allowed only when permitted by Section 1009.3.1.5, 1022.5 or 1023.6, respectively.

SECTION 713
SHAFT ENCLOSURES

713.1 General. The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Exit access stairways and ~~exit access~~ ramps shall be protected in accordance with the applicable provisions of Section 1009. Interior exit stairways and ~~interior exit~~ ramps shall be protected in accordance with the requirements of Section 1022.

Revise as follows:

SECTION 716
OPENING PROTECTIVES

TABLE 716.5
OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

Type of Assembly
Fire barriers having a required fireresistance rating of 1 hour: Enclosures for shafts, exit access stairways~~, exit access~~ and ramps, interior exit stairways~~, interior exit~~ and ramps and exit passageway walls

(Portions of table not shown remain unchanged.)

SECTION 718
CONCEALED SPACES

718.2.4 Stairways. Fireblocking shall be provided in concealed spaces between *stair* stringers at the top and bottom of the run. Enclosed spaces under ~~*stairs*~~ *stairways* shall also comply with Section 1009.9.3.

Revise as follows:

CHAPTER 8
INTERIOR FINISHES

SECTION 803
WALL AND CEILING FINISHES

TABLE 803.9
INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]

Group	SPRINKLERED			NONSPRINKLERED		
	Interior exit stairways~~,~~ ~~interior exit~~ and ramps and exit passageways[a, b]	**Corridors and enclosure for exit access stairways and ~~exit access~~ ramps**	**Rooms and enclosed spaces[c]**	**Interior exit stairways~~,~~ ~~interior exit~~ and ramps and exit passageways[a, b]**	**Corridors and enclosure for exit access stairways and ~~exit access~~ ramps**	**Rooms and enclosed spaces[c]**

b. In other than Group I-2 occupancies in buildings less than three stories above grade plane of other than Group I-3, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.

j. Class B materials shall be permitted as wainscoting extending not more than 48 inches above the finished floor in corridors and exit access stairways and ramps.

(Portions of table and notes not shown remain unchanged)

Revise as follows:

CHAPTER 9
FIRE PROTECTION SYSTEMS

SECTION 909
SMOKE CONTROL SYSTEMS

909.20.1 Access. Access to the ~~*stair*~~ *stairway* shall be by way of a vestibule or an open exterior balcony. The minimum dimension of the vestibule shall not be less than the required width of the *corridor* leading to the vestibule but shall not have a width of less than 44 inches (1118 mm) and shall not have a length of less than 72 inches (1829 mm) in the direction of egress travel.

909.20.4.4 ~~Stair~~ Stairway shaft air movement system. The ~~*stair*~~ *stairway* shaft shall be provided with a dampered relief opening and supplied with sufficient air to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) in the shaft relative to the vestibule with all doors closed.

909.20.5 ~~Stair~~ Stairway pressurization alternative. Where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the vestibule is not required, provided that interior *exit stairways* are pressurized to a minimum of 0.10 inches of water (25 Pa) and a maximum of 0.35 inches of water (87 Pa) in the shaft relative to the building measured with all interior *exit stairway* doors closed under maximum anticipated conditions of stack effect and wind effect.

909.20.6 Ventilating equipment. The activation of ventilating equipment required by the alternatives in Sections 909.20.4 and 909.20.5 shall be by smoke detectors installed at each floor level at an *approved* location at the entrance to the smokeproof enclosure. When the closing device for the ~~*stair*~~ *stairway* shaft and vestibule doors is activated by smoke detection or power failure, the mechanical equipment shall activate and operate at the required performance levels. Smoke detectors shall be installed in accordance with Section 907.3.

909.20.6.2 Standby power. Mechanical vestibule and ~~*stair*~~ *stairway* shaft ventilation systems and automatic fire detection systems shall be powered by an *approved* standby power system conforming to Section 403.4.8 and Chapter 27.

Revise as follows:

CHAPTER 10
MEANS OF EGRESS

SECTION 1007 (IFC [B] 1007)
ACCESSIBLE MEANS OF EGRESS

1007.7.2 (IFC [B] 1007.7.2) Outdoor facilities. Where *exit access* from the area serving outdoor facilities is essentially open to the outside, an exterior area of assisted rescue is permitted as an alternative to an *area of refuge*. Every required exterior area of assisted recue shall have direct access to an *interior exit stairway*, exterior exit *stairway*, or elevator serving as an *accessible means of egress* component. The exterior area of assisted rescue shall comply with Section 1007.7.3 through 1007.7.6 and shall be provided with a two-way communication system complying with Sections 1007.8.1 and 1007.8.2.

SECTION 1008 (IFC [B] 1008)
DOORS, GATES AND TURNSTILES

1008.1.4.1 (IFC [B] 1008.1.4.1) Revolving doors. Revolving doors shall comply with the following:

1. Each revolving door shall be capable of collapsing into a bookfold position with parallel egress paths providing an aggregate width of 36 inches (914 mm).
2. A revolving door shall not be located within 10 feet (3048 mm) of the foot of or top of ~~*stairs*~~ *stairways* or escalators. A dispersal area shall be provided between the ~~*stairs*~~ *stairways* or escalators and the revolving doors.
3. The revolutions per minute (rpm) for a revolving door shall not exceed those shown in Table 1008.1.4.1.
4. Each revolving door shall have a side-hinged swinging door which complies with Section 1008.1 in the same wall and within 10 feet (3048 mm) of the revolving door.
5. Revolving doors shall not be part of an *accessible route* required by Section 1007 and Chapter 11.

1008.1.9.11 (IFC [B] 1008.1.9.11) Stairway doors. Interior *stairway means of egress* doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. *Stairway* discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3.
3. In *stairways* serving not more than four stories, doors are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon a signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.
4. *Stairway exit* doors shall be openable from the egress side and shall only be locked from the opposite side in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit* ~~*stair*~~ *stairway* where permitted in Section 1021.2.
5. *Stairway exit* doors shall be openable from the egress side and shall only be locked from the opposite side in Group R-2 occupancies where the only interior access to the dwelling unit is from a single *exit* ~~*stair*~~ *stairway* where permitted in Section 1021.2.

SECTION 1009 (IFC [B] 1009)
STAIRWAYS

1009.3 (IFC [B] 1009.3) Exit access stairways. Floor openings between stories created by *exit access stairways* shall be enclosed.

Exceptions:

1. In other than Group I-2 and I-3 occupancies, *exit access stairways* that serve, or atmospherically communicate between, only two stories are not required to be enclosed.
2. *Exit access stairways* serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.
3. In buildings with only Group B or M occupancies, *exit access stairway* openings are not required to be enclosed provided that the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the area of the floor opening between stories does not exceed twice the horizontal projected area of the *exit access stairway*, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.

4. In other than Groups B and M occupancies, *exit access stairway* openings are not required to be enclosed provided that the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the floor opening does not connect more than four stories, the area of the floor opening between stories does not exceed twice the horizontal projected area of the *exit access stairway*, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.
5. *Exit access stairways* within an *atrium* complying with the provisions of Section 404 are not required to be enclosed.
6. *Exit access stairways* ~~and *ramps*~~ in open parking garages that serve only the parking garage are not required to be enclosed.
7. <u>*Exit access*</u> *Stairways* serving outdoor facilities where all portions of the *means of egress* are essentially open to the outside are not required to be enclosed.
8. *Exit access stairways* serving stages, platforms and *technical production areas* in accordance with Sections 410.6.2 and 410.6.3 are not required to be enclosed.
9. <u>*Exit access*</u> *Stairways* are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.
10. In Group I-3 occupancies, *exit access stairways* constructed in accordance with Section 408.5 are not required to be enclosed.

1009.7.4 (IFC [B] 1009.7.4) Dimensional uniformity. *Stair* treads and risers shall be of uniform size and shape. The tolerance between the largest and smallest riser height or between the largest and smallest tread depth shall not exceed 3/8 inch (9.5 mm) in any *flight* of *stairs*. The greatest *winder* tread depth at the walkline within any *flight* of *stairs* shall not exceed the smallest by more than 3/8 inch (9.5 mm).

Exceptions:

1. Nonuniform riser dimensions of *aisle stairs* complying with Section 1028.11.2.
2. Consistently shaped *winders*, complying with Section 1009.7, differing from rectangular treads in the same ~~*stairway*~~ *flight* <u>*of stairs*</u>.

Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed one unit vertical in 12 units horizontal (8-percent slope) of ~~*stairway*~~ <u>*stair*</u> width. The *nosings* or leading edges of treads at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair* and shall have a slip-resistant surface. Marking stripes shall have a width of at least 1 inch (25 mm) but not more than 2 inches (51 mm).

1009.9.3 (IFC [B] 1009.9.3) Enclosures under interior stairways. The walls and soffits within enclosed usable spaces under enclosed and unenclosed *stairways* shall be protected by 1-hour fire-resistance-rated construction or the *fire-resistance rating* of the *stairway* enclosure, whichever is greater. Access to the enclosed space shall not be directly from within the ~~*stair*~~ <u>*stairway*</u> enclosure.
Exception: Spaces under *stairways* serving and contained within a single residential dwelling unit in Group R-2 or R-3 shall be permitted to be protected on the enclosed side with 1/2-inch (12.7 mm) gypsum board.

SECTION 1010 (IFC [B] 1010)
RAMPS

1010.2 (IFC [B] 1010.2) Enclosure. All *interior exit ramps* shall be enclosed in accordance with the applicable provisions of Section 1022. *Exit access ramps* shall be enclosed in accordance with the provisions of ~~Section~~ <u>Sections 1009.2,</u> 1009. 3 <u>and 1009.4</u> for enclosure of *stairways*.

SECTION 1011 (IFC [B] 1011)
EXIT SIGNS

1011.4 (IFC [B] 1011.4) Raised character and Braille exit signs. A sign stating EXIT in raised characters and Braille and complying with ICC A117.1 shall be provided adjacent to each door to an *area of refuge*, an exterior area for assisted rescue, an *exit stairway*~~, an *exit*~~ <u>*or*</u> *ramp*, an *exit passageway* and the *exit discharge*.

SECTION 1012 (IFC [B] 1012)
HANDRAILS

1012.6 (IFC [B] 1012.6) Handrail extensions. *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent ~~*stair*~~ *flight* <u>of stairs</u> or *ramp* run. Where *handrails* are not continuous between *flights,* the *handrails* shall extend horizontally at least 12 inches (305 mm) beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the ~~*stair*~~ *flights* <u>of stairs</u> at *stairways* and the *ramp* runs at *ramps*.

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be *accessible* need extend only from the top riser to the bottom riser.
2. *Aisle handrails* in rooms or spaces used for assembly purposes in accordance with Section 1028.13.
3. *Handrails* for *alternating tread devices* and ship ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* and ship ladders are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

SECTION 1013 (IFC [B] 1013)
GUARDS

1013.2 (IFC [B] 1013.2) Where required. *Guards* shall be located along open-sided walking surfaces, including *mezzanines*, *equipment platforms*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.8.

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

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including ~~steps~~ stairs leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of stages and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating where *guards* in accordance with Section 1028.14 are permitted and provided.

SECTION 1015 (IFC [B] 1015)
EXIT AND EXIT ACCESS DOORWAYS

1015.2.1 (IFC [B] 1015.2.1) Two exits or exit access doorways. Where two *exits* or *exit access doorways* are required from any portion of the *exit access*, the *exit* doors or *exit access doorways* shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between *exit* doors or *exit access doorways*. Interlocking or *scissor* ~~*stairs*~~ *stairways* shall be counted as one *exit stairway*.

Exceptions:

1 Where *interior exit stairways* are interconnected by a 1-hour fire-resistance-rated *corridor* conforming to the requirements of Section 1018, the required *exit* separation shall be measured along the shortest direct line of travel within the *corridor*.
2. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the *exit* doors or *exit access doorways* shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

SECTION 1019 (IFC [B] 1019)
EGRESS BALCONIES

1019.2 (IFC [B] 1019.2) Wall separation. Exterior egress balconies shall be separated from the interior of the building by walls and opening protectives as required for *corridors*.
Exception: Separation is not required where the exterior egress balcony is served by at least two ~~*stairs*~~ *stairways* and a deadend travel condition does not require travel past an unprotected opening to reach a ~~*stair*~~ *stairway*.

SECTION 1021 (IFC [B] 1021)
NUMBER OF EXITS AND EXIT CONFIGURATION

1021.1 (IFC [B] 1021.1.) General. Each story and occupied roof shall have the minimum number of *exits*, or access to exits, as specified in this section. The required number of *exits*, or *exit access stairways* or *ramps* providing access to exits, from any story shall be maintained until arrival at grade or a *public way*. *Exits* or access to exits from any story shall be configured in accordance with this section. Each story above the second story of a building shall have a minimum of one interior or exterior *exit stairway*~~,~~ or ~~interior or exterior *exit*~~ *ramp*. At each story above the second story that requires a minimum of three or more *exits*, or access to *exits*, a minimum of 50 percent of the required *exits* shall be interior or exterior *exit stairways*~~,~~ or ~~interior or exterior *exit*~~ *ramps*.

Exceptions:

1. *Interior exit stairways* and ~~*interior exit*~~ *ramps* are not required in *open parking garages* where the *means of egress* serves only the *open parking garage*.

2. *Interior exit stairways* and ~~*interior exit*~~ *ramp*s are not required in outdoor facilities where all portions of the *means of egress* are essentially open to the outside.

SECTION 1022 (IFC [B] 1022)
INTERIOR EXIT STAIRWAYS AND RAMPS

1022.1 (IFC [B] 1022.1) General. *Interior exit stairways* and ~~*interior exit*~~ *ramps* serving as an *exit* component in a *means of egress* system shall comply with the requirements of this section. *Interior exit stairways* and *ramps* shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an *exit passageway* conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An *interior exit stairway* or *ramp* shall not be used for any purpose other than as a *means of egress*.

1022.7 (IFC [B] 1022.7) Interior exit stairway and ramp exterior walls. *Exterior walls* of the *interior exit stairway* and *ramp* shall comply with the requirements of Section 705 for exterior walls. Where nonrated walls or unprotected openings enclose the exterior of the *stairway* <u>or ramps</u> and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the building *exterior walls* within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a *fire-resistance rating* of not less than 1 hour. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the *stairway*<u>, ramp</u> or to the roof line, whichever is lower.

1022.9 (IFC [B] 1022.9) Stairway identification signs. A sign shall be provided at each floor landing in an *interior exit stairway* and *ramp* connecting more than three stories designating the floor level, the terminus of the top and bottom of the *interior exit stairway* and *ramp* and the identification of the ~~*stair*~~ <u>*stairway*</u> or *ramp*. The signage shall also state the story of, and the direction to, the *exit discharge* and the availability of roof access from the *interior exit stairway* and *ramp* for the fire department. The sign shall be located 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions. In addition to the *stairway* identification sign, a floor level sign in raised characters and braille complying with ICC A117.1 shall be located at each floor level landing adjacent to the door leading from the *interior exit stairway* and *ramp* into the *corridor* to identify the floor level.

SECTION 1028 (IFC [B] 1028)
ASSEMBLY

TABLE 1028.6.2 (IFC [B] Table 1028.6.2)
WIDTH OF AISLES FOR SMOKE-PROTECTED ASSEMBLY

TOTAL NUMBER OF SEATS IN THE SMOKEPROTECTED ASSEMBLY SEATING	**INCHES OF CLEAR WIDTH PER SEAT SERVED**			
	~~Stairs and~~ aisle ~~steps~~ <u>stairs</u> with handrails within 30 inches	**~~Stairs and~~ aisle ~~steps~~ <u>stairs</u> without handrails within 30 inches**	**~~Passageways, doorways and~~ <u>Level and ramped aisles</u> ~~ramps~~ not steeper than 1 in 10 in slope**	**~~Ramps~~ <u>Ramped aisles</u> steeper than 1 in 10 in slope**

(Portions of table not shown remain unchanged)

1028.7 (IFC [B] 1028.7) Travel distance. *Exits* and *aisles* shall be so located that the travel distance to an *exit* door shall not be greater than 200 feet (60 960 mm) measured along the line of travel in nonsprinklered buildings. Travel distance shall not be more than 250 feet (76 200 mm) in sprinklered buildings. Where *aisles* are provided for seating, the distance shall be measured along the *aisles* and *aisle accessway* without travel over or on the seats.

Exceptions:

1. *Smoke-protected assembly seating*: The travel distance from each seat to the nearest entrance to a vomitory or concourse shall not exceed 200 feet (60 960 mm). The travel distance from the entrance to the vomitory or concourse to a ~~*stair*~~ <u>*stairway*</u>, *ramp* or walk on the exterior of the building shall not exceed 200 feet (60 960 mm).
2. Open-air seating: The travel distance from each seat to the building exterior shall not exceed 400 feet (122 m). The travel distance shall not be limited in facilities of Type I or II construction.

Revise as follows:

CHAPTER 12
INTERIOR ENVIRONMENT

SECTION 1205
LIGHTING

1205.4 Stairway illumination. *Stairways* within *dwelling units* and *exterior stairways* serving a *dwelling unit* shall have an illumination level on tread runs of not less than 1 foot-candle (11 lux). ~~*Stairs*~~ <u>*Stairways*</u> in other occupancies shall be governed by Chapter 10.

SECTION 1207
SOUND TRANSMISSION

1207.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent *dwelling units* or between *dwelling units* and adjacent public areas such as halls, *corridors*, ~~*stairs*~~ *stairways* or service areas.

Revise as follows:

CHAPTER 21
MASONRY

SECTION 2110
GLASS UNIT MASONRY

2110.1.1 Limitations. Solid or hollow *approved* glass block shall not be used in fire walls, party walls, fire barriers, fire partitions or smoke barriers, or for load-bearing construction. Such blocks shall be erected with mortar and reinforcement in metal channel-type frames, structural frames, masonry or concrete recesses, embedded panel anchors as provided for both exterior and interior walls or other *approved* joint materials. Wood strip framing shall not be used in walls required to have a fire-resistance rating by other provisions of this code.

Exceptions:

1. Glass-block assemblies having a fire protection rating of not less than 3/4 hour shall be permitted as opening protectives in accordance with Section 716 in fire barriers, fire partitions and smoke barriers that have a required fire-resistance rating of 1 hour or less and do not enclose exit stairways~~, exit~~ and ramps or exit passageways.
2. Glass-block assemblies as permitted in Section 404.6, Exception 2.

Revise as follows:

CHAPTER 23
WOOD

SECTION 2308
CONVENTIONAL LIGHT-FRAMED CONSTRUCTION

2308.12.7 Anchorage of exterior means of egress components. Exterior egress balconies, exterior ~~exit~~ stairways or ramps and similar *means of egress* components shall be positively anchored to the primary structure at not over 8 feet (2438 mm) o.c. or shall be designed for lateral forces. Such attachment shall not be accomplished by use of toenails or nails subject to withdrawal.

Revise as follows:

CHAPTER 24
GLASS AND GLAZING

SECTION 2406
SAFETY GLAZING

2406.4.6 Glazing adjacent to ~~stairs~~ stairways and ramps. Glazing where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface of stairways, landings between flights of stairs, and ramps shall be considered a hazardous location.

Exceptions:

1. The side of a stairway, landing or ramp that has a guard complying with the provisions of Sections 1013 and 1607.8, and the plane of the glass is greater than 18 inches (457 mm) from the railing.
2. Glazing 36 inches (914 mm) or more measured horizontally from the walking surface.

2406.4.7 Glazing adjacent to the bottom ~~stair~~ stairway landing. Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 36 inches (914 mm) above the landing and within 60 inches (1524 mm) horizontally of the bottom tread shall be considered a hazardous location.

Exception: Glazing that is protected by a guard complying with Sections 1013 and 1607.8 where the plane of the glass is greater than 18 inches (457 mm) from the guard.

Revise as follows:

CHAPTER 34
EISTING STRUCTURES

SECTION 3406 (IEBC [B] 405)
FIRE ESCAPES

3406.1.3 (IEBC [B] 405.1.3) New fire escapes. New fire escapes for existing buildings shall be permitted only where exterior ~~*stairs*~~ *stairways* cannot be utilized due to lot lines limiting ~~*stair*~~ *stairway* size or due to the sidewalks, alleys or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.

3406.4 (IEBC [B] 405.4) Dimensions. *Stairs* shall be at least 22 inches (559 mm) wide with risers not more than, and treads not less than, 8 inches (203 mm) and landings at the foot of ~~stairs~~ stairways not less than 40 inches (1016 mm) wide by 36 inches (914 mm) long, located not more than 8 inches (203 mm) below the door.

SECTION 3411 (IEBC [B] 410)
ACCESSIBILITY FOR EXISTING BUILDINGS

3411.8.4 (IEBC [B] 410.8.4) ~~Stairs~~ Stairways and escalators in existing buildings. In *alterations*, change of occupancy or *additions* where an escalator or ~~*stair*~~ *stairway* is added where none existed previously and major structural modifications are necessary for installation, an *accessible* route shall be provided between the levels served by the escalator or ~~*stairs*~~ *stairways* in accordance with Sections 1104.4 and 1104.5.

PART II - INTERNATIONAL MECHANICAL CODE

Revise as follows:

IMC CHAPTER 3
GENERAL REGULATIONS

IMC SECTION 306
ACCCESS AND SERVICE SPACE

IMC 306.5.1 (IFGC [M] 306.5.1) Sloped roofs. Where appliances, *equipment*, fans or other components that require service are installed on a roof having a slope of three units vertical in 12 units horizontal (25-percent slope) or greater and having an edge more than 30 inches (762 mm) above grade at such edge, a level platform shall be provided on each side of the *appliance* or *equipment* to which access is required for service, repair or maintenance. The platform shall be not less than 30 inches (762 mm) in any dimension and shall be provided with guards. The guards shall extend not less than 42 inches (1067 mm) above the platform, shall be constructed so as to prevent the passage of a 21-inch diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in the *International Building Code*. Access shall not require walking on roofs having a slope greater than four units vertical in 12 units
horizontal (33-percent slope). Where access involves obstructions greater than 30 inches (762 mm) in height, such obstructions shall be provided with ladders installed in accordance with Section 306.5 or ~~stairs~~ stairways installed in accordance with the requirements specified in the *International Building Code* in the path of travel to and from appliances, fans or *equipment* requiring service.

IMC CHAPTER 11
REFRIGERATION

IMC SECTION 1107
REFRIGERANT PIPING

IMC 1107.2 Piping location. Refrigerant piping that crosses an open space that affords passageway in any building shall be not less than 7 feet 3 inches (2210 mm) above the floor unless the piping is located against the ceiling of such space. Refrigerant piping shall not be placed in any elevator, dumbwaiter or other shaft containing a moving object or in any shaft that has openings to living quarters or to means of egress. Refrigerant piping shall not be installed in an enclosed public stairway, ~~stair~~ stairway landing or means of egress.

PART IV – INTERNATIONAL EXISTING BUILDING CODE

IEBC CHAPTER 8
ALTERATIONS—LEVEL 2

IEBC SECTION 804
FIRE PROTECTION

IEBC 804.1.1 Corridor ratings. Where an approved automatic sprinkler system is installed throughout the story, the required fire-resistance rating for any corridor located on the story shall be permitted to be reduced in accordance with the *International Building Code*. In order to be considered for a corridor rating reduction, such system shall provide coverage for the ~~stairwell~~ stairway landings serving the floor and the intermediate landings immediately below.

IEBC SECTION 805
MEANS OF EGRESS

IEBC 805.3.1.1 Single-exit buildings. Only one exit is required from buildings and spaces of the following occupancies:

1. through 8. *(No change)*
9. In buildings of Group R-2 occupancy of any height with not more than four dwelling units per floor; with a smokeproof enclosure or outside ~~stair~~ stairway as an exit; and with such exit located within 20 feet (6096 mm) of travel to the entrance doors to all dwelling units served thereby.
10. *(No change)*

IEBC 805.3.1.2.1 Fire escape access and details. Fire escapes shall comply with all of the following requirements:

1. and 2. *(No change)*
3. Newly constructed fire escapes shall be permitted only where exterior ~~stairs~~ stairways cannot be utilized because of lot lines limiting the ~~stair~~ stairway size or because of the sidewalks, alleys, or roads at grade level.
4. Openings within 10 feet (3048 mm) of fire escape ~~stairs~~ stairways shall be protected by fire assemblies having minimum 3/4-hour fire-resistance ratings.
   Exception: Opening protection shall not be required in buildings equipped throughout with an approved automatic sprinkler system.
5. *(No change)*

IEBC 805.3.1.2.3 Dimensions. ~~Stairs~~ Stairways shall be at least 22 inches (559 mm) wide with risers not more than, and treads not less than, 8 inches (203 mm). Landings at the foot of ~~stairs~~ stairways shall not be less than 40 inches (1016 mm) wide by 36 inches (914 mm) long and located not more than 8 inches (203 mm) below the door.

IEBC 805.4.3 Door closing. In any *work area*, all doors opening onto an exit passageway at grade or an exit ~~stair~~ stairway shall be self-closing or automatic-closing by listed closing devices.

Exceptions:

1. Where exit enclosure is not required by the *International Building Code*.
2. Means of egress within or serving only a tenant space that is entirely outside the *work area*.

IEBC 805.4.3.1 Supplemental requirements for door closing. Where the *work area* exceeds 50 percent of the floor area, doors shall comply with Section 805.4.3 throughout the exit ~~stair~~ stairway from the *work area* to, and including, the level of exit discharge.

IEBC 805.9.1 Minimum requirement. Every required exit stairway that is part of the means of egress for any *work area* and that has three or more risers and is not provided with at least one handrail, or in which the existing handrails are judged to be in danger of collapsing, shall be provided with handrails for the full length of the ~~run of steps~~ stairway on at least one side. All exit stairways with a required egress width of more than 66 inches (1676 mm) shall have handrails on both sides.

IEBC 805.10.1 Minimum requirement. Every open portion of a ~~stair~~ stairway, landing, or balcony that is more than 30 inches (762 mm) above the floor or grade below and is not provided with guards, or those portions in which existing guards are judged to be in danger of collapsing, shall be provided with guards.

IEBC SECTION 806
ACCESSIBILITY

IEBC 806.2 ~~Stairs~~ Stairways and escalators in existing buildings. In *alterations* where an escalator or ~~stair~~ stairway is added where none existed previously, an accessible route shall be provided in accordance with Sections 1104.4 and 1104.5 of the *International Building Code*.

IEBC CHAPTER 9
ALTERATIONS—LEVEL 3

IEBC SECTION 902
SPECIAL USE AND OCCUPANCY

IEBC 902.2.1 Emergency controls. Emergency controls for boilers and furnace equipment shall be provided in accordance with the *International Mechanical Code* in all buildings classified as day nurseries, children's shelter facilities, residential childcare facilities, and similar facilities with children below the age of 21/2 years or that are classified as Group I-2 occupancies, and in group homes, teaching family homes, and supervised transitional living homes in accordance with the following:

1. Emergency shutoff switches for furnaces and boilers in basements shall be located at the top of the ~~stairs~~ stairways leading to the basement; and
2. Emergency shutoff switches for furnaces and boilers in other enclosed rooms shall be located outside of such room.

IEBC CHAPTER 11
ADDITIONS

IEBC SECTION 1102

HEIGHTS AND AREAS

IEBC 1102.2 Area limitations. No *addition* shall increase the area of an *existing building* beyond that permitted under the applicable provisions of Chapter 5 of the *International Building Code* for new buildings unless fire separation as required by the *International Building Code* is provided.

> **Exception:** In-filling of floor openings and nonoccupiable appendages such as elevator and exit ~~stair~~ <u>stairway</u> shafts shall be permitted beyond that permitted by the *International Building Code*.

IEBC CHAPTER 12
HISTORIC BUILDINGS

IEBC SECTION 1203
FIRE SAFETY

IEBC 1203.9 Stairway railings. Grand stairways shall be accepted without complying with the handrail and guard requirements. Existing handrails and guards at all ~~stairs~~ <u>stairways</u> shall be permitted to remain, provided they are not structurally *dangerous*.

IEBC SECTION 1205
CHANGE OF OCCUPANCY

IEBC 1205.11 ~~Stairs~~ <u>Stairways</u> and <u>guards</u> ~~railings~~. Existing stairways shall comply with the requirements of these provisions. The *code official* shall grant alternatives for stairways and ~~railings~~ <u>guards</u> if alternative stairways are found to be acceptable or are judged to meet the intent of these provisions. Existing stairways shall comply with Section 1203.

> **Exception:** For buildings less than 3,000 square feet (279 m2), existing conditions are permitted to remain at all ~~stairs~~ <u>stairways</u> and ~~rails~~ <u>guards</u>.

IEBC Resource A

2.1 Preliminary evaluation

Exterior Nonbearing Walls: The fire resistance of the exterior walls is important for two reasons. These walls (both bearing and non-bearing) are depended upon to: a) contain a fire within the building of origin; or b) keep an exterior fire *outside* the building. It is therefore important to indicate on the drawings where any openings are located as well as the materials and construction of all doors or shutters. The drawings should indicate the presence of wired glass, its thickness and framing, and identify the materials used for windows and door frames. The protection of openings adjacent to exterior means of escape (e.g., exterior ~~stairs~~ <u>stairways</u>, fire escapes) is particularly important. The ground floor drawing should locate the building on the property and indicate the precise distances to adjacent buildings.

The field investigator should be alert for differences in function as well as in materials and construction details. In general, the details within apartments are not as important as the major exit paths and ~~stairwells~~ <u>exit stairways</u>. The preliminary field investigation should attempt to determine the thickness of all walls. A term introduced below called “thickness design” will depend on an accurate (± 1/4 inch) determination. Even though this initial field survey is called “preliminary,” the data generated should be as accurate and complete as possible.

The field investigator should note the exact location from which observations are recorded. For instance, if a hole is found through a ~~stairwell~~ wall <u>enclosing an exit stairway</u> which allows a cataloguing of the construction details, the field investigation notes should reflect the location of the “find.” At the preliminary stage it is not necessary to core every wall; the interior details of construction can usually be determined at some location.

Doors: Doors to stairways and hallways represent some of the most important fire elements to be considered within a building. The uses of the spaces separated largely controls the level of fire performance necessary. Walls and doors enclosing ~~stairs~~ <u>stairways</u> or elevator shafts would normally require a higher level of performance than between a the bedroom and bath. The various uses are differentiated in Figure 1.

Rule 7: The fire endurance of asymmetrical constructions depends on the direction of heat flow.
This rule is a consequence of Rules 4 and 6 as well as other factors. This rule is useful in determining the relative protection of corridors and ~~stairwells~~ <u>walls enclosing an exit stairway</u> from the surrounding spaces. In addition, there are often situations where a fire is more likely, or potentially more severe, from one side or the other.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.
The intent is for the consistent use of the defined terms for ‘stair’ and ‘stairway’ throughout the all the codes. Stair is used when talking about individual steps or stepped aisles. Stairway is used when the provisions are applicable to a series of steps, or flights and landings between stories. In addition, when terms such as ‘exit access stairway’ and ‘exit access ramp’ follow

each other in a list, consistently eliminate a couple of words by saying 'exit access stairway and ramp.' When the provisions are equally appropriate for ramps and stairways, ramps is added.

PART I – IBC MEANS OF EGRESS
Committee Action: **Approved as Submitted**

Committee Reason: The proposal revised the use of 'stair' and 'stairway' throughout the code so that the application matches the defined terms. This will clarify when requirements are intended for a change in elevation (i.e., stair) vs. a change in story (i.e., stairway). There was some concern about the style choice to say 'exit access stairway and ramp' vs. using the specific defined terms 'exit access stairways and exit access ramps'.

Assembly Action: **None**

PART II – IMC
Committee Action: **Approved as Submitted**

Committee Reason: The proposal revised the use of 'stair' and 'stairway' throughout the code so that the application matches the defined terms. This will clarify when requirements are intended for a change in elevation (i.e., stair) vs. a change in story (i.e., stairway).

Assembly Action: **None**

PART IV – IEBC
Committee Action: **Approved as Submitted**

Committee Reason: The proposal revised the use of 'stair' and 'stairway' throughout the code so that the application matches the defined terms. This will clarify when requirements are intended for a change in elevation (i.e., stair) vs. a change in story (i.e., stairway).

Assembly Action: **None**

E3-12

202, 405.7.1, 410.6.1, 411.7, [F] 414.7.2, 716.5.3, 1004.3, 1008.1.4.4, 1015, 1018.4, 1028.9 (IFC 5005.4.4, [B]1004.3, [B]1008.1.4.4, [B]1015, [B] 1018.4, [B]1028.9)

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company (grkeith@mac.com)

Revise as follows:

SECTION 202
DEFINITIONS

EXIT ACCESS POINT ~~DOORWAY~~. A ~~door or access~~ point along the path of egress travel from an occupied room, area or space where the path of egress enters an intervening room, corridor, exit access ~~stair~~ stairway or exit access ramp.

Revise as follows:

405.7.1 Number of exits. Each floor level shall be provided with no fewer than two exits. Where compartmentation is required by Section 405.4, each compartment shall have no fewer than one exit and shall also have no fewer than one exit access point ~~doorway~~ into the adjoining compartment.

410.6.1 Arrangement. Where two or more exits or exit access points ~~doorways~~ from the stage are required in accordance with Section 1015.1, no fewer than one exit or exit access point ~~doorway~~ shall be provided on each side of a stage.

411.7 Exit marking. Exit signs shall be installed at the required exit or exit access points ~~doorways~~ of amusement buildings in accordance with this section and Section 1011. Approved directional exit markings shall also be provided. Where mirrors, mazes or other designs are utilized that disguise the path of egress travel such that they are not apparent, approved and listed low-level exit signs that comply with Section 1011.5, and directional path markings listed in accordance with UL 1994, shall be provided and located not more than 8 inches (203 mm) above the walking surface and on or near the path of egress travel. Such markings shall become visible in an emergency. The directional exit marking shall be activated by the automatic fire detection system and the automatic sprinkler system in accordance with Section 907.2.12.2.

[F] 414.7.2 (IFC 5005.4.4) Dispensing, use and handling. Where hazardous materials having a hazard ranking of 3 or 4 in accordance with NFPA 704 are transported through corridors, interior exit stairways or ramps, or exit passageways there shall be an emergency telephone system, a local manual alarm station or an approved alarm-initiating device at not more than 150-foot (45 720 mm) intervals and at each exit and exit access point ~~doorway~~ throughout the transport route. The signal shall be relayed to an approved central, proprietary or remote station service or constantly attended on-site location and shall initiate a local audible alarm.

716.5.3 Door assemblies in corridors and smoke barriers. Fire door assemblies required to have a minimum fire
protection rating of 20 minutes where located in corridor walls or smoke barrier walls having a fire-resistance rating in accordance with Table 716.5 shall be tested in accordance with NFPA 252 or UL 10C without the hose stream test.

Exceptions:

1. Viewports that require a hole not larger than 1 inch (25 mm) in diameter through the door, have at least a 0.25-inch-thick (6.4 mm) glass disc and the holder is of metal that will not melt out where subject to temperatures of 1,700°F (927°C).
2. Corridor door assemblies in occupancies of Group I-2 shall be in accordance with Section 407.3.1.
3. Unprotected openings shall be permitted for corridors in multitheater complexes where each motion picture auditorium has at least one-half of its required exit or exit access points ~~doorways~~ opening directly to the exterior or into an exit passageway.
4. Horizontal sliding doors in smoke barriers that comply with Sections 408.3 and 408.8.4 in occupancies in Group I-3.

Revise as follows:

1004.3 (IFC [B] 1004.3) Posting of occupant load. Every room or space that is an assembly occupancy shall have the occupant load of the room or space posted in a conspicuous place, near the main exit or exit access point ~~doorway~~ from the room or space. Posted signs shall be of an approved legible permanent design and shall be maintained by the owner or authorized agent.

1008.1.4.4 (IFC [B] 1008.1.4.4) Security grilles. In Groups B, F, M and S, horizontal sliding or vertical security grilles are permitted at the main exit and shall be openable from the inside without the use of a key or special knowledge or effort during periods that the space is occupied. The grilles shall remain secured in the full-open position during the period of occupancy by the general public. Where two or more means of egress are required, not more than one-half of the exits or exit access points ~~doorways~~ shall be equipped with horizontal sliding or vertical security grilles.

SECTION 1015 (IFC [B] 1015)
EXIT AND EXIT ACCESS POINTS ~~DOORWAYS~~

1015.1 (IFC [B] 1015.1) Exits or exit access points ~~doorways~~ from spaces. Two exits or exit access ~~doorways~~ points from any space shall be provided where one of the following conditions exists:

1. The occupant load of the space exceeds one of the values in Table 1015.1.

   Exceptions:

   1. In Group R-2 and R-3 occupancies, one means of egress is permitted within and from individual dwelling units with a maximum occupant load of 20 where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
   2. Care suites in Group I-2 occupancies complying with Section 407.4.3.

2. The common path of egress travel exceeds one of the limitations of Section 1014.3.
3. Where required by Section 1015.3, 1015.4, 1015.5, or 1015.6.

Where a building contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.

TABLE 1015.1 (IFC [B] TABLE 1015.1)
SPACES WITH ONE EXIT OR EXIT ACCESS POINT ~~DOORWAY~~

OCCUPANCY	MAXIMUM OCCUPANT LOAD
A, B, E, F, M, U	49
H-1, H-2, H-3	3
H-4, H-5, I-1, I-2, I-3, I-4, R	10
S	29

1015.1.1 (IFC [B] 1015.1.1) Three or more exits or exit access points ~~doorways~~. Three exits or exit access points ~~doorways~~ shall be provided from any space with an occupant load of 501 to 1,000. Four exits or exit access points ~~doorways~~ shall be provided from any space with an occupant load greater than 1,000.

1015.2 (IFC [B] 1015.2) Exit or exit access point ~~doorway~~ arrangement. Required exits shall be located in a manner that makes their availability obvious. Exits shall be unobstructed at all times. Exit and exit access points ~~doorways~~ shall be arranged in accordance with Sections 1015.2.1 and 1015.2.2.

1015.2.1 (IFC [B] 1015.2.1) Two exits or exit access points ~~doorways~~. Where two exits or exit access points ~~doorways~~ are required from any portion of the exit access, the exit doors or exit access points ~~doorways~~ shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors or exit access points ~~doorways~~. Interlocking or scissor stairs shall be counted as one exit stairway.

Exceptions:

1. Where interior exit stairways are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required exit separation shall be measured along the shortest direct line of travel within the corridor.
2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the exit doors or exit access points ~~doorways~~ shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

1015.2.2 (IFC [B] 1015.2.2) Three or more exits or exit access points ~~doorways~~. Where access to three or more exits is required, at least two exit doors or exit access points ~~doorways~~ shall be arranged in accordance with the provisions of Section 1015.2.1.

1015.3 (IFC [B] 1015.3) Boiler, incinerator and furnace rooms. Two exit access points ~~doorways~~ are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m2) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu) (422 000 KJ) input capacity. Where two exit access points ~~doorways~~ are required, one is permitted to be a fixed ladder or an alternating tread device. Exit access points ~~doorways~~ shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.

1015.4 (IFC [B] 1015.4) Refrigeration machinery rooms. Machinery rooms larger than 1,000 square feet (93 m2) shall have not less than two exits or exit access points ~~doorways~~. Where two exit access points ~~doorways~~ are required, one such doorway is permitted to be served by a fixed ladder or an alternating tread device. Exit access points ~~doorways~~ shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of room.

All portions of machinery rooms shall be within 150 feet (45 720 mm) of an exit or exit access point ~~doorway~~. An increase in travel distance is permitted in accordance with Section 1016.1.

Doors shall swing in the direction of egress travel, regardless of the occupant load served. Doors shall be tight fitting and self-closing.

1015.5 (IFC [B] 1015.5) Refrigerated rooms or spaces. Rooms or spaces having a floor area larger than 1,000 square feet (93 m^2), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two exits or exit access points ~~doorways~~
.

Travel distance shall be determined as specified in Section 1016.1, but all portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an exit or exit access point ~~doorway~~ where such rooms are not protected by an approved automatic sprinkler system. Egress is allowed through adjoining refrigerated rooms or spaces.

Exception: Where using refrigerants in quantities limited to the amounts based on the volume set forth in the International Mechanical Code.

1015.6 (IFC [B] 1015.6) Day care means of egress. Day care facilities, rooms or spaces where care is provided for more than 10 children that are 2-1/2 years of age or less, shall have access to not less than two exits or exit access points ~~doorways~~.

1018.4 (IFC [B] 1018.4) Dead ends. Where more than one exit or exit access point ~~doorway~~ is required, the exit access shall be arranged such that there are no dead ends in corridors more than 20 feet (6096 mm) in length.

Exceptions:

1. In occupancies in Group I-3 of Occupancy Condition 2, 3 or 4 (see Section 308.5), the dead end in a corridor shall not exceed 50 feet (15 240 mm).
2. In occupancies in Groups B, E, F, I-1, M, R-1, R-2, R-4, S and U, where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the length of the dead-end corridors shall not exceed 50 feet (15 240 mm).
3. A dead-end corridor shall not be limited in length where the length of the dead-end corridor is less than 2.5 times the least width of the dead-end corridor.

1028.9 (IFC [B] 1028.9) Assembly aisles are required. Every occupied portion of any building, room or space used for assembly purposes that contains seats, tables, displays, similar fixtures or equipment shall be provided with aisles leading to exits or exit access points ~~doorways~~ in accordance with this section. Aisle accessways for tables and seating shall comply with Section 1028.10.1.

Reason: The term exit access doorway is a misnomer. By definition, the term exit access doorway includes any access point along the path of egress travel including exit access stairways and ramps. Given the literal nature of the term "doorway," without consulting the definition, most code users would not necessarily associate stairways and ramps when they read the word doorway. This distinction becomes important with the 2012 Edition of the IBC. E5-09/10 introduced the terms "exit access stairway" and "exit access ramp" into Chapter 10. These definitions are particularly significant because the concept of accessing exits at an adjacent story by way of exit access stairways and ramps has been formalized in the 2012 IBC.

There are several requirements that relate to the establishment of these terms. For instance, Section 1015.2 states, "Exit and exit access doorways shall be arranged in accordance with Sections 1015.2.1 and 1015.2.2." It is important that required exits and exit access stairways serving a given story are properly separated. The fact that the requirement refers only to exits and exit access doorways can be misleading. By requiring the separation of exits and exit access points, it is clear to code practitioners that any specified exit access component, whether it be a door, doorway, exit access stairway or exit access ramp, must comply with the provision.

It is not in the best interests of either the design or enforcement communities for the IBC to be misleading through its terminology. It is imperative that the IBC articulate what is intended in the clearest fashion possible. This is particularly important at a time when the IBC means of egress definitions and provisions are being technically and editorially adjusted. Approval of this proposal will increase uniformity in the application of fundamental means of egress provisions.

Cost Impact: None

202-Exit access doorway-E-Keith.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that this new term might confuse the issue rather than clarify this for code users. Exit access points would be confusing when looking at exit sign placement, locations of pull stations. The committee was concerned that the use of this term may possibly reduce the concept of compartmentation or blur the line for measurement of where to measure travel distance.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment

Modify the proposal as follows:

EXIT ACCESS ~~POINTS~~ DOORWAY. A door or doorway ~~point~~ along the path of egress travel from an occupied room, area or space where such ~~the~~ path of egress travel enters an intervening room~~,~~ or corridor~~, exit access stairway or exit access ramp~~.

EXIT ACCESS POINT. A point along the path of egress travel from an occupied room, area or space where such path of egress travel enters an exit access stairway or exit access ramp.

405.7.1 Number of exits. Each floor level shall be provided with no fewer than two exits. Where compartmentation is required by Section 405.4, each compartment shall have no fewer than one exit and shall also have no fewer than one exit, ~~or~~ exit access doorway or exit access point into the adjoining compartment.

410.6.1 Arrangement. Where two or more exits, ~~or~~ exit access doorways or exit access points from the stage are required in accordance with Section 1015.1, no fewer than one exit, ~~or~~ exit access doorway or exit access point shall be provided on each side of a stage.

411.7 Exit marking. Exit signs shall be installed at the required exits, ~~or~~ exit access doorways or exit access points of amusement buildings in accordance with this section and Section 1011. Approved directional exit markings shall also be provided. Where mirrors, mazes or other designs are utilized that disguise the path of egress travel such that they are not apparent, approved and listed low-level exit signs that comply with Section 1011.5, and directional path markings listed in accordance with UL 1994, shall be provided and located not more than 8 inches (203 mm) above the walking surface and on or near the path of egress travel. Such markings shall become visible in an emergency. The directional exit marking shall be activated by the automatic fire detection system and the automatic sprinkler system in accordance with Section 907.2.12.2.

[F] 414.7.2 (IFC 5005.4.4) Dispensing, use and handling. Where hazardous materials having a hazard ranking of 3 or 4 in accordance with NFPA 704 are transported through corridors, interior exit stairways or ramps, or exit passageways there shall be an emergency telephone system, a local manual alarm station or an approved alarm-initiating device at not more than 150-foot (45 720 mm) intervals and at each exit, ~~or~~ exit access doorway or exit access point throughout the transport route. The signal shall be relayed to an approved central, proprietary or remote station service or constantly attended on-site location and shall initiate a local audible alarm.

716.5.3 Door assemblies in corridors and smoke barriers. Fire door assemblies required to have a minimum fire protection rating of 20 minutes where located in corridor walls or smoke barrier walls having a fire-resistance rating in accordance with Table 716.5 shall be tested in accordance with NFPA 252 or UL 10C without the hose stream test.

Exceptions:

1. Viewports that require a hole not larger than 1 inch (25 mm) in diameter through the door, have at least a 0.25-inch-thick (6.4 mm) glass disc and the holder is of metal that will not melt out where subject to temperatures of 1,700°F (927°C).
2. Corridor door assemblies in occupancies of Group I-2 shall be in accordance with Section 407.3.1.
3. Unprotected openings shall be permitted for corridors in multitheater complexes where each motion picture auditorium has at least one-half of its required exit, ~~or~~ exit access doorway or exit access points opening directly to the exterior or into an exit passageway.

4. Horizontal sliding doors in smoke barriers that comply with Sections 408.3 and 408.8.4 in occupancies in Group I-3.

1004.3 (IFC [B] 1004.3) Posting of occupant load. Every room or space that is an assembly occupancy shall have the occupant load of the room or space posted in a conspicuous place, near the main exit, ~~or~~ exit access doorway or exit access point from the room or space. Posted signs shall be of an approved legible permanent design and shall be maintained by the owner or authorized agent.

1008.1.4.4 (IFC [B] 1008.1.4.4) Security grilles. In Groups B, F, M and S, horizontal sliding or vertical security grilles are permitted at the main exit and shall be openable from the inside without the use of a key or special knowledge or effort during periods that the space is occupied. The grilles shall remain secured in the full-open position during the period of occupancy by the general public. Where two or more means of egress are required, not more than one-half of the exits, ~~or~~ exit access doorways or exit access points shall be equipped with horizontal sliding or vertical security grilles.

SECTION 1015
EXITS, ~~AND~~ EXIT ACCESS DOORWAYS AND EXIT ACCESS POINTS

1015.1 Exits, ~~or~~ exit access doorways or exit access points from spaces. Two exits, ~~or~~ exit access doorways or exit access points from any space shall be provided where one of the following conditions exists:

1. The occupant load of the space exceeds one of the values in Table 1015.1.

   Exceptions:

   1. In Group R-2 and R-3 occupancies, one means of egress is permitted within and from individual dwelling units with a maximum occupant load of 20 where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
   2. Care suites in Group I-2 occupancies complying with Section 407.4.

2. The common path of egress travel exceeds one of the limitations of Section 1014.3.
3. Where required by Section 1015.3, 1015.4, 1015.5, or 1015.6.

Where a building contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.

TABLE 1015.1
SPACES WITH ONE EXIT, ~~OR~~
EXIT ACCESS DOORWAY OR EXIT ACCESS POINT

OCCUPANCY	MAXIMUM OCCUPANT LOAD
A, B, E, F, M, U	49
H-1, H-2, H-3	3
H-4, H-5, I-1, I-2, I-3, I-4, R	10
S	29

1015.1.1 Three or more exits, ~~or~~ exit access doorways or exit access points. Three exits, ~~or~~ exit access doorways or exit access points shall be provided from any space with an occupant load of 501 to 1,000. Four exits, ~~or~~ exit access doorways or exit access points shall be provided from any space with an occupant load greater than 1,000.

1015.2 Exit, ~~or~~ exit access doorway or exit access point arrangement. Required exits shall be located in a manner that makes their availability obvious. Exits shall be unobstructed at all times. Exits, ~~and~~ exit access doorways and exit access points shall be arranged in accordance with Sections 1015.2.1 and 1015.2.2.

1015.2.1 Two exits, ~~or~~ exit access doorways or exit access points. Where two exits, ~~or~~ exit access doorways or exit access points are required from any portion of the exit access, the exit doors, ~~or~~ exit access doorways or exit access points shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors, ~~or~~ exit access doorways or exit access points. Interlocking or scissor stairs shall be counted as one exit stairway.

Exceptions:

1. Where interior exit stairways are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required exit separation shall be measured along the shortest direct line of travel within the corridor.
2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the exit doors, ~~or~~ exit access doorways or exit access points shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

1015.2.2 Three or more exits, ~~or~~ exit access doorways or exit access points. Where access to three or more exits, ~~doors or~~ exit access doorways or exit access points is required, at least two exit doors exits, ~~or~~ exit access doorways or exit access points shall be arranged in accordance with the provisions of Section 1015.2.1.

1015.3 Boiler, incinerator and furnace rooms. Two exits, exit access doorways or exit access points are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m^2) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu) (422 000 KJ) input capacity. Where two exits, exit access doorways or exit access points are required, one is permitted to be a fixed ladder or an alternating tread device. Exits, exit access doorways or exit access points shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.

1015.4 Refrigeration machinery rooms. Machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two exits, ~~or~~ exit access doorways or exit access points. Where two exits, exit access doorways or exit access points are required, one such exit, exit access doorway or exit access point is permitted to be served by a fixed ladder or an alternating tread device. Exits, exit access doorways or exit access points shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of room.

All portions of machinery rooms shall be within 150 feet (45 720 mm) of an exit, ~~or~~ exit access doorway or exit access point. An increase in travel distance is permitted in accordance with Section 1016.1.

Doors shall swing in the direction of egress travel, regardless of the occupant load served. Doors shall be tight fitting and self-closing.

1015.5 Refrigerated rooms or spaces. Rooms or spaces having a floor area larger than 1,000 square feet (93 m^2), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two exits, ~~or~~ exit access doorways or exit access points.

Travel distance shall be determined as specified in Section 1016.1, but all portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an exit, ~~or~~ exit access doorway or exit access point where such rooms are not protected by an approved automatic sprinkler system. Egress is allowed through adjoining refrigerated rooms or spaces.

> **Exception:** Where using refrigerants in quantities limited to the amounts based on the volume set forth in the International Mechanical Code.

1015.6 Day care means of egress. Day care facilities, rooms or spaces where care is provided for more than 10 children that are 2-1/2 years of age or less, shall have access to not less than two exits, ~~or~~ exit access doorways or exit access points.

1018.4 (IFC [B] 1018.4) Dead ends. Where more than one exit, ~~or~~ exit access doorway or exit access point is required, the exit access shall be arranged such that there are no dead ends in corridors more than 20 feet (6096 mm) in length.

Exceptions:

1. In occupancies in Group I-3 of Occupancy Condition 2, 3 or 4 (see Section 308.5), the dead end in a corridor shall not exceed 50 feet (15 240 mm).
2. In occupancies in Groups B, E, F, I-1, M, R-1, R-2, R-4, S and U, where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the length of the dead-end corridors shall not exceed 50 feet (15 240 mm).
3. A dead-end corridor shall not be limited in length where the length of the dead-end corridor is less than 2.5 times the least width of the dead-end corridor.

1028.9 (IFC [B] 1028.9) Assembly aisles are required. Every occupied portion of any building, room or space used for assembly purposes that contains seats, tables, displays, similar fixtures or equipment shall be provided with aisles leading to exits, ~~or~~ exit access doorways or exit access points in accordance with this section. Aisle accessways for tables and seating shall comply with Section 1028.10.1.

Commenter's Reason: Based on means of egress code committee comments that the new term, "exit access point," might confuse code users with respect to exit sign placement and locations of pull stations, the definition of exit access doorway has been restored. The original reason for the proposal submittal was that the current definition of EXIT ACCESS DOORWAY contained additional exit access components; specifically, exit access stairways and exit access ramps. Those terms are independently defined in the IBC and need not be included in the definition of exit access doorway. A new term "exit access point" is created for purposes of technical clarification and is intended to identify how to accurately determine numbers of required exits or access to exits from spaces and exit/exit access configuration. The term is integrated into Section 1015 and helps to indicate what combination of means of egress components may be used to satisfy the various requirements contained in that section. For instance, Section 1015.2.1 presently requires separation between exits and exit access doorways. Based on the current definition of exit access doorway, exit access stairways and ramps would also be required to be properly separated. As a matter of practice, most code practitioners do not normally consult definitions and that technical subtlety might be lost. The creation of a definition for EXIT ACCESS POINT and the reference to that term in applicable sections will assist design professionals and code enforcement officials and result in more consistent interpretation and application of these fundamental provisions. This public comment has addressed the concerns of the means of egress committee.

E3-12
Final Action: AS AM AMPC____ D

E4 – 12
202, 1026.3 (IFC [B] 1026.3)

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company (grkeith@mac.com)

Revise as follows:

SECTION 202
DEFINITIONS

EXIT ACCESS RAMP. An ~~interior~~ *ramp* that is not a required *interior* or *exterior* *exit ramp*.

EXIT ACCESS STAIRWAY. An ~~interior~~ *stairway* that is not a required *interior* or *exterior* *exit stairway*.

EXTERIOR EXIT RAMP. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and is open to yards, courts or public ways.

EXTERIOR EXIT STAIRWAY~~, EXTERIOR~~. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and is open to ~~that is open on at least one side, except for required structural columns, beams, handrails and guards. The adjoining open areas shall be either~~ yards, courts or public ways. ~~The other sides of the exterior stairway need not be open.~~

INTERIOR EXIT RAMP. An *exit* component that serves to meet one or more *means of egress* design requirements, such as required number of *exits* or *exit access* travel distance, and provides for a protected path of egress travel to the *exit discharge* or *public way.*

INTERIOR EXIT STAIRWAY. An *exit* component that serves to meet one or more *means of egress* design requirements, such as required number of *exits* or *exit access* travel distance, and provides for a protected path of egress travel to the *exit discharge* or *public way.*

RAMP. A walking surface that has a running slope steeper than one unit vertical in 20 units horizontal (5-percent slope).

STAIRWAY. One or more *flights* of *stairs*, either exterior or interior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

~~**STAIRWAY, INTERIOR.** A stairway not meeting the definition of an exterior stairway.~~

Revise as follows:

1026.3 (IFC [B] 1026.3) Open side. *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall be open on at least one side, except for required structural columns, beams, handrails and guards. An open side shall have a minimum of 35 square feet (3.3 m^2) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

Reason: Several new means of egress terms were created and defined in the 2012 Edition of the International Building Code. They include, “EXIT ACCESS STAIRWAY,” “EXIT ACCESS RAMP,” “INTERIOR EXIT STAIRWAY” and “INTERIOR EXIT RAMP.” These, and other terms, are fundamental to the design of any means of egress system. There is a precise relationship between these terms. It is proposed to modify the definition of both “EXIT ACCESS STAIRWAY” and “EXIT ACCESS RAMP” by deleting the word “interior.” This is appropriate in that the exit access can be exterior to the building and changes in floor level can occur along the path of egress travel. Since an exit access stairway or ramp can be interior or exterior to the building, it is clarified that they are not exterior exit stairways or ramps as well.

Exterior exit stairways and exterior exit ramps are exit components according to the definition of “EXIT” in Section 202 and Section 1022.1. Both of these terms are currently undefined in the IBC. There is, however, a definition for “STAIRWAY, EXTERIOR.” An exterior stairway is not a means of egress component, per se, in the IBC. It is proposed to replace the definition of “STAIRWAY, EXTERIOR” with a definition for “EXTERIOR EXIT STAIRWAY.” The proposed definition is consistent with the current definition except for the distinction that such stairways are open to yards, courts or public ways consistent with the requirements in Section 1026.4. Additionally, Section 1026.3 has been modified to add technical language formerly contained in the definition of “STAIRWAY, EXTERIOR” as regards in impact of structural columns, beams, handrails and guards on openness determination. A companion definition for exterior exit ramps has been created which is consistent with the proposed definition of exterior exit stairway.

Lastly, it is proposed to delete the current definition of “STAIRWAY, INTERIOR.” This definition is nonsensical, obsolete and out of current technical context. The current definition of "EXIT ACCESS STAIRWAY" effectively replaces this definition.

The definitions of “INTERIOR EXIT RAMP,” “INTERIOR EXIT STAIRWAY.” “RAMP” and “STAIRWAY” have been included for reference purposes so the relationship of the various terms can be seen.

In summary, the proposed modifications to these means of egress component definitions will provide necessary clarity for users who are designing or analyzing a means of egress system. It is imperative that IBC definitions be technically accurate and properly descriptive. Approval of this proposal will allow for more consistent interpretations and applications of important IBC means of egress provisions.

Cost Impact: None

202-Exit access doorways-E-Keith.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: There was a concern that ramps or stairways within the exit discharge would fall within the definition of exit access ramps and stairways.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this Public Comment

Modify the proposal as follows:

EXIT ACCESS RAMP. A ramp within the exit access portion of the means of egress system ~~that is not a required *interior* or *exterior exit ramp*~~.

EXIT ACCESS STAIRWAY. A stairway within the exit access portion of the means of egress system ~~that is not a required *interior* or *exterior exit stairway*~~.

(Portions of proposal not shown remain unchanged.)

Commenter’s Reason: The ICC Means of Egress Code Development Committed disapproved Item E4-12 at the 2012 ICC code development hearings in Dallas, Texas. In its published reason statement, the committee noted, “There was a concern that ramps or stairways within the exit discharge would fall within the definition of exit access ramps and stairways.” Based on that comment, and the fact that the concern was over current text, the proposed definitions for exit access stairways and exit access ramps have been revised to indicate that exit access stairways and ramps occur within the exit access portion of the means of egress system. Given that the formal technical relationship between exit access stairways and ramps and interior exit stairways and ramps has been established in the 2012 Edition of the IBC, it is important that these key definitions accurately describe their role in the proper design of a means of egress system. Approval of this public comment will provide necessary clarification to these fundamental means of egress provisions.

E4-12

Final Action: AS AM AMPC____ D

E7-12

202, 403.5.1, 505.2.3, 707.3.3, 707.5.1, 707.7.1, 711.4, 712.1.8, 712.1.12, 713.1, 1001.2, 1007.2, 1007.3, 1007.6.2, 1009.2-1009.3.1.8, 1010.2, 1011.1, 1015.1, 1015.2, 1015.2.1, 1015.2.1.1 (New), 1015.2.2, 1015.2.3 (New), 1015.2.3.1 (New), 1016.3, 1018 (New), 1026.6, 1027.1, 1028.5 (IFC [B] 1001.2, 1007.2, 1007.3, 1007.6.2, 1009.2-1009.3.1.8, 1010.2, 1011.1, 1015.1, 1015.2, 1015.2.1, 1015.2.1.1 (New), 1015.2.2, 1015.2.3 (New), 1015.2.3.1 (New), 1016.3, 1018 (New), 1026.6, 1027.1, 1028.5)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

SECTION 202
DEFINITIONS

EXIT ACCESS RAMP. An ~~interior~~ *ramp* that is not a required ~~*interior*~~ *exit ramp*.

EXIT ACCESS STAIRWAY. An ~~interior~~ *stairway* that is not a required ~~*interior*~~ *exit stairway*.

Revise as follows:

SECTION 1001
ADMINISTRATION

1001.2 (IFC [B] 1001.2) Minimum requirements. It shall be unlawful to alter a building or structure in a manner that will reduce the number of exits or the capacity of the means of egress to less than required by this code. <u>Means of egress shall be designed to be continuous and unobstructed</u>.

SECTION 1007 (IFC [B] 1007)
ACCESSIBLE MEANS OF EGRESS

1007.2 (IFC [B] 1007.2) Continuity and components. Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible* routes complying with Section 1104.
2. *Interior exit stairways* complying with Sections 1007.3 and 1022.
3. ~~Interior~~ *exit access stairways* complying with Sections 1007.3 and ~~1009.3~~ <u>1018.2 or 1018.3</u>.
4. Exterior *exit stairways* complying with Sections 1007.3 and 1026 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1007.4.
6. Platform lifts complying with Section 1007.5.
7. *Horizontal exits* complying with Section 1025.
8. *Ramps* complying with Section 1010.
9. *Areas of refuge* complying with Section 1007.6.
10. Exterior area for assisted rescue complying with Section 1007.7.

1007.3 (IFC [B] 1007.3) Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between stories shall have a clear width of 48 inches (1219 mm) minimum between *handrails* and shall either incorporate an *area of refuge* within an enlarged floor-level landing or shall be accessed from either an *area of refuge* complying with Section 1007.6 or a *horizontal exit*. *Exit access stairways* that connect levels in the same story are not permitted as part of an *accessible means of egress*.

Exceptions:

1. Exit access stairways providing means of egress from mezzanines are permitted as part of an accessible means of egress.
2~~1~~. The clear width of 48 inches (1219 mm) between *handrails* is not required in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3~~2~~. *Areas of refuge* are not required at *stairways* in buildings equipped throughout by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
4~~3~~. The clear width of 48 inches (1219 mm) between *handrails* is not required for *stairways* accessed from a *horizontal exit*.
5~~4~~. *Areas of refuge* are not required at *stairways* serving *open parking garages*.
6~~5~~. *Areas of refuge* are not required for smoke protected seating areas complying with Section 1028.6.2.
7~~6~~. The *areas of refuge* are not required in Group R-2 occupancies.

1007.6.2 (IFC [B] 1007.6.2) Separation. Each *area of refuge* shall be separated from the remainder of the story by a *smoke barrier* complying with Section 709 or a *horizontal exit* complying with Section 1025. Each *area of refuge* shall be designed to minimize the intrusion of smoke.

Exception: *Areas of refuge* located within an enclosure for ~~*exit access stairways* or~~ *interior exit stairways*.

SECTION 1009 (IFC [B] 1009)
STAIRWAYS

1009.1 (IFC [B] 1009.1) General. Stairways serving occupied portions of a building shall comply with the requirements of this section.

~~**1009.2 (IFC [B] 1009.2) Interior exit stairways.** Interior exit stairways shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1.~~

~~**1009.2.1 (IFC [B] 1009.2.1) Where required.** Interior exit stairways shall be included, as necessary, to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance.~~

~~**1009.2.2 (IFC [B] 1009.2.2) Enclosure.** All interior exit stairways shall be enclosed in accordance with the provisions of Section 1022.~~

~~**1009.3 (IFC [B] 1009.3) Exit access stairways.**~~ *Relocated to 1018.3*

~~**1009.3.1 (IFC [B] 1009.3.1) Construction.** Where required, enclosures for exit access stairways shall be constructed in accordance with this section. Exit access stairway enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 711, or both.~~

~~**1009.3.1.1 (IFC [B] 1009.3.1.1) Materials.** Exit access stairway enclosures shall be of materials permitted by the building type of construction.~~

~~**1009.3.1.2 (IFC [B] 1009.3.1.2) Fire-resistance rating.** Exit access stairway enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more, and not less than 1 hour where connecting less than four stories. The number of stories connected by the exit access stairway enclosures shall include any basements, but not any mezzanines. Exit access stairway enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours.~~

~~**1009.3.1.3 (IFC [B] 1009.3.1.3) Continuity.** Exit access stairway enclosures shall have continuity in~~

~~accordance with Section 707.5 for fire barriers or Section 711.4 for horizontal assemblies as applicable.~~

~~**1009.3.1.4 (IFC [B] 1009.3.1.4) Openings.** Openings in an exit access stairway enclosure shall be protected in accordance with Section 716 as required for fire barriers. Doors shall be self- or automatic-closing by smoke detection in accordance with Section 716.5.9.3.~~

~~**1009.3.1.4.1 (IFC [B] 1009.3.1.4.1) Prohibited openings.** Openings other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.~~

~~**1009.3.1.5 (IFC [B] 1009.3.1.5) Penetrations.** Penetrations in an exit access stairway enclosure shall be protected in accordance with Section 714 as required for fire barriers.~~

~~**1009.3.1.5.1 (IFC [B] 1009.3.1.5.1) Prohibited penetrations.** Penetrations other than those necessary for the purpose of the exit access stairway enclosure shall not be permitted in exit access stairway enclosures.~~

~~**1009.3.1.6 (IFC [B] 1009.3.1.6) Joints.** Joints in an exit access stairway enclosure shall comply with Section 715.~~

~~**1009.3.1.7 (IFC [B] 1009.3.1.7) Ducts and air transfer openings.** Penetrations of an exit access stairway enclosure by ducts and air transfer openings shall comply with Section 717.~~

~~**1009.3.1.8 (IFC [B] 1009.3.1.8) Exterior walls.** Where exterior walls serve as a part of an exit access stairway enclosure, such walls shall comply with the requirements of Section 705 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply.~~

(Renumber remaining sections)

SECTION 1010
RAMPS

~~**1010.2 (IFC [B] 1010.2) Enclosure.** All interior exit ramps shall be enclosed in accordance with the applicable provisions of Section 1022. Exit access ramps shall be enclosed in accordance with the provisions of Section 1009.3 for enclosure of stairways.~~

(Renumber remaining sections)

SECTION 1011 (IFC [B] 1011)
EXIT SIGNS

1011.1 (IFC [B] 1011.1) Where required. *Exits* ~~and *exit access* doors~~ shall be marked by an *approved exit* sign readily visible from any direction of egress travel. The path of egress travel to *exits* and within *exits* shall be marked by readily visible *exit* signs to clearly indicate the direction of egress travel in cases where the *exit* or the path of egress travel is not immediately visible to the occupants. Intervening *means of egress* doors within *exits* shall be marked by *exit* signs. *Exit* sign placement shall be such that no point in an *exit access corridor* or *exit passageway* is more than 100 feet (30 480 mm) or the *listed* viewing distance for the sign, whichever is less, from the nearest visible *exit* sign.

Exceptions:

1. *Exit* signs are not required in rooms or areas that require only one *exit* or *exit access*.
2. Main exterior *exit* doors or gates that are obviously and clearly identifiable as *exits* need not have *exit* signs where *approved* by the *building official*.
3. *Exit* signs are not required in occupancies in Group U and individual sleeping units or dwelling units in Group R-1, R-2 or R-3.

4. *Exit* signs are not required in dayrooms, sleeping rooms or dormitories in occupancies in Group I-3.
5. In occupancies in Groups A-4 and A-5, *exit* signs are not required on the seating side of vomitories or openings into seating areas where *exit* signs are provided in the concourse that are readily apparent from the vomitories. Egress lighting is provided to identify each vomitory or opening within the seating area in an emergency.

SECTION 1015 (IFC [B] 1015)
EXITS AND EXIT ACCESS DOORWAYS

1015.1 (IFC [B] 1015.1) Exits or exit access doorways from spaces. Two exits or exit access doorways from any space including mezzanines shall be provided where one of the following conditions exists:

1. The *occupant load* of the space exceeds one of the values in Table 1015.1.

   Exceptions:

   1. In Group R-2 and R-3 occupancies, one *means of egress* is permitted within and from individual dwelling units with a maximum *occupant load* of 20 where the dwelling unit is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
   2. Care suites in Group I-2 occupancies complying with Section 407.4.3.

2. The *common path of egress travel* exceeds one of the limitations of Section 1014.3.
3. Where required by Section 1015.3, 1015.4, 1015.5, or 1015.6.

Where a building contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.

1015.2 (IFC [B] 1015.2) Exit or exit access doorway arrangement. Required exits shall be located in a manner that makes their availability obvious. ~~Exits shall be unobstructed at all times.~~ Exits, ~~and~~ exit access doorways, and exit access stairways and ramps shall be arranged in accordance with Sections 1015.2.1 and 1015.2.2.

1015.2.1 (IFC [B] 1015.2.1) Two exits or exit access doorways. Where two *exits* or *exit access doorways* and exit access stairways and ramps are required from any portion of the *exit access*, the *exit* ~~doors~~ or *exit access doorways* and exit access stairways and ramps shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between *exit* ~~doors~~ or *exit access doorways* and exit access stairways and ramps. Interlocking or *scissor stairs* shall be counted as one *exit stairway*.

Exceptions:

1. Where interior exit stairways are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required exit separation shall be measured along the shortest direct line of travel within the corridor.
2. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the *exit* ~~doors~~ or *exit access doorways* and exit access stairways and ramps shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

1015.2.1.1 (IFC [B] 1015.2.1.1) Measurement point. The separation distance required in Section 1015.2.1 shall be measured in accordance with the following:

1. The separation distance to exit or exit access doorways shall be measured to any point along the width of the doorway.
2. The separation distance to exit access stairways shall be measured to the closest riser.
3. The separation distance to exit access ramps shall be measured to the start of the ramp run.

1015.2.2 (IFC [B] 1015.2.2) Three or more exits or exit access doorways. Where access to three or more *exits* is required, at least two *exit* ~~doors or~~ *exit access doorways* shall be arranged in accordance with the provisions of Section 1015.2.1.

1015.2.3 (IFC [B] 1015.2.3) Remoteness of exit access stairways or ramps. Where two exit access stairways or ramps provide the required means of egress to exits at another story, the required separation distance shall be maintained for all portions of such exit access stairways or ramps.

1015.2.3.1 (IFC [B] 1015.2.3.1) Three or more exit access stairways or ramps. Where more than two exit access stairways or ramps provide the required means of egress, at least two shall be arranged in accordance with 1015.2.3.

SECTION 1016 (IFC [B] 1016)
EXIT ACCESS TRAVEL DISTANCE

1016.3 (IFC [B] 1016.3) Measurement. Exit access travel distance shall be measured from the most remote point within a story along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an exit.

~~**Exceptions**~~ **Exception**:

~~1.~~ In open parking garages, exit access travel distance is permitted to be measured to the closest riser of an exit access stairway or the closest slope of an exit access ramp.

~~2. In outdoor facilities with open exit access components, exit access travel distance is permitted to be measured to the closest riser of an exit access stairway or the closest slope of an exit access ramp.~~

SECTION 1018 (IFC [B] 1018)
EXIT ACCESS STAIRWAYS AND RAMPS

1018.1 (IFC [B] 1018.1) General. Exit access stairways and ramps serving as an exit access component in a means of egress system shall comply with the requirements of this section. The number of stories connected by exit access stairways and ramps shall include basements, but not mezzanines.

1018.2 (IFC [B] 1018.2) All occupancies. Exit access stairways and ramps that serve floor levels within a single story are not required to be enclosed.

1018.3 (IFC [B] 1018.3) ~~**1009.3(IFC [B] 1009.3)**~~ **Occupancies other than Group I-2 and I-3.** ~~**Exit access stairways.** Floor openings between stories created by exit access stairways shall be enclosed.~~ In other than Group I-2 and I-3 occupancies, floor openings containing exit access stairways or ramps that do not comply with one of the conditions listed in this section shall be enclosed with a shaft enclosure constructed in accordance with Section 713.

~~**Exceptions:**~~

1. ~~In other than Group I-2 and I-3 occupancies,~~ Exit access stairways and ramps that serve, or atmospherically communicate between, only two stories~~, are not required to be enclosed~~. Such interconnected stories shall not be open to other stories.
2. In Group R-1, R-2 or R-3 occupancies, exit access stairways and ramps connecting four stories or less serving and contained within ~~a single~~ ~~residential~~ an individual dwelling unit or

sleeping unit or live/work unit ~~in Group R-1, R-2 or R-3~~ ~~occupancies~~ ~~are not required to be enclosed~~.

3. ~~In buildings with only Group B or M occupancies,~~ Exit access stairways and ramps in ~~openings are not required to be enclosed provided that the~~ buildings ~~is~~ equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the area of the ~~floor~~ vertical opening between stories does not exceed twice the horizontal projected area of the ~~exit access~~ stairway or ramp, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M occupancies, this provision is limited to openings that do not connect more than four stories.
4. ~~In other than Groups B and M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the floor opening does not connect more than four stories, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.~~

4~~5~~. Exit access stairways and ramps within an atrium complying with the provisions of Section 404 ~~are not required to be enclosed~~.

5~~6~~. Exit access stairways and ramps in open parking garages that serve only the parking garage ~~are not required to be enclosed~~.

6~~7~~. Exit access stairways and ramps serving ~~outdoor facilities where all portions of the means of egress are essentially open to the outside are not required to be enclosed~~ open-air seating complying with the exit access travel distance requirements of Section 1028.7.

~~8.~~ ~~Exit access stairways serving stages, platforms and technical production areas in accordance with Sections 410.6.2 and 410.6.3 are not required to be enclosed.~~

7~~9~~. Exit access stairways and ramps serving ~~are permitted to be open between~~ the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.

~~10.~~ ~~In Group I-3 occupancies, exit access stairways constructed in accordance with Section 408.5 are not required to be enclosed.~~

1018.4 (IFC [B] 1018.4) Group I-2 and I-3 occupancies. In Group I-2 and I-3 occupancies, floor openings between stories containing exit access stairways or ramps are required to be enclosed with a shaft enclosure constructed in accordance with Section 713.

Exception: In Group I-3 occupancies, exit access stairways or ramps constructed in accordance with Section 408 are not required to be enclosed.

(Renumber Subsequent Sections)

SECTION 1026 (IFC [B] 1026)
EXTERIOR EXIT STAIRWAYS AND RAMPS

1026.6 (IFC [B] 1026.6) Exterior stairway and ramp protection. *Exterior exit stairways* and *ramps* shall be separated from the interior of the building as required in Section 1022.2. Openings shall be limited to those necessary for egress from normally occupied spaces.

Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are no more than two stories above *grade plane* where a *level of exit discharge* serving such occupancies is the first story above *grade plane*.
2. Separation from the interior of the building is not required where the *exterior* exit *stairway* or *ramp* is served by an exterior *ramp* or balcony that connects two remote *exterior stairways* or other *approved exits* with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be a minimum of 50 percent of the height of the enclosing wall, with the top of the openings no less than 7 feet (2134 mm) above the top of the balcony.

3. ~~Separation from the interior of the building is not required for an *exterior stairway* or *ramp* located in a building or structure that is permitted to have unenclosed *exit access stairways* in accordance with Section 1009.3~~.
~~4.~~ Separation from the interior of the building is not required for *exterior* exit *stairways* or *ramps* connected to open-ended *corridors*, provided that Items 3.1 ~~4.1~~ through 3.5 ~~4.5~~ are met:
   ~~4.1~~3.1. The building, including *corridors*, *stairways* or *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
   ~~4.2~~3.2. The open-ended *corridors* comply with Section 1018.
   ~~4.3~~3.3. The open-ended *corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1026.
   ~~4.4~~3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1022.7.
   ~~4.5~~3.5. At any location in an open-ended *corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m2) or an *exterior stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

SECTION 1027 (IFC [B] 1027)
EXIT DISCHARGE

1027.1 (IFC [B] 1027.1) General. *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide direct access to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 below shall not exceed 50 percent of the number and capacity of the required exits.

Exceptions:

1. A maximum of 50 percent of the number and capacity of *interior exit stairways* and *ramps* is permitted to egress through areas on the *level of exit discharge* provided all of the following are met:
   1.1 ~~Such~~ Discharge of interior exit stairways and ramps shall be provided with ~~enclosures egress to~~ a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2 The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the fire-resistance rating for the enclosure.
   1.3 The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. All portions of the *level of exit discharge* with access to the egress path shall either be protected throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
   1.4 Where a required interior exit stairway or ramp and an exit access stairway or ramp serve the same floor level and terminate at the same level of exit discharge, the termination of the exit access stairway or ramp and the exit discharge door of the interior exit stairway or ramp shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the interior exit stairway or ramp and the last tread of the exit access stairway or termination of slope of the exit access ramp.
2. A maximum of 50 percent of the number and capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided all of the following are met:
   2.1 The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* ~~for~~ of the interior exit stairway or ramp enclosure.

2.2 The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
2.3 The area is separated from the remainder of the *level of exit discharge* by construction providing protection at least the equivalent of *approved* wired glass in steel frames.
2.4 The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1025 shall not be required to discharge directly to the exterior of the building.

SECTION 1028 (IFC [B] 1028)
ASSEMBLY

1028.5 (IFC [B] 1028.5) Interior balcony and gallery means of egress. For balconies, galleries or press boxes having a seating capacity of 50 or more located in a building, room or space used for assembly purposes, at least two means of egress shall be provided, with one from each side of every balcony, gallery or press box ~~and at least one leading directly to an exit.~~

Revise as follows:

SECTION 403
HIGH-RISE BUILDINGS

403.5.1 Remoteness of interior exit stairways. Required *interior exit stairways* shall be separated by a distance not less than 30 feet (9144 mm) or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the enclosure surrounding the *interior exit stairways*. In buildings with three or more *interior exit stairways,* no fewer than two of the *interior exit stairways* shall comply with this section. Interlocking or *scissor stairs* shall be counted as one *interior exit stairway.*

Revise as follows:

SECTION 505
MEZZANINES AND EQUIPMENT PLATFORMS

505.2.3 Openness. A *mezzanine* shall be open and unobstructed to the room in which such *mezzanine* is located except for walls not more than 42 inches (1067 mm) in height, columns and posts.

Exceptions:

1. *Mezzanines* or portions thereof are not required to be open to the room in which the *mezzanines* are located, provided that the *occupant load* of the aggregate area of the enclosed space is not greater than 10.
2. A *mezzanine* having two or more ~~*means of egress*~~ exits or access to exits is not required to be open to the room in which the *mezzanine* is located ~~if at least one of the *means of egress* provides direct access to an *exit* from the *mezzanine* level.~~
3. *Mezzanines* or portions thereof are not required to be open to the room in which the *mezzanines* are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the *mezzanine* area.
4. In industrial facilities, *mezzanines* used for control equipment are permitted to be glazed on all sides.
5. In occupancies other than Groups H and I, that are no more than two *stories* above *grade plane* and equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, a *mezzanine* having two or more *means of egress* shall not be required to be open to the room in which the *mezzanine* is located.

Revise as follows:

SECTION 707
FIRE BARRIERS

707.3.3 Enclosures for exit access stairways. The *fireresistance rating* of the fire barrier separating building areas from an exit access stairway or ramp shall comply with Section ~~1009.3.1.2~~ 713.4.

707.5.1 Supporting construction. The supporting construction for a *fire barrier* shall be protected to afford the required *fire-resistance rating* of the *fire barrier* supported. Hollow vertical spaces within a *fire barrier* shall be fireblocked in accordance with Section 718.2 at every floor level.

Exceptions:

1. The maximum required *fire-resistance rating* for assemblies supporting *fire barriers* separating tank storage as provided for in Section 415.8.2.1 shall be 2 hours, but not less than required by Table 601 for the building construction type.
2. Shaft enclosures shall be permitted to terminate at a top enclosure complying with Section 713.12.
3. Supporting construction for 1-hour *fire barriers* required by Table 509 in buildings of Type IIB, IIIB and VB construction is not required to be fire-resistance rated unless required by other sections of this code.
4. Interior exit stairway and ramp enclosures required by Section 1022.2 and exit access stairway and ramp enclosures required by ~~Section~~ ~~1009.3~~ Sections 1018.3 and 1018.4 shall be permitted to terminate at a top enclosure complying with Section 713.12.

707.7.1 Prohibited penetrations. Penetrations into enclosures for ~~exit access stairways, exit access ramps~~, interior exit stairways~~, interior exit~~ and ramps or an exit passageway shall be allowed only ~~when~~ where permitted by Section ~~1009.3.1.5,~~ 1022.5 or 1023.6~~, respectively~~.

SECTION 711
HORIZONTAL ASSEMBLIES

711.4 Continuity. Assemblies shall be continuous without openings, penetrations or joints except as permitted by this section and Sections 712.1, 714.4, 715, ~~1009.3~~ 1018 and 1022.1. Skylights and other penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof assembly is maintained. Unprotected skylights shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 705.8.6. The supporting construction shall be protected to afford the required *fire-resistance rating* of the *horizontal assembly* supported.

Exception: In buildings of Type IIB, IIIB or VB construction, the construction supporting the *horizontal assembly* is not required to be fire-resistance-rated at the following:

1. Horizontal assemblies at the separations of incidental uses as specified by Table 509, provided the required *fire-resistance rating* does not exceed 1 hour.
2. Horizontal assemblies at the separations of *dwelling units* and *sleeping units* as required by Section 420.3.
3. Horizontal assemblies at *smoke barriers* constructed in accordance with Section 709.

SECTION 712
VERTICAL OPENINGS

712.1 General. The provisions of this section shall apply to the vertical opening applications listed in Sections 712.1.1through 712.1.18.

712.1.1 Shaft enclosures. Vertical openings contained entirely within a shaft enclosure complying with Section 713 shall be permitted.

712.1.8 Two story openings. In other than Groups I-2 and I-3, a floor opening that is not used as one of the application listed in this section shall be permitted if it complies with all the items below.

1. Does not connect more than two stories.
~~2.~~ ~~Does not contain a stairway or ramp required by Chapter 10.~~
2~~3.~~ Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments.
3~~4.~~ Is not concealed within the construction of a wall or a floor/ceiling assembly.
4~~5.~~ Is not open to a corridor in Group I and R occupancies.
5~~6.~~ Is not open to a corridor on nonsprinklered floors.
6~~7.~~ Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

712.1.12 ~~Unenclosed~~ Exit access stairways and ramps. Vertical floor openings ~~created by~~ ~~unenclosed~~ containing exit access stairways or ramps in accordance with ~~Sections 1009.2 and 1009.3~~ Section 1018 shall be permitted.

SECTION 713
SHAFT ENCLOSURES

713.1 General. The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. ~~Exit access stairways and exit access ramps shall be protected in accordance with the applicable provisions of Section 1009.~~ Interior exit stairways and ~~interior exit~~ ramps shall be protected in accordance with the requirements of Section 1022.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

The most substantial part of this change is the relocation of exit access specific stair requirements from the general stair section 1009 to a stand alone section 1018. Another substantial purpose of this code change proposal is for coordination between the open stairway code change from this committee for the last cycle (E5-09/10) and other changes that occurred during the same cycle. In addition, there were areas that needed to be clarified as part of coordination. The CTC also reviewed the concerns raised in the E5 09/10 Public Comments and addressed some outstanding issues from the public comments. Below are the specific reason statements for each section proposed for change:

202 (and 1026.6 exception #3)-The word "interior" was deleted from the definition of exit access stairway and ramp. Generally, this is done because there is no need to restrict exit access to interior elements. Specifically, this was done in coordination with the proposed deletion of exception #3 to section 1026.6. Exception #3 was a holdover from when what are currently exit access stairs were exit stairs. Exception #3 was there to coordinate the allowance for an exterior exit stair to be unprotected when an interior exit stair would be allowed to be unprotected. E5 changed the unenclosed exit stair to an exit access stair. In keeping with that methodology this exception is being deleted and "interior" is being removed from the exit access stair and ramp definitions so that the provisions that allow an unenclosed exit access stair are equally applicable to interior or exterior stairways. Rather than use exception #3 to 1026.6 for a exterior stair without protection the exit access provisions would be used for the exterior stair.

1001.2 – The new sentence in 1001.2 was a requirement in two sentences in 1015.2 that is proposed to be relocated here as it is a more general requirement. This was done as part of some additional proposed revisions to section 1015.2 that will be explained below in section order.

1007.2 -This is another coordination change related to the relocation of the access stair provisions from 1009.3 to 1018.

1007.3 – The last sentence of the main paragraph states that exit access stairways connecting levels in the same story are not permitted as part of an accessible means of egress. While this is true for split level floors or stepped aisles, this should not be true for mezzanines. While they are considered part of the floor below for height and area requirements, mezzanines are required to be elevated over 7'-0" (Section 505.2) similar to a story change in level.

1007.6.2-The exception should only apply to exit stairways based on mandatory enclosure requirements for exit stairways. Exit access stairs may be open or enclosed with non-rated “enclosures” therefore the requirement needs to be clear that separation of areas of refuge serving exit access stairways must comply with 1007.6.2.

1009.2, 1009.3 and subsections– This proposed change will remove the specific requirements for exit access stairways for the general stairway section 1009. 1009 will remain a general stair design section for all stairway details that are not means of egress system specific such as tread and riser dimensions, headroom, widths, etc. The specific enclosure requirements regarding exit access stairs are proposed to be addressed in a new stand alone section, 1018. This is in keeping with the same organization already in chapter 10 for the specific protection requirements for interior exit stairways and ramps and exterior exit stairways and ramps, as well as exit passageways and horizontal exits, each having a dedicated section that addresses the specific protection requirements for each means of egress element. The idea is to separate the general requirements from the specific requirements with regards to each type of MOE element.

1009.3.1 through 1009.3.1.8 – These sections explain how to construct a rated shaft enclosure around an exit access stair when a fire rating is required based on floor penetration limits being exceeded to prevent vertical smoke and heat migration. They were deleted entirely and not relocated to 1018 because the new sections 1018.3 and 1018.4 are proposed to reference to Section 713 for floor opening enclosure construction requirements. The original concept in E5 09/10 was to repeat the shaft enclosure requirements in the exit access stair section as exit access stair enclosure construction requirements. It was decided that this added unneeded text to the code and because it was a duplicate of requirements based on 713 that a change to one section may not be made to the companion section and therefore has the potential to set up an inconsistency with the two code sections that are intended to be the same.

1010.2 – This section is proposed to be deleted because it is not necessary. Just as 1009 is the general requirements for stairs 1010 is the general requirements for ramps. The specific requirements are addressed in stand alone sections that do not need to be cross referenced from the general section or vise versa.

1011.1 – “Exit access doors” is proposed for deletion in the first sentence because marking the path of egress travel is addressed in the remainder of section and exit access doors are part of the path of egress travel.

1015.1 – Revised to include mezzanines to clarify a mezzanine is a space, not a story, for purposes of means of egress. This also clarifies the 2012 IBC revision to Section 505 where mezzanines now reference Chapter 10 for means of egress. 505.3 Egress was deleted from the 2009 edition and replaced with 505.2.2, which is just a reference to chapter 10.

1015.2 –The second sentence was moved to 1001.1 because it is a more general requirement. Exit access stairways and ramps is proposed to be added to the third sentence because by definition an exit access doorway is a point where a path of travel enters an unenclosed exit access stairway but not the stairway itself. Therefore, current code text will allow exit access stairs to diverge towards each other reducing the distance between the stairways to less than the minimum separation. This is the beginning of a few changes to section 1015 that will prohibit diverging exit access stairs to less than the required separation distance for exit access doorways. Further modifications detailed below detail arrangement of exit access stairways in addition to exit access doorways, therefore, the elements were added to 1015.2 for consistency with the next proposed changes to 1015.2.1 and 1015.2.2.

1015.2.1 and 1015.2.2- In three places the word “doors” was deleted after “exit” because exit stands on its own and does not need to specifically reference and exit door.

1015.2.1.1– When exit access stairs are used the point where the path of travel enters the stairway is by definition an “exit access doorway”. There is concern that there will be confusion regarding how to measure the distance between “exit access doorways” when unenclosed exit access stairways are used. The three measurement methods are proposed to be added to clearly state how to measure between doors, stairways and ramps when they need to meet separation requirements per section 1015.

1015.2.3 and 1015.2.3.1-This proposed section and sub-section are intended to require that the minimum separation distances between exit access stairways and ramps be maintain for the entire length of travel on the stairway or ramp. This is to prohibit stair and ramp runs that meet separation distance requirements at the first riser or beginning slope, from converging towards another stair or ramp such that the separation is reduced as the occupant goes up or down the stair or ramp run. Exit access stairs and ramps should maintain the required distance, just as doors, until egress travel over the ramp or stair is completed.

1016.3 – This is a companion change to 1018.3 exception #6 (pervious #7 to 1009.2.2) detailed below regarding outdoor facilities. The exception to 1018.3 was changed to match the requirements for open air seating as regulated by section 10128.7, which allows unlimited travel distance in non-combustible construction that has open air seating and 400 feet in combustible construction. This change deletes the measurement of the travel distance to the closest riser in outdoor facilities and replaces it with the 400 foot or unlimited travel distance per 1028.7. The intent is to coordinate the various travel distance requirements regarding open air seating facilities.

New Section 1018 Exit access stairways and ramps-
Current section 1009.3 is proposed to be relocated to new section 1018. This is the most significant aspect of this code change proposal. This part of the proposed change creates a new stand alone code section for exit access stairway and ramp specific requirements so that the specific requirements for exit access stairs are separate from the general requirements. This is in keeping with the same organization already in chapter 10 for the specific protection requirements for interior exit stairways and ramps and exterior exit stairways and ramps, as well as exit passageways and horizontal exits, each having a dedicated section that addresses the specific protection requirements for each means of egress element. The specific enclosure requirements regarding exit access

stairs are proposed to be addressed in the new section, 1018. 1009 will remain a general stair design section for all stairway details that are not means of egress system specific such as tread and riser dimensions, headroom, widths, etc.

New 1018.1 – This is just a general scoping section. The statement that stories include basements but not mezzanines was included in this section.

New 1018.2 - This section clarifies that steps/ramps between levels within a story are always permitted to be open. Enclosure requirements are not required until openings between stories are created for exit access stairways/ramps.

New 1018.3 (relocated 1009.3) – This proposed section is the text relocated from 1009.3 with some changes to the format and some changes to the specific exemptions. The code change text is formatted with underlines and strike-troughs of the relocated 1009.3 text. Each specific change is explained as follows:

New 1018.3 As an alternative to the rule with exceptions format the section was reformatted with the exceptions reconfigured as conditions which permit unprotected floor openings for exit access stairs/ramps. This is in keeping with the philosophy introduced with the vertical openings code change approved for the 2012 edition, which reconfigured the shaft enclosure exceptions to options. As part of the reformatting the statement “not required to be enclosed” has been removed from the exceptions to the body of section 1018.3. Additionally “and ramps” has been added to each condition; this was done to make it clear that the entire section addresses ramps and stairs equally. Previous section 1009.3.1 and 1009.3.1.1 through 1009.3.1.8 were the enclosure requirements applicable when a floor opening is required to be protected with a fire rated enclosure; this was deleted and not relocated to 1018. These sections were deleted entirely and not relocated to 1018 because the new sections 1018.3 and 1018.4 are proposed to reference to Section 713 for floor opening enclosure construction requirements. The original concept in E5 09/10 was to repeat the shaft enclosure requirements in the exit access stair section as exit access stair enclosure construction requirements. It was decided that this added unneeded text to the code and because it was a duplicate of requirements based on 713 that a change to one section may not be made to the companion section and therefore has the potential to set up an inconsistency with the two code sections that are intended to be the same.

1018.3 Exception/condition #1-Group I-2 and I-2 deleted from condition #1 and moved down to a new Section 1018.4, which addresses group I-2 and I-1. The restriction that requires all group I-2 and I-3 stairway floor openings to be protected with a shaft has not been changed. The last sentence stating “such interconnected stories shall not be open to other stories” was added to clarify that the first condition can only be used when there are no openings to other stories, other than the two stories connected by the exit access stair. This is to prevent other permitted floor openings from being used with this allowed opening to create a staggered opening condition where more than two stories can atmospherically communicate.

1018.3 Exception/condition #2-The use group limitation of this condition was moved from the end of the sentence to the beginning to make it easier to use so the code user can quickly identify the scope of the condition. Additionally “live/work unit” was added to the types of units that can use this condition. Unenclosed exit access stairs are permitted in live/work units per 419.4 and live/work unit is a type of group R-2 unit distinct from dwelling units and sleeping units.

1018.3 Exception/condition #3 and Deletion of exception #4-The term floor opening was replaced with vertical opening because the opening in this condition can be between multiple floors. Exception #4 was the same exception as exception #3 except that it applies to groups other than B and M with the only difference being that the opening is limited to 4 stories for groups other than B and M. To reduce the amount of text and number of conditions the “other than group B and M” provision was moved to condition #3 as the last sentence in condition #3.

1018.3 Exception/condition #4 and #5-Just reformatting as described in the 1018.3 general explanation.

1018.3 Exception/condition #6- This condition was modified with input from Ed Roether, who is an expert in stadium design. “Outdoor facilities where all portions of the means of egress are essentially open to the outside” is proposed to be changed to “open-air seating”, which is the term used in section 1028.7 regarding travel distance in assembly seating. This condition is proposed to be changed to be coordinated with the requirements for open air seating as regulated by section 1028.7, which allows unlimited travel distance in non-combustible construction that has open air seating and 400 feet in combustible construction.

1018.3 previous exception #8-This exception was deleted because the 2012 IBC section 410.6 was modified to address the specific means of egress requirements for stages and technical production areas. New section 410.6.2 in the 2012 IBC specifically exempts stage and technical production areas from stair/ramp enclosure therefore this exception/condition is redundant and not needed.

1018.3 Exception/condition #7-Just reformatting as described in the 1018.3 general explanation.

1018.3 previous exception #10 deleted– This exception was moved to 1018.4

New 1018.4 – This is the relocated and reformatted requirement for group I-2 and I-3 exit access stair/ramp enclosure as part of the reformat from exceptions to conditions. Additionally, as noted above, the previous exception #10 was relocated as an exception to this requirement because it is a specific exception for group I-3.

1026.6 Exception #3 deletion- 1026.6 exception #3 was a holdover from when what are currently exit access stairs were exit stairs. Exception #3 was there to coordinate the allowance for an exterior exit stair to be unprotected when an interior exit stair would be allowed to be unprotected. E5 changed the unenclosed exit stair to an exit access stair. In keeping with that methodology this exception is being deleted and “interior” is being removed from the exit access stair and ramp definitions so that the provisions that allow an unenclosed exit access stair are equally applicable to interior or exterior stairways. Rather than use exception #3 to 1026.6 for to create an exterior exit stair without protection the exit access provisions would be used for the exterior stair.

1027.1 exception #1.1-This is an editorial change that clarifies the exit stairways/ramps must have the free path of travel. This is a companion to the new section 1.4 described below.

1027.1 exception #1.4-This limitation is proposed to prevent an exit access stair and separate exit stair, which begin on the same floor, from termination to close together on the exit discharge floor. This is proposed so that one localized fire event on the exit discharge floor will not take out the termination of both means of egress components when an exit stair is permitted to discharge into the building. The 30 feet or ¼ diagonal separation distances were based on the 30 feet or ¼ diagonal that is specified for separation of interior stairways in high-rise section 403.5.1.

1028.5 and 505.2.3- "and at least one leading directly to an exit" is proposed for deletion. ICC staff asked for the committee to look at this do to numerous interpretive questions regarding what "leading directly to an exit" means. In both of these cases exit access stairs serving 2 stories could meet 1018.3 exception #1 and since neither condition qualifies as a story allowing exit access stairways is consistent with the provisions of 1018.3. Since "directly to an exit" can be interpreted to mean the mezzanine floor or balcony must have at least one exit at the mezzanine or balcony level that text is proposed to be deleted to allow exit access stairs to be used in both cases for both sets of stairways.

403.5.1-This is in response to E5 public comments. The intent of the separation required by this section is specific to the enclosure, not the stairway, therefore this language has been corrected.

505.2.3 – See reason statement for 1028.5.

707.3.3 and 707.5.1-These changes are to coordinate with the change in section numbering that occurred with moving the exit access stairway and ramp provisions from 1009 to 1018 and the change to reference section 713 for exit access stairway and ramp rated enclosure design requirements. References related to if an enclosure is required refer to sections in 1018, which is where the requirements for when a rated enclosure is required are proposed to be relocated. References related to the construction of the rated enclosure refer to section 713, which is where the requirements for how to rate the enclosure are located.

707.7.1-References to exit access stairways and ramps are proposed to be removed from this section because section 1018 is proposed to reference section 713 for exit access stairway and ramp rated enclosure design. Existing section 713.7.1 addresses prohibited openings therefore this reference is no longer needed in section 707.7.1.

711.4- See reason statement for 707.3.3 above.

712.1.8- Criteria #2 was proposed to be deleted and was approved to be deleted in E5 09/10 but was inadvertently reinstated do to a language change proposed to the same text in FS 56 09/10. Floor openings for open exit access stairways are intended to be protected in accordance with the exit access stair provision in 1009.3 (1018 per this proposal). If Criteria #2 is retained it will cause inconsistency with the exit access stairway provisions. It was the intent of E5 09/10 to have all exit access stair related opening protection requirements provided in the exit access stair provisions in chapter 10.

712.1.12 – This section has the terminology updated from "unenclosed" to "exit access" stairway to coordinate with terminology approved in E5-09/10. Additionally the section references are updated from 1009.3 to 1018 to coordinate with the relocation of exit access stair provisions from 1009.3 to 1018, which is explained further below in the reason statement. The purpose of the section is to act as a pointer to the exit access stairway vertical opening requirements that are all provided in proposed section 1018 (previous section 1009.3) for any vertical opening that contains an exit access stairway.

713.1 – This is another coordination change related to the relocation of the access stair provisions from 1009.3 to 1018. The enclosure requirements for exit access stairways in 1018 now reference Section 713 for rated enclosure construction requirements, rather than repeating the requirements in chapter 10, therefore this sentence is no longer needed.

Cost Impact: None

1009-E-BALDASSARRA

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1001.2 (IFC [B] 1001.2) Minimum requirements. It shall be unlawful to alter a building or structure in a manner that will reduce the number of exits or the capacity of the means of egress to less than required by this code. ~~Means of egress shall be designed to be continuous and unobstructed.~~

1015.2 (IFC [B] 1015.2) Exit or exit access doorway arrangement. Required exits shall be located in a manner that makes their availability obvious. Exits, exit access doorways, ~~and~~ exit access stairways and ramps shall be arranged in accordance with ~~Sections 1015.2.1 and 1015.2.2~~ this section.

1015.2.1 (IFC [B] 1015.2.1) Two exits or exit access doorways. Where two *exits*, ~~or~~ *exit access doorways*, ~~and~~ exit access stairways or ~~and~~ ramps, or any combination thereof, are required from any portion of the *exit access*, ~~the *exit* or *exit access doorways* and exit access stairways and ramps~~ they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between ~~*exit* or *exit access doorways* and exit access stairways and ramps~~ them. Interlocking or *scissor stairs* shall be counted as one *exit stairway*.

Exceptions:

1. Where interior exit stairways are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018, the required exit separation shall be measured along the shortest direct line of travel within the corridor.
2. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance ~~of the *exit* or *exit access doorways,* and exit access stairways and ramps~~ shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

Committee Reason: The committee proposed a modification to Section 1001.2 is to remove the proposed last sentence. That language is not needed as it is already included in the definition for 'means of egress.' The modification to Section 1015.2 and 1015.2.1 was proposed by the proponent due to a grammatical error. The revised proposal will allow for all four components, 1) exits, 2) exit access doorways, 3) exit access stairways, and 4) exit access ramps, sot be considered when evaluating arrangements of exit access elements. The remainder of the proposal is a good cleanup related to the open stairway change, E5-09/10. The deletion of the separation (1009.3) requirements in favor of a reference to stairway separation requirements (Section 713 in new Section 1018.3) removes redundant language and will allow for consistency in the future. The new Section 1018, as a section for exit access stairway separation, is consistent with the idea of interior exit stairway separation in Section 1022 and exterior exit stairway separation in Section 1026. The new language regarding convergence of open exit stairways addressed this safety concern in an appropriate manner (1027.1).

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Al Godwin, CBO, CPM, representing Aon Fire Protection Engineering Corporation, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

SECTION 1011 (IFC [B] 1011)
EXIT SIGNS

1011.1 (IFC [B] 1011.1) Where required. *Exits* and *exit access* doors shall be marked by an *approved exit* sign readily visible from any direction of egress travel. The path of egress travel to *exits* and within *exits* shall be marked by readily visible *exit* signs to clearly indicate the direction of egress travel in cases where the *exit* or the path of egress travel is not immediately visible to the occupants. Intervening *means of egress* doors within *exits* shall be marked by *exit* signs. *Exit* sign placement shall be such that no point in an *exit access corridor* or *exit passageway* is more than 100 feet (30 480 mm) or the *listed* viewing distance for the sign, whichever is less, from the nearest visible *exit* sign.

Exceptions:

1. *Exit* signs are not required in rooms or areas that require only one *exit* or *exit access*.
2. Main exterior *exit* doors or gates that are obviously and clearly identifiable as *exits* need not have *exit* signs where *approved* by the *building official*.
3. *Exit* signs are not required in occupancies in Group U and individual sleeping units or dwelling units in Group R-1, R-2 or R-3.
4. *Exit* signs are not required in dayrooms, sleeping rooms or dormitories in occupancies in Group I-3.
5. In occupancies in Groups A-4 and A-5, *exit* signs are not required on the seating side of vomitories or openings into seating areas where *exit* signs are provided in the concourse that are readily apparent from the vomitories. Egress lighting is provided to identify each vomitory or opening within the seating area in an emergency.

Commenter's Reason: The original proposal deleted the phrase "and *exit access doors*." These are the exit access doors out of rooms, offices, banquet halls, conference rooms, etc. Exit signs have always been required at these locations unless complying with the exceptions. The term "*Exits*" is not inclusive of *exit access* doors.

Without this phrase, exit signs will only be required in the *exit access* “in cases where the exit or path of egress travel is not immediately visible”. As such, each room has to be evaluated as to whether exit signs are needed.

The phrase should be left in.

E7-12

Final Action: AS AM AMPC____ D

E12-12
1003.4.1 (New) [IFC [B] 1003.4.1 (New)]

Proposed Change as Submitted

Proponent: Eric Astrachan, Executive Director, Tile Council of North America, Inc. (eastrachan@tileusa.com)

Add new text as follows:

1003.4.1 (IFC [B] 1003.4.1) Ceramic and Porcelain Tile. Tiles specified for interior floor surfaces of the means of egress shall comply with ANSI A137.1, Section 6.2.2.1.10.

Reason: Currently, Section 1003.4 requires that walking surfaces of the means of egress be "slip resistant" with no method of measurement, quantitative threshold, or general principles to help the specifier, end-user, and code official.

The purpose of this revision is to provide these criteria for ceramic tiles used for interior floor surfaces of the means of egress. Section 6.2.2.1.10 of the ANSI A137.1-2012 standard for ceramic tile sets forth a quantitative minimum threshold, means of measurement, and general principles regarding slip resistance based on the consensus of a broad range of stakeholders.

Cost Impact: None

1003.4.1 (New)-E-Astrachan.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The edition of the standard referenced is not yet available in print. The standard is only for ceramic and porcelain tile. It seems inappropriate to require one type of flooring materials to meet slip resistance requirements and not others. It might possibly be interpreted that other types of floor finishes were not permitted in certain locations. Field testing would require a special device that most code official will not have. Third party testing might not always be an option. If tiles manufactured in the United States already meet this standard, is this information part of their standard product information? That would be needed for code officials to be able to verify compliance with this proposed requirement.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Eric Astrachan, Executive Director, Tile Council of North America, Inc. requests Approval as Submitted.

Commenter's Reason: If the proposed change is not approved, Section 1003.4 will continue to require walking surfaces of the means of egress to be "slip resistant" with no method of measurement, quantitative threshold, or general principles to help the specifier, end-user, and code official. As expressed in our original proposal, the proposed change establishes these criteria for ceramic tile and porcelain tiles used for interior floor surfaces of the means of egress by referencing the relevant section (Section 6.2.2.1.10) of the standard for ceramic tile, ANSI A137.1-2012.

During the Development Hearing, members of the Means of Egress Code Committee spoke favorably regarding the criteria proposed but were concerned that the edition of the referenced standard was not yet available in print. Members of the Committee expressed their reluctance that the proposal had to be disapproved for this reason by a very close 8 to 7 vote and strongly encouraged its resubmission for consideration once the published version of the standard is available. Other concerns had to do with establishing if the information needed by code officials would be part of standard product information.

In August 2012 ANSI A137.1-2012 will be available in its published form (draft copies are available now). Further, the criteria proposed (Section 6.2.2.1.10 from ANSI A137.1-2012) will also be included in its entirety in the “2013 TCNA Handbook for Ceramic, Glass, and Stone Tile Installation” (commonly known as the “TCA Handbook” and referenced in Section 9300 specifications).

Additionally, tile manufacturers are already providing the information needed by code officials as part of standard product information. Links to manufacturer catalogs confirming such can be provided if desired.

With the concerns of the Committee addressed, we respectfully request that E12-12 should be approved as originally submitted (AS).

E12-12

Final Action: AS AM AMPC____ D

E14-12

1003.6, 1004.1.1, 1004.1.1.1, 1004.1.1.2, 1004.1.2, 1005.3.1, 1005.4, 1015.1, 1020.1, 1021.2 (IFC [B] 1003.6, 1004.1.1, 1004.1.1.1, 1004.1.1.2, 1004.1.2, 1005.3.1, 1005.4, 1015.1, 1020.1, 1021.2)

Proposed Change as Submitted

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company (grkeith@mac.com)

Revise as follows:

1003.6 (IFC [B] 1003.6) Means of egress continuity. The path of egress travel along a *means of egress* shall not be interrupted by any building element other than a *means of egress* component as specified in this chapter. Obstructions shall not be placed in the required width of a *means of egress* except projections permitted by this chapter. ~~The required capacity of a *means of egress* system shall not be diminished along the path of egress travel.~~

~~1004.1.2~~ 1004.2 (IFC [B] ~~1004.1.2~~ 1004.2) Areas without fixed seating. The number of occupants shall be computed at the rate of one occupant per unit of area as prescribed in Table 1004.1.2. For rooms, areas or spaces without fixed seating, the occupant load shall not be less than that number determined by dividing the floor area under consideration by the occupant load factor assigned to the function of the space as set forth in Table 1004.1.2. Where an intended function is not listed in Table 1004.1.2, the building official shall establish a function based on a listed function that most nearly resembles the intended function.

(Renumber subsequent sections)

1005.1 (IFC [B] 1005.1) General. All portions of the means of egress system shall be sized in accordance with this section.

Exception: Means of egress complying with Section 1028.

~~1004.1.1~~ 1005.1.1 (IFC [B] ~~1004.1.1~~ 1005.1.1) Cumulative occupant loads. Where the path of egress travel includes intervening rooms, areas or spaces, ~~cumulative occupant loads~~ the required capacity shall be determined in accordance with this section.

~~1004.1.1.1~~ 1005.1.1.1 (IFC [B] ~~1004.1.1.1~~ 1005.1.1.1) Intervening spaces. Where occupants egress from one room, area or space through another, the ~~design occupant load~~ required capacity shall be based on ~~the cumulative~~ that portion of the occupant loads having required egress through adjacent ~~of all~~ rooms, areas or spaces added to the occupant load of the space under consideration to that point along the path of egress travel.

~~1004.1.1.2~~ 1005.1.1.2 (IFC [B] ~~1004.1.1.2~~ 1005.1.1.2) Adjacent levels. ~~The occupant load of a mezzanine or story with egress through a room, area or space on an adjacent level shall be added to the occupant load of that room, area or space.~~ Where interior and exterior exit stairways or ramps serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of such stairways or ramps serving that story. Where exit access stairways or ramps provide required access to an exit at an adjacent story, the required capacity of the adjacent story shall be based on that portion of the occupant load of the mezzanine or story having required egress through such adjacent story added to the occupant load of that story.

1005.3.1 (IFC [B] 1005.3.1) Stairways. The capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity factor of 0.3 inches (7.62 mm) per occupant. ~~Where stairways serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of the stairways serving that story.~~

Exception: For other than Group H and I-2 occupancies, the capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity factor of 0.2 inches (5.1 mm) per occupant in buildings equipped throughout with and automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

1005.4 (IFC [B] 1005.4) Continuity. The capacity of the means of egress required from any room, area, space, mezzanine or story of a building shall not be reduced along the path of egress travel until arrival at the public way.

1015.1 (IFC [B] 1015.1) Exits or exit access doorways from spaces. Two exits or exit access doorways from any room, area or space shall be provided where one of the following conditions exists:

1. The *occupant load* of the space exceeds one of the values in Table 1015.1. When occupants egress through the space, that portion of the occupant load having required egress through such space to that point along the path of egress travel shall be added to the occupant load of the space under consideration.

   Exceptions:

   1. In Group R-2 and R-3 occupancies, one *means of egress* is permitted within and from individual dwelling units with a maximum *occupant load* of 20 where the dwelling unit is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
   2. Care suites in Group I-2 occupancies complying with Section 407.4.

2. The *common path of egress travel* exceeds one of the limitations of Section 1014.3.
3. Where required by Section 1015.3, 1015.4, 1015.5, or 1015.6.

Once established, the required number of exits or exit access doorways shall be maintained until arrival at the exit discharge or public way.

Where a building contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy. ~~Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.~~

1020.1 (IFC [B] 1020.1) General. *Exits* shall comply with Sections 1020 through 1026 and the applicable requirements of Sections 1003 through 1013. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of exit protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge*. Within a building, once established, the required number of exits shall be maintained until arrival at the exit discharge or public way.

1021.2 (IFC [B] 1021.2) Exits from stories. Two exits, or exit access stairways or ramps providing access to exits, from any story or occupied roof shall be provided where one of the following conditions exists:

1. The occupant load or number of dwelling units exceeds one of the values in Table 1021.2(1) or 1021.2(2). When exit access stairways or ramps provide required access to an exit at an adjacent story, the occupant load of the adjacent story shall be based on that portion of the occupant load of the mezzanine or story having required egress through such adjacent story added to the occupant load story under consideration.
2. The exit access travel distance exceeds that specified in Table 1021.2(1) or 1021.2(2) as

determined in accordance with the provisions of Section 1016.1.
3. Helistop landing areas located on buildings or structures shall be provided with two exits, or exit access stairways or ramps providing access to exits.

Exceptions:

1. Rooms, areas and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.
2. Group R-3 occupancy buildings shall be permitted to have a one exit.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one exit,
4. Air traffic control towers shall be provided with the minimum number of exits specified in Section 412.3.
5. Individual dwelling units in compliance with Section 1021.2.3.
6. Group R-3 and R-4 congregate residences shall be permitted to have one exit.
7. ~~Exits serving specific spaces or areas need not be accessed by the remainder of the story when all of the following are met:~~
   - ~~7.1 The number of exits from the entire story complies with Table 1021.1(1) or 1021.2(2);~~
   - ~~7.2 The access to exits from each individual space in the story complies with Section 1015.1; and~~
   - ~~7.3 All spaces within each portion of a story shall have access to the minimum number of approved independent exits as specified in Table 1021.1(1) or 1021.2(2) based on the occupant load of that portion of the story.~~

Reason: The 2012 Edition of the IBC is significant in that many fundamental Chapter 10 provisions have been clarified by modifying terminology or technical correlation. E10-09/10 and E22-09/10 were two such contributing proposals. Through those proposals, Sections 1004 and 1005 were altered to place means of egress occupant load determination and sizing provisions in functional context. When provisions are placed in proper technical context so as to gain consistency in interpretation and application, additional clarification is often required to complete the thought process and maximize understanding of the intent of the specific requirement.

Proposed revisions are explained in numerical order. Presently, means of egress capacity continuity requirements are located in two sections, Section 1003.6 and 1005.4. Section 1003.6 does not contain a key requirement that the required capacity shall not be reduced until arrival at the public way. The two sections have been consolidated, clarified and located in technical context in Section 1005.4. Code users are not well served by having fundamental code requirements fragmented at two separate locations. Section 1005 is the logical location for this important means of egress sizing provision.

This proposal places cumulative occupant load application requirements in the technical context of various means of egress design requirements such as required capacity and minimum numbers of exits or access to exits. Relocation of the cumulative occupant load provisions from Section 1004.1.1 inadvertently removes the spatial charging language of “rooms, areas or spaces” from Section 1004. Therefore, these terms are replaced in technical context in the next section, Section 1004.1.2, and technical continuity is maintained.

Section 1005.1 now contains provisions for how cumulative occupants loads are to be specifically applied in the determination of means of egress capacity requirements. Additionally, provisions have been clarified be consistent with current IBC means of egress capacity philosophy. For instance, 2012 Section 1004.1.1.2 (proposed Section 1005.1.1.2) implies that 100 percent of the occupant load of an adjacent level is to be added to the occupant load of a space under consideration at another building level. This proposal clarifies that only that portion of the occupant load having required egress through the adjacent level needs to be considered. Additionally, the last sentence of Section 1005.3.1 has been clarified and relocated in context in new Section 1005.1.1.2. It clarifies that cumulative occupant loads are not considered only when exit stairways (interior and exterior exit stairways) are employed in the design of the means of egress system. The current language states that any stairway, to include required exit access stairways, need not consider cumulative occupant loads. Historically, occupant loads from adjacent stories have not been considered when determining the required capacity for only exit components.

As previously discussed, means of egress capacity continuity provisions have been consolidated and located in technical context in Section 1005.4.

Cumulative occupant load provisions specifically applicable to the determination of the number of exits or exit access doorways from an individual room, area or space have been placed in context in Section 1015.1. Presently, the requirement that, “cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.” is located as an afterthought cross-reference as the last sentence of Section 1015.1. The actual requirement has been articulated and placed in technical context in the section. Additionally, currently there is no requirement to maintain the required number of exits or exit access doorways, once established, until arrival at the exit discharge or public way. This logical requirement will now be legally charged.

Section 1020.1 has also been revised to include a legal requirement that the required number of exits be maintained within a building.

Section 1021.2 has been modified to include guidance as to what portion of the occupant loads of an adjacent story are to be applied in the determination of the number of exits required from a story above or below. Also, Exception 7 to Section 1021.2 has been deleted as there is currently no requirement for specific spaces to have access to all exits on a story.

In summary, this proposal clarifies how cumulative occupant loads are to be applied in the determination of specific means of egress design requirements. The general provisions currently located in Section 1004.1.1 are replaced by more specifically applicable requirements located in context at Sections 1005.1.1, 1015.1 and 1021.2. The provisions have also been clarified to indicate what portions of occupant loads from adjacent spaces are to be considered under the various design conditions. It should be noted that this proposal is consistent with current IBC means of egress design philosophy. Approval of this proposal will provide necessary guidance to designers and enforcement officials in these fundamental means of egress areas and will lead to more consistent interpretation and application of these important provisions. Through improved formatting and language this proposal further clarifies 2012 IBC means of egress provisions and increases functionality and technical continuity in this important area of life safety.

Cost Impact: None

1004.1.1.1-E-Keith.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Section 1021.1 would require exits to be sized on the first floor for the occupants for both the 1st and 2nd floor. This would be in conflict with the cascading stairway loading that has been utilized in the code for years. The language "capacity shall not be diminished" needs to stay in the code. E14, E15 and E17 should be worked on together. Part of the issue might be addressed by E7 changes to 1027.1.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company requests Approval as Modified by this Public Comment

Modify the proposal as follows:

1003.6 Means of egress continuity. The path of egress travel along a *means of egress* shall not be interrupted by any building element other than a *means of egress* component as specified in this chapter. Obstructions shall not be placed in the required width of a *means of egress* except projections permitted by this chapter.

<u>**1004.1.1 Cumulative occupant loads.** Where the path of egress travel includes intervening rooms, areas or spaces, cumulative occupant loads shall be determined in accordance Sections 1005.1, 1015.1 and 1021.2.</u>

1004.2 Areas without fixed seating. The number of occupants shall be computed at the rate of one occupant per unit of area as prescribed in Table 1004.1.2. For rooms, areas or spaces without fixed seating, the occupant load shall not be less than that number determined by dividing the floor area under consideration by the occupant load factor assigned to the function of the space as set forth in Table 1004.1.2. Where an intended function is not listed in Table 1004.1.2, the building official shall establish a function based on a listed function that most nearly resembles the intended function.

1005.1 General. All portions of the means of egress system shall be sized in accordance with this section.

Exception: Means of egress complying with Section 1028.

1005.1.1 Cumulative occupant loads. Where the path of egress travel includes intervening rooms, areas or spaces, the required capacity shall be determined in accordance with this section.

1005.1.1.1 Intervening spaces. Where occupants egress from one room, area or space through another, the required capacity shall be based on that portion of the <u>cumulative</u> occupant loads having required egress through adjacent rooms, areas or spaces added to the occupant load of the space under consideration to that point along the path of egress travel. <u>The portion of the occupant load from adjacent rooms, areas or spaces shall be based on the capacity of the means of egress components providing access to the space under consideration, calculated in accordance with the provisions of Section1005.3.2.</u>

1005.1.1.2 Adjacent levels. Where interior and exterior exit stairways or ramps serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of the stairways or ramps serving that story. Where exit access stairways or ramps provide required access to an exit at an adjacent story, the required capacity of the adjacent story shall be based on that portion of the occupant load of the mezzanine or story having required egress through such adjacent story added to the occupant load of that story. The portion of the occupant load from adjacent mezzanines or stories shall be based on the capacity of the means of egress components providing required access to the story under consideration, calculated in accordance with the provisions of Section1005.3.1.

1005.3.1 Stairways. The capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity factor of 0.3 inches (7.62 mm) per occupant.

> **Exception:** For other than Group H and I-2 occupancies, the capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity factor of 0.2 inches (5.1 mm) per occupant in buildings equipped throughout with and automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

1005.4 Continuity. The capacity of the means of egress required from any room, area, space, mezzanine or story of a building shall not be reduced along the path of egress travel until arrival at the public way.

1015.1 Exits or exit access doorways from spaces. Two exits or exit access doorways from any room, area or space shall be provided where one of the following conditions exists:

1. The *occupant load* of the space exceeds one of the values in Table 1015.1. Where occupants egress through a ~~the~~ space, that portion of the cumulative occupant loads having required egress through such space to that point along the path of egress travel shall be added to the occupant load of the space under consideration. The portion of the occupant load from adjacent rooms, areas or spaces shall be based on the capacity of the means of egress components providing access to the space under consideration, calculated in accordance with the provisions of Section1005.3.2.

   Exceptions:

   1. The number of exits from foyers, lobbies, vestibules and similar spaces need not be based on the cumulative occupant loads for areas discharging through such spaces, where the capacity of the exits from such spaces isaa based on applicable cumulative occupant loads.

   ~~1~~ 2. In Group R-2 and R-3 occupancies, one *means of egress* is permitted within and from individual dwelling units with a maximum *occupant load* of 20 where the dwelling unit is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

   ~~2~~ 3. Care suites in Group I-2 occupancies complying with Section 407.4.

2. The *common path of egress travel* exceeds one of the limitations of Section 1014.3.
3. Where required by Section 1015.3, 1015.4, 1015.5, or 1015.6.

Once established, the required number of exits or exit access doorways shall be maintained until arrival at the exit discharge or public way.

Where a building contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy.

1020.1 General. *Exits* shall comply with Sections 1020 through 1026 and the applicable requirements of Sections 1003 through 1013. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of exit protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge*. Within a building, once established, the required number of exits shall be maintained until arrival at the exit discharge or public way.

1021.2 Exits from stories. Two exits, or exit access stairways or ramps providing access to exits, from any story or occupied roof shall be provided where one of the following conditions exists:

1. The occupant load or number of dwelling units exceeds one of the values in Table 1021.2(1) or 1021.2(2). ~~Where exit access stairways or ramps provide required access to an exit at an adjacent story, the occupant load of the adjacent story shall be based on that portion of the occupant load of the mezzanine or story having required egress through such adjacent story added to the occupant load story under consideration.~~ Where interior and exterior exit stairways or ramps serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required number of exits serving that story. Where exit access stairways or ramps provide required access to an exit at an adjacent story, the occupant load of a mezzanine or story need not be considered in the calculation of the required number of exits serving such adjacent story.

   Exception: Where the only access to required exits from a mezzanine is through an adjacent story, the entire occupant load of such mezzanine shall be added to the occupant load of the adjacent story.

2. The exit access travel distance exceeds that specified in Table 1021.2(1) or 1021.2(2) as determined in accordance with the provisions of Section 1016.1.

3. Helistop landing areas located on buildings or structures shall be provided with two exits, or exit access stairways or ramps providing access to exits.

Exceptions:

1. Rooms, areas and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.
2. Group R-3 occupancy buildings shall be permitted to have a one exit.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one exit,
4. Air traffic control towers shall be provided with the minimum number of exits specified in Section 412.3.
5. Individual dwelling units in compliance with Section 1021.2.3.
6. Group R-3 and R-4 congregate residences shall be permitted to have one exit.

Commenter's Reason: Four code change submittals (E14-12 through E17-12) were intended to address the issue of proper determination of cumulative occupant loads. The committee seemed to agree that there was confusion; however, did not agree on the appropriate remedy.

This is a very subtle issue that impacts format, location and technical context. Currently, cumulative occupant load determination provisions are located in Section 1004, Occupant Loads. By providing general cumulative occupant load determination requirements in Section 1004.1.1, there is the inference that cumulative occupant loads are applied uniformly for all means of egress design requirements. Such is not necessarily the case. Means of egress design requirements are intended to accomplish two goals: To maintain occupant tenability (i.e. exit access travel distance and intervening space provisions) and to adequately size and apportion the applicable means of egress components (i.e. capacity, numbers and configuration provisions). Occupant loads have virtually nothing to do with occupant tenability issues. On the other hand, capacity and numbers of exits/access to exits requirements are primarily occupant load driven. Capacity or sizing is the primary concern. The means of egress system must be appropriately sized to accommodate all occupants or combinations of occupants that could potentially use a given means of egress component. Accordingly, capacity provisions should be very liberally applied to all building designs. Numbers of exits/access to exits provisions are intended to complement capacity requirements by providing necessary opportunity/availability to reasonably egress the space, story or building should a fire event block a portion of the means of egress system. While capacity provisions are critical to occupant accommodation, numbers provisions beyond two have a point of diminishing return when considering cumulative occupant loads, especially where adjacent building levels are concerned.

This proposal describes the application of cumulative occupant loads in the context of the specific design requirement. Sections 1005.1.1 and 1005.1.2 generally require that capacity will be based on that portion of cumulative occupant loads that egress through a given space or story. Section 1015.1, Item 1, Exception 1 notes that foyers, lobbies, etc. need not have increased numbers of exits based on cumulative occupant loads. Please note that the capacity of the lobby exit is based on cumulative occupant loads. Section 1021.2 states that numbers of exits from a given story need not include contributing occupant loads from adjacent stories unless there are no other exits from an adjacent mezzanine. Again, bearing in mind that the required capacity from the exit level story would be based on applicable cumulative occupant loads, it is not necessary to consider cumulative occupant loads when determining the number of exits from a given story because of availability and opportunity. For a given story, there is no need to potentially increase the number of exits below for two reasons. If the fire event is on the lower story, occupants above may egress at their level without entering the fire floor. If the fire is at the upper level, there is no need for additional exits at the story below because there is no fire jeopardizing any of the exits. Additionally, there is reduced competition for the exits at the lower level based on rate of travel considerations. The increased size (capacity) of the means of egress system at the level below also mitigates the need for additional exits at that level.

This methodology is consistent with those remarks applicable to Section 1004.1.1.2 as stated in the *2012 IBC Code and Commentary, Vol. 1* that states:

> "The egress requirements for mezzanines or second floors that use exit access stairways to move to the ground level are handled similar to those spaces with accessory areas addressed in Section 1004.1.1.1, versus the requirements for exiting from multiple levels in 1021. That is, that portion of the mezzanine/second floor occupant load that travels through the floor below to the exit is to be added to the occupant load of the space on the floor below. The sizing and number of the egress components must reflect this combined occupant load. This does not apply to the means of egress from a mezzanine/second floor that does not require travel through another level (i.e., an interior exit stairway serving the mezzanine/second floor)."

The IBC needs to identify how to apply cumulative occupant load provisions for various means of egress design scenarios and articulate those provisions so that they are universally understood by all code practitioners. This proposal is consistent with E5-09/10 means of egress philosophy contained in the 2012 IBC: however, restores the so-called "cascade effect" design considerations contained in earlier editions of the IBC as well as legacy codes.

E14-12

Final Action: AS AM AMPC____ D

E15-12

1004.1.1, 1004.1.1.1, 1004.1.1.2, 1004.1.1.3, 1014.2 (IFC [B] 1004.1.1, 1004.1.1.1, 1004.1.1.2, 1004.1.1.3, 1014.2)

Proposed Change as Submitted

Proponent: Dennis Richardson, PE; Building Official, City of Salinas, representing Tri-Chapter (Peninsula, East Bay and Monterey Bay Chapters of ICC)

Revise as follows:

1004.1.1 (IFC 1004.1.1) Cumulative occupant loads. Where the path of egress travel includes intervening rooms, areas or spaces, cumulative occupant loads shall be determined in accordance with this section.

1004.1.1.1 (IFC [B] 1004.1.1.1) Intervening spaces. Where occupants egress from one room, area or space through ~~another~~ others, the ~~design~~ *occupant load* shall be assigned individually for each area and considered as required by Section 1014.2. ~~be based on the cumulative *occupant loads* of all rooms, areas or spaces to that point along the path of egress travel.~~

1004.1.1.2 (IFC [B] 1004.1.1.2) Adjacent levels for mezzanines. The *occupant load* of a *mezzanine* ~~or story~~ with all required egress through a room, area or space on an adjacent level shall be added to the *occupant load* of that room, area or space.

Where a mezzanine is served by a means of egress, independent of the room or space in which it is located, the portion of occupant load accumulated to the room or space shall be added to the occupant load of that room or space.

Exceptions:

1. Where a mezzanine is not required to be open in accordance with Exception 2 of Section 505.2.3, provided the loss of all exit access, through the room or space the mezzanine is located in, shall not reduce the available capacity from the mezzanine to less than 50% of the required egress capacity from the mezzanine.
2. Where a mezzanine is not required to be open in accordance with Exception 5 of Section 505.2.3.

1004.1.1.3 (IFC [B] 1004.1.1.3) Adjacent stories. The portion of the occupant load accumulated from a story with exit access through an adjacent story shall be added to the story where access to an exit along that path is provided.

Exceptions:

1. In occupancies other than Group H and I, provided the loss of all exit access through the adjacent story shall not reduce the available egress capacity from the story under consideration to less than 50 percent of its required egress capacity.
2. In occupancies other than Group H and I, where unenclosed exit access stairways serving only the first and second stories of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, provided at least two means of egress are provided from both floors.

1014.2 (IFC [B] 1014.2) Egress through intervening spaces. Egress through intervening spaces shall comply with this section. The capacity and minimum number of exits or exit access doorways and paths required from all interconnected portions of the exit access on a given story shall be considered individually for each room and in the aggregate for each portion of the exit access. The capacity and minimum number of exits or exit access doorways shall be provided based on the requirements in Sections 1005 and 1015, Egress capacity along any path of egress shall be based on the portion of the occupant loads from rooms, areas or spaces accumulated along that egress path.

1. Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas and the area served are accessory to one or the other, are not a Group H occupancy and provide a discernible path of egress travel to an exit.

   Exception: Means of egress are not prohibited through adjoining or intervening rooms or spaces in a Group H, S or F occupancy when the adjoining or intervening rooms or spaces are the same or a lesser hazard occupancy group.

2. An exit access shall not pass through a room that can be locked to prevent egress.
3. Means of egress from dwelling units or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.
4. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes.

   Exceptions:

   1. Means of egress are not prohibited through a kitchen area serving adjoining rooms constituting part of the same dwelling unit or sleeping unit.
   2. Means of egress are not prohibited through stockrooms in Group M occupancies when all of the following are met:
      2.1 The stock is of the same hazard classification as that found in the main retail area;
      2.2 Not more than 50 percent of the exit access is through the stockroom;
      2.3 The stockroom is not subject to locking from the egress side; and
      2.4 There is a demarcated, minimum 44-inch-wide (1118 mm) aisle defined by full- or partial-height fixed walls or similar construction that will maintain the required width and lead directly from the retail area to the exit without obstructions.

Reason: A number of code changes over the past two code cycles have, when combined together, made the code more restrictive as written or interpreted even though as advertised the individual code changes were not intended to increase the cost of construction. The issue primarily revolves around the assignment or accumulation of occupant load from one location to another and whether or not all, or none, or a portion of the occupant load from one area obtaining access to required exits through another story or area is added to the occupant load of that story or area for determination of the number of exits or exit access doorways and egress width.

This code change addresses two areas of concern that the committee may wish to consider separately: Egress on a given level and egress from one story or level through another by way or unenclosed exit access stairways.

In summary on a given level: This code change reinforces the concept that the occupant load is assigned to each occupied area individually. When there are intervening rooms, each area must be considered both individually and in the aggregate with other portions of the exit access to determine the number and width of exit access. Portions of the occupant load are accumulated along egress paths to determine the capacity of individual egress elements along those paths. But once occupants from one area make a choice and head out along one of several independent paths of egress travel, their occupant load is not added to some other area to determine how many paths of travel would be required from that different area as if a second fire were to occur at the same time in that area. Example D is provided at the end of this reason statement.

In summary on separate levels: This code change also attempts to treat egress design along unenclosed exit access stairways through adjacent stories or through adjacent levels (in the case of mezzanines) in a similar manner recognizing previous limited instances where open exit access stairways from stories were considered as exits and the capacity (width) was required to be maintained but the occupant load was not added to the adjacent story providing exit access. Example A is provided in this reason statement.

This code change also recognizes mezzanines with independent egress can function similar to a story in a building. Example B is provided in this reason statement.

This code change recognizes mezzanines with sole egress through a room or area should have the occupant load added to that room or area. Example C is provided in this reason statement.

In order to treat open exit access stairways, for both adjacent stories and levels (mezzanines), equally there must be some limitation on the loss of provided egress capacity from a mezzanine or story that gains a portion of its egress capacity through adjacent levels.

Except for the limited previous exceptions of occupancies other than H or I on the first or second floor equipped with sprinklers throughout (Example E), this code change places a limit of the loss of egress capacity through adjacent levels to no more than 50% of the required capacity. In the event more than 50% of required egress capacity would be blocked if egress through the adjacent level is lost then this code change requires the portion of occupant load to be added to the story or level where exit access is provided. This is consistent with the concept found in 2012 IBC section 1005.5 and is necessary in the case where two of three means of egress from a mezzanine could be open or two of four means of egress from a story could have open exit access through a story (both cases with more than 50% of the required capacity unprotected through the adjacent level or story).

Description of Examples A, B and C: All three examples are a 10 story office building with a parking garage at the first two floors. Upper floors are cut away to help with view. All doors shown are 3'-0" x 6'-8" with 32" net clear. Typical design of each floor of the office building is for 850 occupants. Building is equipped throughout with a sprinkler system per Section 903.3.1.1 (NFPA 13). Each floor requires 3 exits or exit access stairways in accordance with Section 1021.2.4. A minimum of two interior or exterior exit stairways are required from each story above the second floor per Section 1021.1.

Total required net exit door width from each typical story = 850 x .15 = 127.5 inches < 128 inches provided, OK.

Loss of any one exit at interior exit stairway 1 results in no more than 50% of required capacity; Distribution of egress capacity OK per Section 1005.5.

Example A: An two story open office suite covers the entire 3rd and 4th floors is and has a portion of the floor cut away. Access to interior exit stairway 1 is provided from the 4th floor using unenclosed exit access stairway 1. The occupant load of the 3rd floor is 850 without considering any occupant load from the adjacent floor. Occupant load of the partially cut away 4th floor is now 600. The portion of occupant load going to interior exit access stair way = 600 – 2 x 32/.15 = 174. Required width of exit access stair 1 = 174 x .20 = 34.6 inches therefore use 44 inch minimum exit access stair per Section 1009.4.

What occupant load is the third floor designed for? Are the typical floor exit doors and number of interior exit stairs code compliant?

If the portion of occupant load from the 4th floor utilizing the unenclosed exit access stair is added to the third floor occupant load (or all of the occupant load depending how the current code is interpreted), the third floor will now be over 1000 occupant load and 4 means of egress will be required from the third floor down through the building even though the occupant load for the overall building is reduced and previous codes would have allowed this condition in occupancies other than H and I.

This code change, for a B occupancy, would require the portion of the occupant load from the 4th floor to be added to the 3rd floor only if the exit access capacity required from the 4th floor would be reduced to less than 50% of required capacity if the exit access through the adjacent 3rd floor was blocked. In this example the egress would be ok as drawn. For H or I occupancies the portion of occupant load accumulated along the exit access stairway would be added to the occupant load of the story below as a requirement after this code change.

Example B: In this example the third floor does not communicate with any other floor but a mezzanine with an occupant load of 350 is installed. The mezzanine is served by an independent exit going into interior exit stairway 3 and by exit access stairway 1 providing access to the 3rd floor. The occupant load of the 3rd floor is 850 without considering any occupant load from the mezzanine.

What occupant load is the third floor designed for? Are the typical floor exit doors and number of interior exit stairs code compliant?

According to the current code all or a portion of the occupant load from the mezzanine (depending on how it is interpreted) would need to be added to the 3rd floor and in either case, even though the mezzanine has direct access to an exit the building would now require 4 means of egress from the 3rd floor down.

This code change for a B occupancy as shown, would require the portion of the occupant load from the third floor mezzanine to be added to the 3rd floor only if the exit access capacity required from the mezzanine would be reduced to less than 50% of required capacity if the exit access through the 3rd floor was blocked. For H or I occupancies the portions of occupant load accumulated along the exit access stairway would be added to the occupant load of the story below as a requirement of this code change.

For the B occupancy, egress would be ok as shown in the example.

Example C: In this example the third floor does not communicate with any other floor but a mezzanine with an occupant load of 350 is installed and the sole egress from the mezzanine is by two exit access stairways to the 3rd floor. The occupant load of the 3rd floor is 850 without considering any occupant load from the mezzanine.

What occupant load is the third floor designed for? Are the typical floor exit doors and number of interior exit stairs code compliant?

This example would be treated as required by current code where all of the occupant load from the mezzanine is added to the occupant load of the 3rd floor open office below. 3rd floor would now require 4 exits as the occupant load from the third story including the mezzanine would be greater than 1000.

Example D: In this example, the occupant loads assigned to each room or area based on 2012 IBC section 1004.1.2 and the function of the space. All door hardware is either panic or classroom hardware and in all cases is openable in the direction of door swing without the use of a key or special knowledge or effort. All door hardware can be locked with a key in the direction opposite of door swing for security purposes of individual areas. For this example each door is a single leaf from 36 inch minimum up to 48 inch maximum and the building is equipped throughout with an NFPA 13 sprinkler system. If additional door width is required at a door location, based on capacity, two 36" doors are provided.

In layout D.1, all rooms have adequate means of egress for the occupant load contained in the room when evaluated on an individual basis. The occupant load of the entire story is 700 and the story has an adequate number of exits when looked at in the aggregate (doors 3.1, 5.1 and 7.1).

When the Accounting Office and General Office are looked at in the aggregate, they have adequate egress for an aggregate occupant load of 400 for this portion of the exit access (doors 5.1 and 6.1 which both must be have capacity for 200 occupants). The lobby has a total of 20 occupant load and door 7.1 must be sized for an accumulated occupant load along this egress path of 360 (200 from door 6.1, 140 from door 4.1 and 20 from the lobby). Utilizing the concept of one fire, if there was a fire in the lobby then all occupants would have adequate access to other means of egress through doors 5.1 and 3.1. If the fire occurred when doors 4.1 and 6.1 are locked from the lobby side then the limited number of occupants in the lobby have access to adequate egress through door 7.1.

If the fire occurs in another room, the general office for example, the portion of occupant load from the general office and the sales office with egress through the lobby are not added to the occupant load of the lobby to determine the number of exits or exit access doors from the lobby but the occupant load is accumulated along this path to determine the required capacity of doors 7.1 along this path. Because those individuals from other rooms, if exiting from a fire through the lobby, would have already exercised their option of two means of egress from the room where the occupants originated and there is no need to add the occupants or the portion of the design occupant load through the lobby to the occupant load of the lobby to determine the number of means of egress from the lobby. The code does not assume both a fire that persons are exiting from and then encountering another different fire along the way.

Egress in layout D.1 would meet the code as revised by the proposed change.

In layout D.2, all rooms have adequate means of egress for the occupant load contained in the room when evaluated on an individual basis. The occupant load of the entire story is still 700 and the story has an adequate number of exits when looked at in the aggregate (doors 3.2, 5.2 and 7.2). Since the sales office also has required egress through the general office, the accounting office, general office and sales office must be looked at in the aggregate and based on the total aggregate occupant load of 680 for this portion of the exit access. Three exit or exit access doors are required and provided from this portion of the exit access (door 3.2, 5.2, and 6.2). The capacity of door 5.2 and 6.2 must be designed based on an accumulated occupant load 270 along each egress path which is determined as follows: (140, the portion from the sales office, plus 100 from the accounting office, and 300 from the general office) all divided by 2= 270. The capacity of door 7.2 is determined based on the occupant load of 270 used to determine the occupant load of door 6.2 along with the accumulated occupant load of 20 from the lobby for a total occupant load of290 for the capacity of door 7.2 along the continuation of this egress path. This is consistent with Figure 1004.4.4 of the 1012 IBC Commentary and its accompanying explanation.

Egress in layout D.2 would meet the code as revised by the proposed change.

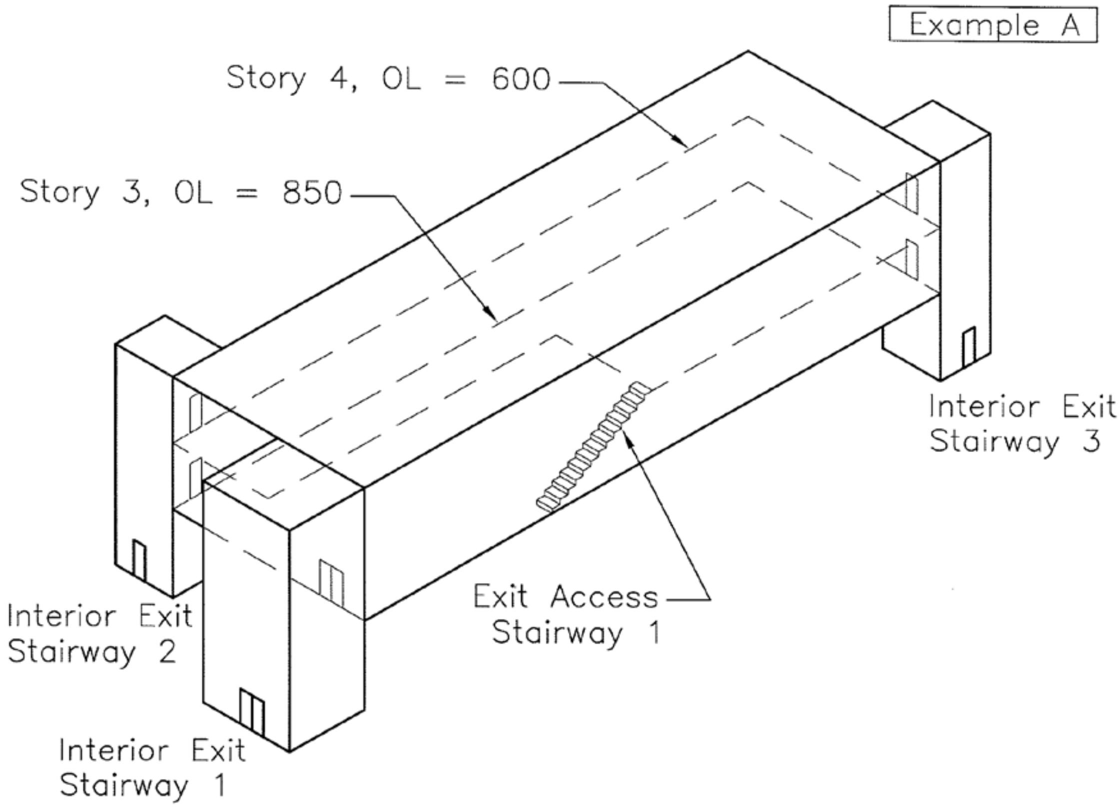
This example has adequate egress from each room, story and portion of the exit access when considered in the aggregate but it would not comply with the 2009 IBC because all occupants do not have access to all required exits from the story as was required by 2009 IBC section 1021.1 This was resolved by E5 and E120 in the past code cycle. This example would also not comply with the literal read of the 2012 IBC because all of the occupant load from the sales office and the accounting office would be added to the general office for a total of 680 requiring three means of egress from the general office.

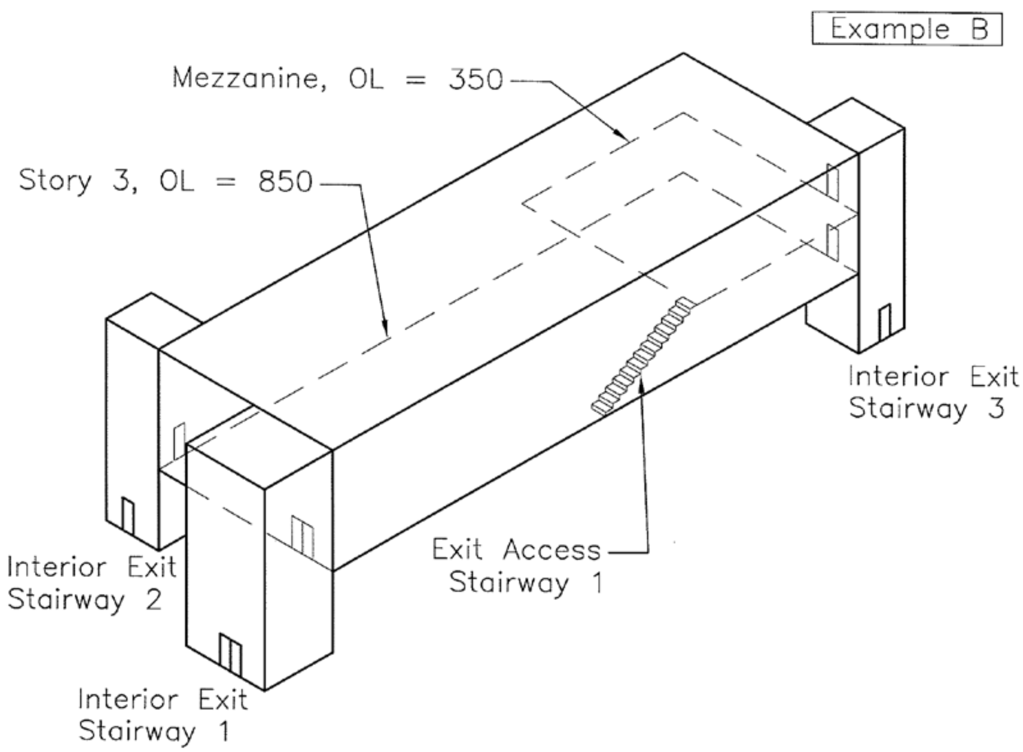
Example E: This example illustrates an egress system allowed for occupancies other than H and I in the first two floors of a building equipped throughout with an NFPA 13 sprinkler system. This arrangement was allowed under the 2006 IBC section 1020.1, exception 9 without adding the occupant load to the floor below. This code change would continue to allow this configuration as long as the capacity from each floor is maintained as required by the code.

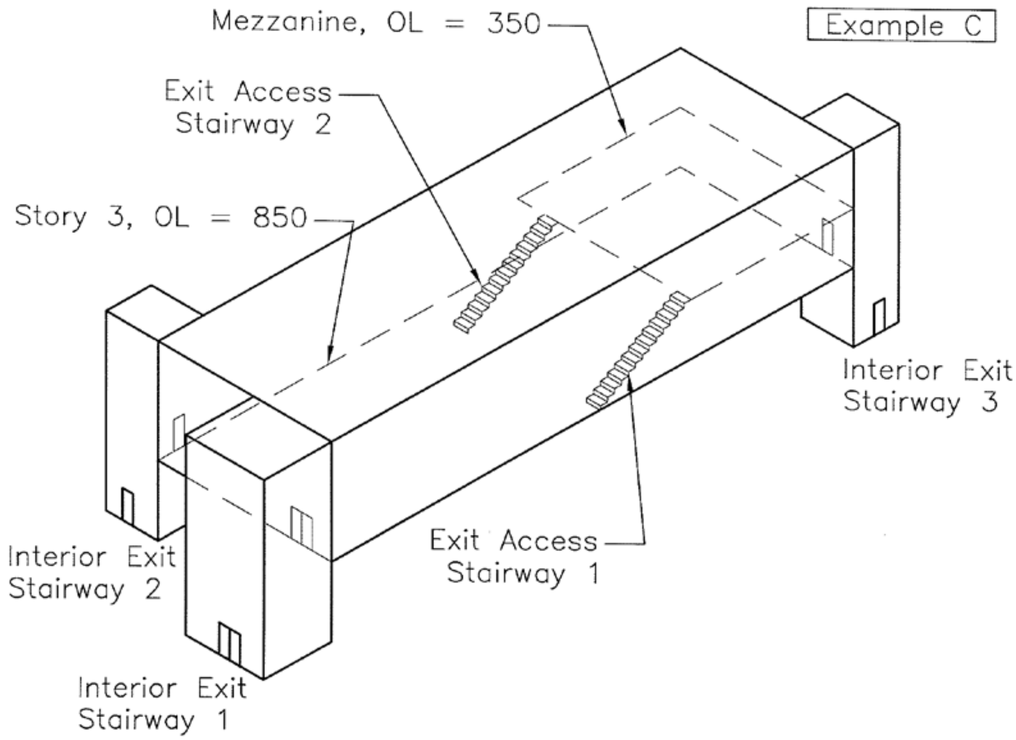
This configuration would apparently not meet the current code as the occupant load or a portion of the occupant load from the second floor would currently be required to be added to the occupant load of the first floor causing the occupant load to have three exits. This was apparently an unintended consequence of E122 06/07.

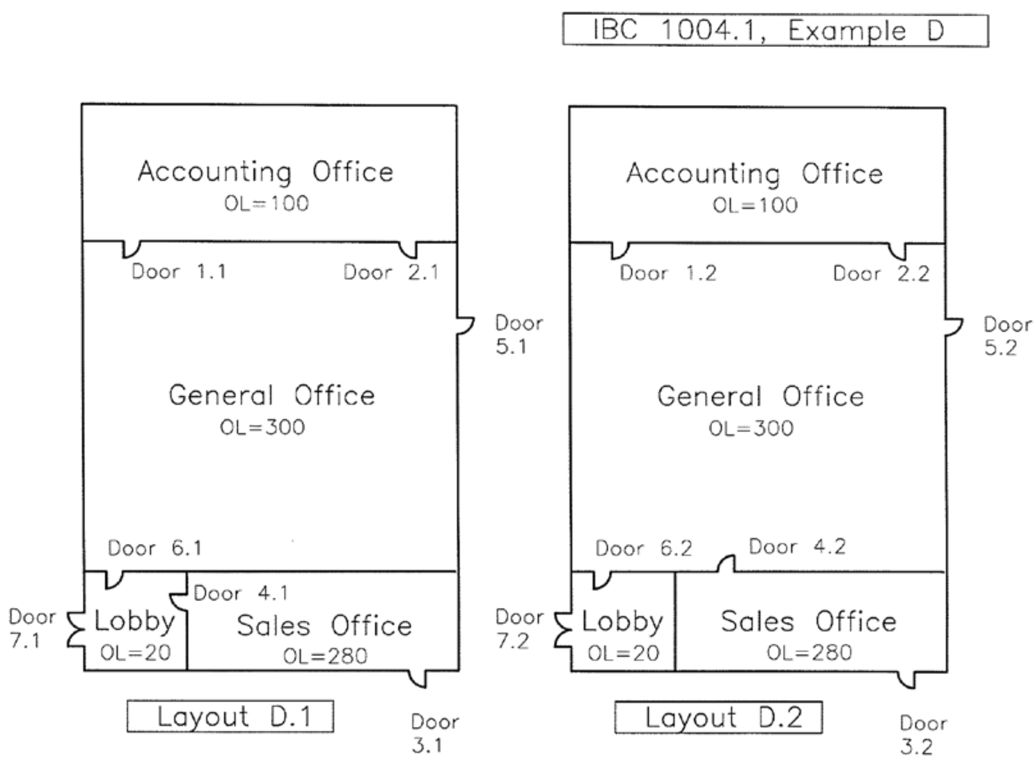
In Conclusion: This code change would clarify egress from a single level through intervening rooms would have occupant load assigned to each room and be evaluated both individually and in the aggregate for each portion of the exit access.

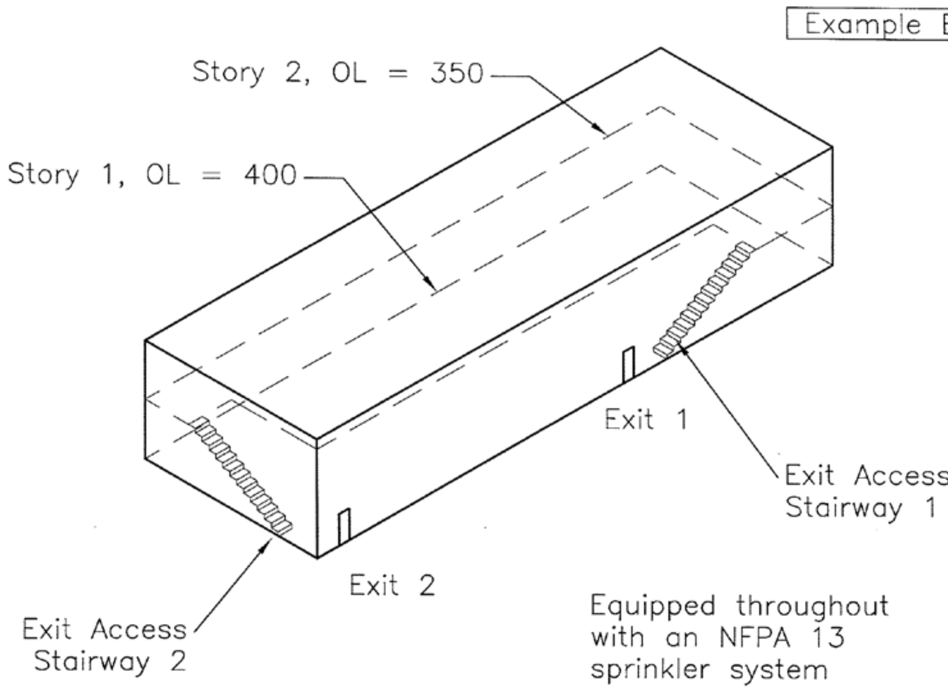
This code change would still require occupant load from an adjacent story or level to be added to an adjacent level when the sole egress occurs through the story. This code change provides a framework utilizing existing exceptions for the egress through an adjacent story or level to be considered in a similar manner depending on the degree of independent egress from the story or mezzanine.


Example A
Story 4, OL = 600
Story 3, OL = 850
Interior Exit Stairway 3
Exit Access Stairway 1
Interior Exit Stairway 2
Interior Exit Stairway 1


Example B
Mezzanine, OL = 350
Story 3, OL = 850
Interior Exit Stairway 3
Exit Access Stairway 1
Interior Exit Stairway 2
Interior Exit Stairway 1


Example C
Mezzanine, OL = 350
Exit Access Stairway 2
Story 3, OL = 850
Interior Exit Stairway 3
Interior Exit Stairway 2
Exit Access Stairway 1
Interior Exit Stairway 1


IBC 1004.1, Example D
Accounting Office
OL=100
Door 1.1
Door 2.1
Door 5.1
General Office
OL=300
Door 6.1
Door 4.1
Door 7.1
Lobby
OL=20
Sales Office
OL=280
Layout D.1
Door 3.1
Accounting Office
OL=100
Door 1.2
Door 2.2
Door 5.2
General Office
OL=300
Door 6.2
Door 4.2
Door 7.2
Lobby
OL=20
Sales Office
OL=280
Layout D.2
Door 3.2



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

Staff Note: The version of E15-12 shown above was part of the errata posted on the ICC website and also appeared in the Report of Hearings.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal seems to treat the 2nd floor like a mezzanine regardless of how close the exit access stairways are to the exterior exits in the level of exit discharge. This would be in conflict with the cascading stairway loading that has been utilized in the code for years. "Loss of exit access" is to open for interpretation. The proposed language is very confusing. The intent is not clearly expressed. Disapproval is also consistent with the committee vote on E17.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dennis Richardson, PE; Building Official, City of Salinas, representing Tri-Chapter (Peninsula, East Bay and Monterey Bay Chapters of ICC), requests Approval as Modified by this Public Comment

Replace the proposal with the following:

1004.1.1 Cumulative occupant loads. Where the path of egress travel includes intervening rooms, areas or spaces, cumulative occupant loads shall be determined in accordance with this section.

1004.1.1.1 (IFC [B] 1004.1.1.1) Intervening spaces <u>or accessory areas</u>. Where occupants egress from one <u>or more</u> room, area or space through ~~another~~ <u>others</u>, the design *occupant load* shall be <u>the combined occupant load of interconnected accessory or</u>

intervening spaces. Design of egress path capacity shall be based on the cumulative portion of occupant loads of all rooms, areas or spaces to that point along the path of egress travel.

1004.1.1.2 (IFC [B] 1004.1.1.2) Adjacent levels for mezzanines. That portion of the *occupant load* of a *mezzanine* ~~or story~~ with required egress through a room, area or space on an adjacent level shall be added to the *occupant load* of that room, area or space.

1004.1.1.3 (IFC [B] 1004.1.1.3) Adjacent stories. Other than for the egress components designed for convergence in accordance with Section 1005.6, the occupant load from separate stories shall not be added.

Commenter's Reason: Over the past two code cycles there have been numerous changes to the egress provisions. Along the way a number of basic premises of the code have been slightly modified with the result of inconsistent interpretation and application of the code.

The goal of this code change is to state how occupant load is addressed in one place (Section 1004) so that the user can consistently apply the occupant load in other sections utilized to calculate the width (or capacity) and determine the number of exits or exit access paths. During the past two code cycles seemingly straight forward changes have had the effect of making the code more restrictive through interpretation even though they were not advertised as such.

1004.1.1.1 Intervening spaces: The current code as written gives inconsistent interpretations as shown in the 2012 ICC Code and Commentary Figure 1004.1.1 on page 10-10 and Figure 1021.2(1) on page 10-135. In Figure 1004.1.1, if interpreted literally as written, a small lobby with 10 occupant load with one path of exit travel through it would either have all or part of the occupant load from the next room added to it to determine both number and capacity of exits. If the code is applied literally in this example, then the design occupant load (now much larger) would require two exits or exit access from the lobby on its own even though the large room driving egress already has access to two exits. In the example accompanying Figure 1021.2(1) part of the occupant load is added to the corridor to determine the corridor now needs three exits which is incorrect as the room driving this condition already had access to three exits or exit access and the overall story only needs three exits.

Instead of taking occupant load from one space and adding it to another as implied by the current code for the overall design occupant load, this public comment emphasizes rooms that share an egress path must be looked at for the occupant load in the aggregate to address number of exits, door swing, hardware, etc. and each path of egress travel width (or capacity) must be designed for an accumulation of the portion of occupant load with egress along that path. Each individual room must also have access to the required egress as currently required by code.

1004.1.1.2 Mezzanines: Egress from mezzanines has been treated differently than stories in the IBC code for a number of years. The concept provided here is only the portion of occupant load with required egress through the room, area or space shall be added to the occupant load of the room, area or space below. This accounts for mezzanines where there is considerable independent egress directly off of the mezzanine and also for the conditions where some or all of the required egress from the mezzanine is through the level below.

1004.1.1.3 Stories: Historically in the IBC occupant load has not needed to be accumulated through exits from one story to another as long as both the maximum number and capacity at any story is maintained in the stories below. This has been referred to the "cascading stairway" loading effect. The concern of "conflict with the cascading stairway loading utilized by the code for years" was mentioned by the egress committee in the disapproval of E14, E15 and E17. In past codes, there is one instance where occupant load is added between stories when there is convergence with egress to a central level occurring at the same time from both above and below. This is acknowledged in this public comment.

The loss of the cascading loading for stairways may have occurred, in the minds of some, when unenclosed exit stairways found in section 1020, exceptions 8 and 9, of the 2006 IBC were relocated by E122-06/07 from the exit provisions to the exit access provisions. E122-06/07 stated it did not increase the cost of construction and there was no discussion in the E122-06/07 reason of any effect on cascading stairway loading at that time. Yet by renaming unenclosed exit stairs as unenclosed exit access stairs some practitioners interpreted this as a need to now add the portion of occupant load from an exit access stairway to the story below (as part of the exit access) instead of maintaining both the capacity and number of means of egress from the story as has historically been done for exits. This cascade stairway loading concept was alive and well regarding egress width from a story in section 1004.4 of the 2006 IBC, again in the last sentence of section 1005.1 of the 2006 IBC, and finally addressed for the number of exits from a story in 2006 IBC section 1019.1. The last section of this public comment attempts to address this issue to ensure, even though egress through an adjacent story has been reorganized, the intent of maintaining the cascade stairway loading is maintained as pointed out by the egress committee.

E15-12

Final Action: AS AM AMPC____ D

E17-12
1004.1.1.2, 1005.3.1, 1005.3.2 (IFC [B] 1004.1.1.2, 1005.3.1, 1005.3.2)

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee

Revise as follows:

1004.1.1.2 (IFC [B] 1004.1.1.2) Adjacent levels. That portion of the occupant load of a mezzanine or story with required egress through a room, area or space on an adjacent story ~~level~~ shall be added to the occupant load of that room, area or space.

1005.3.1 (IFC [B] 1005.3.1) Stairways. The capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity factor of 0.3 inches (7.62 mm) per occupant. Where interior or exterior exit stairways serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of the stairways serving that story. Where exit access stairways provide required access to an exit at an adjacent story, the occupant load determined in accordance with Section 1004.1.1.2 shall be used in calculating the required capacity of the means of egress serving that story.

> **Exception:** For other than Group H and I-2 occupancies, the capacity, in inches (mm), of *means of egress stairways* shall be calculated by multiplying the *occupant load* served by such *stairway* by a *means of egress* capacity factor of 0.2 inch (5.1 mm) per occupant in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an *emergency voice/alarm communication system* in accordance with Section 907.5.2.2.

1005.3.2 (IFC [B] 1005.3.2) Other egress components. The capacity, in inches (mm), of *means of egress* components other than *stairways* shall be calculated by multiplying the *occupant load* served by such component by a *means of egress* capacity factor of 0.2 inch (5.1 mm) per occupant. Where exit access ramps provide required access to an exit at an adjacent story, the occupant load determined in accordance with Section 1004.1.1.2 shall be used in calculating the required capacity of the means of egress serving that story.

> **Exception:** For other than Group H and I-2 occupancies, the capacity, in inches (mm), of *means of egress* components other than *stairways* shall be calculated by multiplying the *occupant load* served by such component by a *means of egress* capacity factor of 0.15 inch (3.8 mm) per occupant in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an *emergency voice/alarm communication system* in accordance with Section 907.5.2.2.

Reason: This proposal is submitted by the ICC Building Code Action Committee (BCAC) The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 3 open meetings and over 15 workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The 2012 Edition of the IBC has formalized the concept of accessing exits from adjacent stories. Accordingly, several means of egress design details need to be clarified so as to be consistent with the intent of Section 1021. Currently, Section 1004.1.1.2 literally requires that (100% of) the occupant load of a mezzanine or story with egress through a room, area or space on an adjacent level shall be added to the occupant load of that room, area or space. That would be appropriate if there were no other exits serving the mezzanine or story. However, if the mezzanine or story also has other independent exits that do not egress through the adjacent story, it is reasonable to assume these other independent exits can and will be used by the occupants of that mezzanine or story. This proposal clarifies that only that portion of the occupant load of the level of origin actually using exit access stairways need be used in determining means of egress requirements for the adjacent story. To be consistent with this philosophy, Section 1005.3.2 has also been modified to state an identical provision for exit access ramps which provide required access to an exit at an adjacent story.

Additionally, Section 1005.3.1 has been modified to clarify that only the occupant load of a story directly accessing an interior exit stairway need be considered in determining the required capacity of such interior exit stairway that serves additional stories. The cascade effect is accounted for in the means of egress capacity factor for stairways in Section 1005.3.1. A cross-reference to the method for determining the required capacity for areas served by exit access stairways from an adjacent level has also been provided.

Section 1004.6 (Mezzanine levels) of the 2009 IBC reads very similarly to Section 1004.1.1.2 (Adjacent levels) of the 2012 IBC. The 2009 IBC Commentary states, "The egress requirements for mezzanines are handled similar to those addressed in Section 1004.1 with accessory areas versus the requirements for exiting from multiple levels in Section 1004.4. That is, that portion of the mezzanine occupant load that discharges to the floor below is to be added to the occupant load of the space on the floor below. The sizing and number of the egress components must reflect this combined occupant load. This does not apply to the means of egress from a mezzanine that does not require travel through another level (i.e., an exit stairway serving the mezzanine)."

Clarification is achieved by adding the "that portion" language in the commentary to the actual provision. Approval of this proposal is consistent with the means of egress philosophy contained in the 2012 IBC and will result in the more consistent interpretation and application of fundamental means of egress design provisions.

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

1004.1.1.2-E-BAJNAI-BCAC.docx

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The term "portion of the occupant load" is too open for interpretation and is confusing. Elimination of the enclosures for the stairways does not change how the occupants move to egress from the space. This would be in conflict with the cascading stairway loading that has been utilized in the code for years. This would have significant effect on the size and number of exits in a two story building with two exit access stairways.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee, requests Approval as Modified by this Public Comment

Replace the proposal with the following:

1004.1.1.2 (IFC [B] 1004.1.1.2) Adjacent levels. That portion of the occupant load of a mezzanine or story with required egress through a room, area or space on an adjacent story ~~level~~ shall be added to the occupant load of that room, area or space.

Commenter's Reason: This public comment is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 5 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Revision to the code text is made to clarify the Code's intent and be consistent with the 2012 IBC Commentary under Section 1004.1.1.2.

The 2012 IBC Commentary under Section 1004.1.1.2 states:

"The egress requirements for mezzanines or second floors that use exit access stairways to move to the ground level are handled similar to those spaces with accessory areas addressed in Section 1004.1.1.1, versus the requirements for exiting from multiple levels in 1021. That is, ***that portion of the mezzanine/second floor occupant load that travels through the floor below to the exit is to be added to the occupant load of the space on the floor below***. The sizing and number of the egress components must reflect this combined occupant load. This does not apply to the means of egress from a mezzanine/second floor that does not require travel through another level (i.e., an interior exit stairway serving the mezzanine/second floor)."

E17-12

Final Action: AS AM AMPC____ D

E18-12
Table 1004.1.2 (IFC [B] Table 1004.2)

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering representing Aon Fire Protection Engineering (al.godwin@aon.com)

Revise as follows:

TABLE 1004.1.2 (IFC [B] TABLE 1004.1.2)
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANCY

FUNCTION OF SPACE	OCCUPANCY LOAD FACTOR
Mercantile	
~~Areas on other floors~~	~~60 gross~~
~~Basement and grade floor areas~~	~~30 gross~~
Primary floors of the retail space[b]	30 gross
Floors and mezzanine other than the primary floors	60 gross
Storage, stock, shipping areas	300 gross

(Portions of table and notes not shown remain unchanged.)

b. The primary floor is the entry floor of the retail space. More than one floor will be considered a primary floor where customer entry from outside the retail space can occur on different levels. Other floors are secondary floors, mezzanines, and basements that customers can only access once inside the retail space.

Reason: It has never been made clear if the grade floor is the 1st floor of the retail space, or only those floors at grade. What about retails spaces that are on the 2nd floor of a strip center or mall? Is it assumed that they will not be as crowded as a retail space on the 1st floor? What if there are two grade floors? Why does a basement level have the same occupant load as the "grade floor."

This revision is provided to hopefully clarify the requirement. At least provide better clarification in the commentary.

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

Staff Note: The original proposal had an errata in the 2nd column in the struck-out language. The proposal as shown has been corrected.

T1004.1.2-E-Godwin.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The issue is more the occupant load of the space rather than if this is the entry floor or not. A store could have a primary retail space on more than one floor This proposal would not work for malls. "Primary floor" would not have consistent interpretation.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Al Godwin, CBO, CPM, Aon Fire Protection Engineering representing Aon Fire Protection Engineering, requests Approval as Submitted

Commenter's Reason: When published in the monograph the "60 gross" and "30 gross" of the existing struck through language were transposed. This added confusion to the proposal.

The Committee stated that the issue is not what floor they are on but the occupant load of the space. However, the current code already assumes that the grade floor and basement floor will have the largest occupant load regardless of what products are present on these or other floors that might attract customers. This proposal is only to clarify that the "grade floor" of a retail space is the entry floor of the retail space. Thus, a retail space whose entry floor is on the second level would use the 30 factor and not the 60 factor.

Also included is direction that in some buildings like malls, 2 story retails spaces may have two "grade" or entry floors.

Public Comment 2:

Stephen Thomas, Colorado Code Consulting, LLC representing Colorado Chapter ICC, requests Approval as Modified by this Public Comment

Replace the proposal with the following:

TABLE 1004.1.2 (IFC [B] TABLE 1004.1.2)
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANCY

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR [a]
Mercantile	60 gross
~~Areas on other floors~~	~~60 gross~~
~~Basement and grade floor areas~~	~~30 gross~~
Storage, stock, shipping areas	300 gross

(Portions of table and notes not shown remain unchanged.)

Commenter's Reason: The original proposal tried to define what the primary floor was for mercantile occupancies. This public comments attempts to make this requirement easier for the code user. The different occupant load factors for various floors were originally based on multi-story single operator buildings. However, the use of these buildings is no longer the same as they were. Many of the big box retailers are now constructing multi-story buildings. We do not believe the number of occupants will be any different on different floors. Therefore, we are recommending that a single occupant load factor be used for all floors.

60 square feet per occupant was selected because it is a more reasonable number in today's retail environment. Much of the floor area is covered with display cases and counters. The actual number of people, even at Christmas time or Black Friday, would not exceed the 60 square feet limit. This occupant load factor is more reasonable and still provides the required number and capacity of exits from the building.

E18-12
Final Action: AS AM AMPC____ D

E19-12
1004.2 (IFC [B] 1004.2)

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, Aon Fire Protection Engineering representing Aon Fire Protection Engineering (al.godwin@aon.com)

Revise as follows:

1004.2 (IFC [B] 1004.2) Increased occupant load. The *occupant load* permitted in any building, or portion thereof, is permitted to be increased where approved by the *building official* from that number established for the occupancies in Table 1004.1.2, provided that all other requirements of this ~~the~~ code or any other applicable codes are also met based on such modified number and the *occupant load* does not exceed one occupant per 7 square feet (0.65 m^2) of net occupiable floor space.

In making the decision, the *building official* shall be permitted to consider such issues as:

1. Is this a temporary or permanent increase;
2. The function and operation of the business;
3. Openness of egress flow;
4. Management control of crowd and evacuation issues;
5. The effect of seating or tables on the egress path;
6. Is alcohol present.

After review, the *building official* shall be permitted to require a lesser density.

Where required by the *building official*, an approved aisle, seating or fixed equipment diagram substantiating any increase in *occupant load* shall be submitted. Where required by the *building official*, such diagram shall be posted.

Reason: As written, the 1:7 seems automatic if extra exits and width are provided. Some designers have felt that it is automatic and expressed opposition when other factors were brought into the evaluation. However, there are many issues that should be considered in evaluating the increase. Only a few are listed.

There is a difference in increasing the occupant load for rooms used for code hearings than rooms used as a night club, with low lights and patrons consuming alcohol. To allow an occupant load increase requires a different evaluation.

Also, there are other codes that are affected as well. An occupant load increase may change the alarm specifications, the restroom requirements, the fresh air requirements, etc. All of these factors are part of the evaluation.

Cost Impact: This code proposal will not increase the cost of construction since no extra construction costs are involved.

1004.2-E-Godwin.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: To design a space for an increased occupant load the designer is already exceeding minimum code requirements and there is already a maximum number permitted. The proposed language is too subjective. The intent is already addressed in the codes, therefore the proposed language is largely duplicative.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Al Godwin, CBO, CPM, representing Aon Fire Protection Engineering Corporation, requests Approval as Modified by this Public Comment.

Replace the proposal with the following:

1004.2 Increased occupant load. The *occupant load* permitted in any building, or portion thereof, is permitted to be increased, where approved by the *building official*, from that number established for the occupancies in Table 1004.1.2, provided that all other requirements of the code are also met based on such modified number and the *occupant load* does not exceed one occupant per 7 square feet (0.65 m^2) of net occupiable floor space. Where required by the *building official*, an approved aisle, seating or fixed equipment diagram substantiating any increase in *occupant load* shall be submitted. Where required by the *building official*, such diagram shall be posted. Where required by the *building official*, an approved aisle, seating or fixed equipment diagram substantiating any increase in *occupant load* shall be submitted. Where required by the *building official*, such diagram shall be posted.

Commenter's Reason: While all of the items listed in the original proposal and the reason statement are applicable, the Committee felt that these items will be addressed before an increase will be permitted. As such, the proposal was a duplicate of provisions that already exists.

Therefore, the proposal has been reduced to just add "when approved by the building official." As currently written, it is not clear if 7 square foot per person is a right that can be claimed anytime extra doors are present, or if the building official has some decision making authority. This will clarify that it is not a right but is subject to review.

The commentary should identify that in making this decision, the building official should consider all of the items in the original proposal and those listed in the Reason statement.

E19-12

Final Action: AS AM AMPC____ D

E25-12
1006.1.1 (New) [IFC [B] 1006.1.1(New)]

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care

Add new text as follows:

1006.1.1 (IFC [B] 1006.1.1) Occupancy sensors. Occupancy sensors shall be permitted to activate the required illumination for the means of egress provided they meet all of the following conditions:

1. The occupancy sensors operate as fail safe devices when the occupancy sensor fails;
2 Where the occupancy sensor is activated by an occupant the area served is illuminated for a minimum duration of 15 minutes;
3. The occupancy sensor operates as a fail safe device in the event of a power supply failure to the emergency lighting system required by Section 1006.3.
4. The means of egress is not required to have illumination to charge luminous egress path markings in accordance with Section 1024.5

Reason: This change permits the use of occupancy sensors which has been allowed in some jurisdictions. It also helps reduce energy as mandated by DOE. There are several proposals from the Adhoc Health Care Committee dealing with Section 1006. The proposals can be accepted individually, however, the proposals can work together.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx .

Cost Impact: None

1006.1-E-Williams-Adhoc.docx

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Allowance for automatic controls is needed as part of energy conservation and green building concerns. It is recognized that timers are used to turn on the lights to charge the photoluminescent stripes required in high-rises by Section 1024. However, there is a concern that there are currently no standards for testing or listing of these controls – specifically looking for a fail-safe device. These automatic controls should be limited to general means of egress lighting and not relied on for emergency means of egress lighting. This disapproval is consistent with E22 and E24.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

John Williams, Adhoc Health Care – MOE study group, requests Approval as Modified by this Public Comment.

Replace the proposal with the following:

1006.1 (IFC [B] 1006.1) Illumination required. The *means of egress*, including the *exit discharge*, shall be illuminated at all times the building space served by the *means of egress* is occupied.

Exceptions:

1. Occupancies in Group U.
2. *Aisle accessways* in Group A.
3. *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
4. *Sleeping units* of Group I occupancies.
5. Portions of the m*eans of egress* provided with automatic lighting controls installed in accordance with Section 1006.1.1.

1006.1.1 (IFC [B] 1006.1.1) ~~Occupancy sensors~~ Automatic lighting controls. ~~Occupancy sensors~~ Automatic lighting controls shall be permitted to activate the required illumination for the means of egress provided they meet all of the following conditions:

1. The controls shall be configured to provide the required illumination within each room or space while occupied.
2. Where provided, occupant sensors shall activate the required illumination ~~the occupancy sensor is activated by an occupant the area served is illuminated~~ for a minimum duration of 15 minutes.

~~1.~~ 3. Where the automatic lighting controls fail, the controls shall fail in the on or operating state. ~~The occupancy sensors operate as fail safe devices when the occupancy sensor fails;~~

4. Occupant sensors shall not extinguish lighting ~~The means of egress is not~~ required ~~to have illumination~~ to charge luminous egress path markings in accordance with Section 1024.5

~~3.~~ 5. All designated emergency lighting luminaries in the means of egress path shall operate in the event of emergency system activation providing light levels in accordance with Section 1006.3. ~~The occupancy sensor operates as a fail safe device in the event of a power supply failure to the emergency lighting system required by Section 1006.3.~~

6. The automatic lighting controls shall be tested as a component of the emergency lighting equipment in accordance with the IFC Section 604.5.

Commenter's Reason: The revised proposal responded to the committee's comments. The testing section was added in Item 6. Item 5 refines how the emergency means of egress lighting if used. We refined other areas of the proposal to indicate the need to fail on and not interfere with any of the luminous marking system needs.

Today's practice:

	Emergency fixture options		
	Battery powered wall fixtures	Battery back-up ceiling fixtures	Designated fixtures connected to emergency panels
Normal power ON	OFF as standard feature	May be turned OFF when space unoccupied, maybe left ON depending on design	Mostly ON 24/7
Normal power OFF	ON as standard feature	ON as standard feature	ON when transfer switch connects to emergency generator

Change we would like to see with this proposal:

	Emergency fixture options		
	Battery powered wall fixtures	Battery back-up ceiling fixtures	Designated fixtures connected to emergency panels
Normal power ON	OFF as standard feature	Turned OFF when space unoccupied	Turned OFF when space unoccupied
Normal power OFF	ON as standard feature	ON as standard feature	ON when transfer switch connects to emergency generator

The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx.

Public Comment 2:

Wade Rudolph, CBET, CHFM, Sacred Heart Hospital representing Wisconsin Healthcare Engineers Association Codes & Standards Committee, requests Approval as Submitted

The proposal as submitted by John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare should be accepted as proposed.

The rationale provided by the ICC Review committee substantiates that the proposal is acceptable for safe egress out of the building for almost 100% of the time, but is somehow not reliable for egress in a fire event. This logic does not make sense.

The concern that there is no current standard to test the devices is not valid, as the industry will create a test upon acceptance.

Hospitals are required to have illumination of means of egress and have invested a substantial amount of money into emergency generators, and emergency power distribution systems that have proven to be reliable in many situations. To require an additional luminous egress path markings is redundant. Hospitals already have normal power plus emergency power. The need for the markings is an expense that will add no more value to safe egress in the event of a fire.

Healthcare depends on emergency power systems to support life safety functions such as surgery, emergency services and the like, so to not consider this emergency power as a reliable source for egress illumination defies logic.

Healthcare costs are a major national concern. To increase construction costs with three required redundant systems is not good use of healthcare resources that should be allocated to the patient at the bedside.

I am submitting this request on behalf of the Wisconsin Healthcare Engineers Association Codes & Standards committee representing over 700 members in the State of Wisconsin.

Thank you for your time and consideration of my comments.

E25-12

Final Action: AS AM AMPC____ D

E37-12
1007.1 (IFC [B] 1007.1)

Proposed Change as Submitted

Proponent: Gene Boecker, AIA, Code Consultants, Inc, representing self (geneb@codeconsultants.com)

Revise as follows:

1007.1 (IFC [B] 1007.1) Accessible means of egress required. Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress are required by Section 1015.1 or 1021.1 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. Accessible means of egress are not required in alterations to existing buildings.
2. One accessible means of egress is required from an accessible mezzanine level in accordance with Section 1007.3, 1007.4 or 1007.5.
3. In assembly areas with sloped or stepped aisles, one accessible means of egress is permitted where the common path of travel is accessible and meets the requirements in Section 1028.8.
4. <u>Accessible means of egress are not required from levels of parking garages that do not contain accessible parking spaces.</u>

Reason: According to Section 1105.1.1 and 1106.6 of the IBC, accessible parking is required on levels that have a direct connection to the building. Van accessible parking is allowed to be limited to the ground floor level. Hence accessible parking is not required on all levels of a parking garage.

It is often unclear whether an accessible means of egress, once provided for the accessible parking spaces within a garage on a single level, should be applied throughout the structure. Because the intent for accessible means of egress is to provide access for individuals with mobility disabilities, this would not be necessary on parking garage levels without accessible parking spaces.

Section 1007.2.1 of the IBC requires an elevator to serve as an accessible mean of egress in buildings where a required accessible floor is more than four stories above the level of exit discharge (a five story building). While accessible parking is not required on the upper levels of a garage (without access to the building on those levels) that does not mean that the upper levels are not to be designed for accessibility. It simply means that they are not required to be designed for mobility disabilities. The floors must still be designed for other types of disabilities. Protruding objects/headroom obstructions are still required to be addressed for visual disabilities and a telephone bank would need to provide units for the hearing impaired. Tactile exit signs are unaffected by this proposal because they are required under Section 1011.4 and are not a part of the accessible means of egress provisions in Section 1007.

Similarly, although the code contains an exemption for areas of refuge for parking garages, a 48 inch clear width between handrails would still be required since an open parking garage is usually without sprinklers. The purpose of the 48 inch clear width is to facilitate fire fighter capability to carry a wheelchair down the stairs. If there is no accessible parking on the upper levels, this too should not be a requirement.

While accessible parking may be provided on multiple levels because building entrances are provided at various levels, full compliance should not be necessary at levels where mobility accessibility is not an issue. If accessible parking is provided on all levels, then the accessible means of egress should be provided on all levels as well. However, if accessible parking is provided on only the grade level of an eight-level parking garage, the requirements for an accessible means of egress elevator should not apply and the stairways serving the upper levels should be designed based on required capacity rather than a blanket 48 inch between handrail requirement.

Cost Impact: The code change proposal will reduce the cost of construction in some instances.

1007.1 #2-E-Boecker.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The allowance for no accessible means of egress on levels of parking garages that do not contain accessible parking spaces conflicts with the needs of persons with mobility impairments that are not using accessible parking spaces.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gene Boecker, AIA, Code Consultants, Inc (CCI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1007.1 (IFC [B] 1007.1) Accessible means of egress required. Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress are required by Section 1015.1 or 1021.1 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. Accessible means of egress are not required in alterations to existing buildings.
2. One accessible means of egress is required from an accessible mezzanine level in accordance with Section 1007.3, 1007.4 or 1007.5.
3. In assembly areas with sloped or stepped aisles, one accessible means of egress is permitted where the common path of travel is accessible and meets the requirements in Section 1028.8.
4. ~~Accessible means of egress are not required from levels of parking garages that do not contain accessible parking spaces.~~ In parking garages, the second accessible means of egress shall be permitted to use the parking garage drive aisles.

Commenter's Reason: The committee disapproved this based on the assumption that disabled people who choose not to park in the designated spaces need to have an accessible means of egress. Fundamentally, this argument is flawed. The code does not require all doors to act as exits - even if they lead to the outside - only those which are designated as exits. If other doors are provided, while occupants can use them if they so choose, the code does not obligate the designer to construct them as exits. Irrespective of the concerns expressed, this is a design issue that continues to come up in discussions and should have a resolution.

If it is important that accessible means of egress be provided from all parts of a parking garage, regardless of whether or not there are marked spaces, then the code should require all spaces to be designed for Accessibility. It does not do so because it recognizes specific locations which must be set aside.

Garages often have a configuration where the drive aisle slopes from one end of the garage to the other. At one end is a set of stairs. Diagonally opposite that is another set of stairs. An elevator may or may not be provided at one end. If an elevator is not present, then the second accessible means of egress is down the drive aisle to the far corner of the garage. The drive aisle is not required to be designed for accessibility. It usually has a slope of 10 percent rather than a maximum of 8.3 percent; and, the drive aisle does not have landings at 30 inch vertical increments or handrails on both sides. Hence it is not a ramp which is designed to meet accessibility needs. If an elevator is provided, the second accessible means of egress must be provided with emergency standby power. This is an added cost of $35,000 to $100,000 depending on geographic location and height of the garage.

The proposed amendment accepts the premise that there may be persons with disabilities on levels other than those with designated spaces. However, it offers a suggestion that the drive aisle be used as the second accessible means of egress. One accessible means of egress can be the stairs near the side where the accessible spaces are provided. This stairway must be widened to 48 inches clear between handrails. According to the concerns expressed by the committee, this would need to be extended upward to the full height of the stair. While questionable relative to the code assumptions as stated in the first paragraph, this is a relatively small expense to the overall garage. The real concern is how to provide the second accessible means of egress. The sloped drive aisles create a limitation in design and the emergency standby power represents a significant increase is cost.

The proposal seeks a third alternative, still keeping with the concerns expressed by the committee. Because the path of egress in a garage is most often in descent, the sloped aisles, although greater than the slopes for accessible design, should be acceptable. The slope is in the same direction as gravity. Breaking is a concern but not overcoming the vertical change in elevation. Additionally, parking garages have a significant safety record for human life. This is a reasonable alternative to the interpretation that it is necessary to provide something for a part of the building where the need is not evident.

E37-12
Final Action: AS AM AMPC____ D

E39-12

1007.3, 1007.4 (IFC [B] 1007.3, 1007.4)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1007.3 (IFC [B] 1007.3) Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between stories shall have a clear width of 48 inches (1219 mm) minimum between *handrails* and shall either incorporate an *area of refuge* within an enlarged floor-level landing or shall be accessed from ~~either~~ an *area of refuge* complying with Section 1007.6 ~~or a *horizontal exit*~~. *Exit access stairways* that connect levels in the same story are not permitted as part of an *accessible means of egress*.

Exceptions:

1. The clear width of 48 inches (1219 mm) between *handrails* is not required in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
2. *Areas of refuge* are not required at *stairways* in buildings equipped throughout by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. The clear width of 48 inches (1219 mm) between *handrails* is not required for *stairways* ~~accessed from a *horizontal exit*~~ from a refuge area in conjunction with a horizontal exit.
4. *Areas of refuge* are not required at *stairways* serving *open parking garages*.
5. *Areas of refuge* are not required for smoke protected seating areas complying with Section 1028.6.2.
6. ~~The~~ *Areas of refuge* are not required at stairways in Group R-2 occupancies.
7. *Areas of refuge* are not required at *stairways* in *Group I-3 facilities*.
8. Areas of refuge are not required for stairways accessed from a refuge area in conjunction with a horizontal exit.

1007.4 (IFC [B] 1007.4) Elevators. In order to be considered part of an *accessible means of egress*, an elevator shall comply with the emergency operation and signaling device requirements of Section 2.27 of ASME A17.1. Standby power shall be provided in accordance with Chapter 27 and Section 3003. The elevator shall be accessed from either an *area of refuge* complying with Section 1007.6 or a *horizontal exit*.

Exceptions:

1. ~~Elevators are not required to be accessed from an *area*~~ Areas *of refuge* ~~or *horizontal exit*~~ *are not required at the elevator* in *open parking garages*.
2. A*reas of refuge* are not required at elevators in *Group I-3 facilities*.

3~~2.~~ ~~Elevators are not required to be accessed from an *area*~~ Areas *of refuge* ~~or *horizontal exit* in~~ are not required in buildings and facilities equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

4~~3.~~ Areas of refuge are not required at Elevators not required to be located in a shaft in accordance with Section 712 ~~are not required to be accessed from an *area of refuge* or *horizontal exit*~~.

5~~4.~~ Areas of refuge are not required at Elevators ~~are not required to be accessed from an *area of refuge* or *horizontal exit* for~~ serving smoke protected seating areas complying with Section 1028.6.2.

6. Areas of refuge are not required for elevators accessed from a refuge area in conjunction with a horizontal exit.

Reason: This proposal is for the most part editorial and makes the language in the exceptions consistent. There is with one new items added and one relocation for added clarity.

"Areas of refuge are not required at stairways/elevators in Group I-3 facilities" is a new exception to coordinate with the DOJ 2010 ADA Standards for Accessible Design. The Department of Justice (ADA 207.2 Exception 2) had concerns that areas of refuge could pose security risks in correctional facilities due to their enclosed nature, and a building designer has the option of locating a facility's accessible spaces such that an elevator need never be used as part of an accessible means of egress.

" Areas of refuge are not required for stairways/elevators accessed from a refuge area in conjunction with a horizontal exit" clarifies that a redundant area of refuge is not needed immediately adjacent to the elevator where a refuge area and horizontal exit to the elevator are provided.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None

1007.3 #2-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The language in the most part is editorial and clarifies and coordinates the exceptions in 1007.3 and 1007.4. Moving 'horizontal exits' from the main body into an exception helps identify the compartment formed by the horizontal exit as an alternative for smoke protection offered by and area of refuge. However, the committee wanted some additional information on why it was appropriate to not require areas of refuge in Group I-3 since the residents are not capable of self preservation.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Carl Baldasarra, Code Technologies Committee – Open stairway study group, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1007.3 (IFC [B] 1007.3) Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between stories shall have a clear width of 48 inches (1219 mm) minimum between *handrails* and shall either incorporate an *area of refuge* within an enlarged floor-level landing or shall be accessed from either an *area of refuge* complying with Section 1007.6 or a *horizontal exit*. *Exit access stairways* that connect levels in the same story are not permitted as part of an *accessible means of egress*.

Exceptions:

1. The clear width of 48 inches (1219 mm) between *handrails* is not required in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
2. *Areas of refuge* are not required at *stairways* in buildings equipped throughout by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. The clear width of 48 inches (1219 mm) between *handrails* is not required for *stairways* from a refuge area in conjunction with a horizontal exit.
4. *Areas of refuge* are not required at *stairways* serving *open parking garages*.
5. *Areas of refuge* are not required for smoke protected seating areas complying with Section 1028.6.2.
6. The *Areas of refuge* are not required at stairways in Group R-2 occupancies.

~~7. *Areas of refuge* are not required at *stairways* in *Group I-3 facilities*.~~

7.~~8.~~ Areas of refuge are not required for stairways accessed from a refuge area in conjunction with a horizontal exit.

1007.4 (IFC [B] 1007.4) Elevators. In order to be considered part of an *accessible means of egress*, an elevator shall comply with the emergency operation and signaling device requirements of Section 2.27 of ASME A17.1. Standby power shall be provided in accordance with Chapter 27 and Section 3003. The elevator shall be accessed from either an *area of refuge* complying with Section 1007.6 or a *horizontal exit*.

Exceptions:

1. *Areas of refuge are not required at the elevator* in *open parking garages*.
~~2. *Areas of refuge* are not required at elevators in *Group I-3 facilities*.~~
~~3.~~2. *Areas of refuge* are not required in buildings and facilities equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
~~4.~~3. Areas of refuge are not required at Elevators not required to be located in a shaft in accordance with Section 712.
~~5.~~4. Areas of refuge are not required at Elevators serving smoke protected seating areas complying with Section 1028.6.2.
~~6.~~5. Areas of refuge are not required for elevators accessed from a refuge area in conjunction with a horizontal exit.

Commenter's Reason: E39 was denied by the Means of Egress Committee based on a question that was asked by a committee member regarding providing the exemption to exempt the area of refuge requirement for group I-3 occupancies; specifically, the committee member questioned the addition of exception #7 to 1007. Unfortunately our work group representatives were not at the microphone when the question was raised so we failed to provide a response to the question. The proposals text regarding horizontal exits and elevators was not questioned or challenged by floor testimony or committee deliberations.

Exception #7 to 1007 was added for consistency with the ADA 207.2 exception 2, which exempts group I-3 (detention) occupancies from area of refuge requirements do to security concerns. Furthermore, the life safety concerns are already addressed by the increase fire protection features and constant supervision that is provided in group I-3 facilities. Per the 2012 edition of the IBC group I-3 occupancies are already exempted from area of refuge requirements per current exemption # 2 to 1007, which exempts buildings that are sprinkled per 903.3.1.1. IBC section 903.2.3 requires group I occupancies to be sprinkled per 903.3.1.1. It is a valid argument that proposed exception #7 to 1007 is redundant therefore not needed; therefore our public comment proposes to delete exception #7 from the code change. The proposals text regarding horizontal exits and elevators is unaffected by this public comment.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "IBC Coordination with the new ADAAG". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E39-12

Final Action: AS AM AMPC____ D

E42-12
1007.5 (IFC [B] 1007.5)

Proposed Change as Submitted

Proponent: Jerome Seville, Commonwealth of Pennsylvania representing self (Jseville@pa.gov)

Revise as follows:

1007.5 (IFC [B] 1007.5) Platform lifts. Platform (wheelchair) lifts shall not serve as part of an *accessible means of egress*, except where allowed as part of a required *accessible route* in Section 1109.8, Items 1 through 9. <u>Platform lifts permitted to serve as part of an accessible route by Item 10 in Section 1109.8 shall not serve as part of an accessible means of egress for Group I-1 or I-2 facilities or where the exit will serve more than 200 occupants.</u> Standby power shall be provided in accordance with Chapter 27 for platform lifts permitted to serve as part of a *means of egress*.

Reason: There will be occupancies, even in new construction, where the only practical means of access into the structure will be by a wheelchair lift. With the entrance constituting one of the means of egress, it would be beneficial to allow the use of the lift to exit.

Assisted living facilities, hospitals and nursing homes (Groups I-1 and I-2) have a higher excepted number of people that may have difficulty with stairways. The occupancy limit of 200 for other occupancies is being based upon IBC Section 1007.6.1, where it is being assumed that there will be one wheelchair individual per 200 occupants; thus only one wheelchair in the area being evacuated by the lift.

Cost Impact: None

1007.5-E-Seville.doc

Public Hearing Results

Committee Reason: This proposal does not seem to be consistent with the intent of accessibility and actually lessens access. If this allowing egress through this platform lift option is a concern, limiting to the option to just Group I-1 and I-2 does not seem sufficient.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Jerome Seville, Commonwealth of Pennsylvania representing self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1007.5 (IFC [B] 1007.5) Platform lifts. Platform (wheelchair) lifts shall not serve as part of an *accessible means of egress*, except where allowed as part of a required *accessible route* in Section 1109.8 Items 1 through 9. <u>In other than Group I-1 and I-2 occupancies, platform lifts allowed as part of a required accessible route in Section 1109.8, Item 10 shall be permitted to serve as one of the accessible means of egress provided the occupant load of the area being served does not exceed 200.</u> Standby power shall be provided in accordance with Chapter 27 for platform lifts permitted to serve as part of a *means of egress*.

Commenter's Reason: Section 1109.8, Item 10 allows for platform lifts to be used as part of an accessible route into a building where the existing site constraints make use of a ramp or elevator infeasible. There will be infills or complete changes of occupancies in urban areas, particularly in hilly jurisdictions, where the only practical means of access into the structure will be by a wheelchair lift. With the entrance constituting one of the means of egress, it would be beneficial to allow the use of the lift to exit for smaller buildings. Additionally, this text limits the use of the Item #10 allowance to only one of the accessible means of egress.

Because Section1007.1 requires at least two accessible means of egress in most buildings. The second accessible means of egress would still be required to meet the provisions of Section 1007.

The occupancy limit of 200 is consistent with IBC Section1007.6.1, which assumes only one person using a wheelchair in the area of the exit. ASME A18.1, to which standby power to a wheelchair lift must adhere to, mandates that if by battery the lift must be able to go five (5) complete cycles under full load. However, Group I-1 and I-2 occupancies should be excluded from this allowance since by their very nature; there could be a higher number of individuals in wheelchairs which may exceed the 5 cycle limit of the standby power source.

E42-12

Final Action: AS AM AMPC____ D

E48-12
1007.8 (IFC [B] 1007.8)

Proposed Change as Submitted

Proponent: Steve Pfeiffer representing City of Seattle, Dept of Planning & Development (steve.pfeiffer@seattle.gov)

Revise as follows:

1007.8 (IFC [B] 1007.8) Two-way communication. A two-way communication system complying with Sections 1007.8.1 and 1007.8.2 shall be provided at the landing serving each elevator ~~landing~~ or bank of elevators on each *accessible* floor that is one or more stories above or below the *story* of *exit discharge.* ~~complying with Sections 1007.8.1 and 1007.8.2.~~

Exceptions:

1. Two-way communication systems are not required at the landing serving each elevator ~~landing~~ or bank of elevators where the two-way communication system is provided within *areas of refuge* in accordance with Section 1007.6.3.
2. Two-way communication systems are not required on floors provided with *exit ramps* conforming to the provisions of Section 1010.

Reason: The purpose of this change is to clarify which elevator landings are required to have a two-way communication system where there are multiple elevators or banks of elevators on an accessible floor. The current language is clear where there is only one elevator, but if there are multiple elevators, it's unclear whether communication is required at one elevator, each elevator, or whether a communication device serving a bank of elevators would suffice. This change would require a single two-way communication at the landing for each single elevator or each bank of elevators on the floor. References to Sections 1007.8.1 and 1007.8.2 are also relocated as to more clearly apply to the communication system rather than the story of exit discharge.

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

1007.8-E-Pfeiffer.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This revision will clarify that only a single two-way communication system is required at a group of elevators. However, there is a question if this language would now require two-way communication at the back-of-house service elevators, including freight elevators.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment:

Gene Boecker, AIA, representing Code Consultants, Inc (CCI), and Rick Lupton, Dept. of Planning & Development representing City of Seattle, WA, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1007.8 (IFC [B] 1007.8) Two-way communication. A two-way communication system complying with Sections 1007.8.1 and 1007.8.2 shall be provided at the landing serving each elevator or bank of elevators on each *accessible* floor that is one or more stories above or below the *story* of *exit discharge.*

Exceptions:

1. Two-way communication systems are not required at the landing serving each elevator landing or bank of elevators where the two-way communication system is provided within *areas of refuge* in accordance with Section 1007.6.3.
2. Two-way communication systems are not required on floors provided with *exit ramps* conforming to the provisions of Section 1010.
3. <u>Two-way communications systems are not required at the landings serving only service elevators that are not designated as part of the accessible means of egress or serve as part of the required accessible route into a facility.</u>
4. <u>Two-way communications systems are not required at the landings serving only freight elevators.</u>
5. <u>Two-way communication systems are not required at the landing serving a private residence elevator.</u>

Commenter's Reason: The committee expressed concern that the language as written could be confusing relative to whether or not "every" elevator meant back-of-house elevators. The added two exceptions clarifies the original intent that service and fright elevators are not included. Exception #3 was worded in such a way that a service elevator would require the two-way communications system if it was the designated accessible means of egress off the floor or the required accessible route onto the floor. Freight elevators are not intended for passenger use and should not be required to have two-way communications system. Private residence elevators can only be used within individual dwelling units and the two-way communication system would not be practical.

E48-12

Final Action: AS AM AMPC____ D

E54-12
202, 1008.1.2, 1008.1.4.3 (IFC [B] 1008.1.2, 1008.1.4.3)

Proposed Change as Submitted

Proponent: John Woestman, Kellen Company, representing Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

Add the definition as follows:

SECTION 202
DEFINITIONS

HORIZONTAL SLIDING ACCORDION FOLDING DOOR. An accordion-folding style multiple-section track-hung moveable door assembly.

Revise as follows:

1008.1.2 (IFC [B] 1008.1.2) Door swing. Egress doors shall be of the pivoted or side-hinged swinging type.

Exceptions:

1. Private garages, office areas, factory and storage areas with an *occupant load* of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within or serving a single *dwelling unit* in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1008.1.4.1.
6. In other than Group H occupancies, *horizontal sliding* accordion folding *doors* complying with Section 1008.1.4.3 are permitted in a *means of egress*.
7. Power-operated doors in accordance with Section 1008.1.4.2.
8. Doors serving a bathroom within an individual *sleeping unit* in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a *means of egress* from spaces with an *occupant load* of 10 or less.

Doors shall swing in the direction of egress travel where serving a room or area containing an *occupant load* of 50 or more persons or a Group H occupancy.

1008.1.4.3 (IFC [B] 1008.1.4.3) Horizontal sliding accordion folding doors. In other than Group H occupancies, *horizontal sliding* accordion folding doors permitted to be a component of a *means of egress* in accordance with Exception 6 to Section 1008.1.2 shall comply with all of the following criteria:

1. The doors shall be power operated and shall be capable of being operated manually in the event of power failure.
2. The doors shall be openable by a simple method from both sides without special knowledge or effort.
3. The force required to operate the door shall not exceed 30 pounds (133 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required width.
4. The door shall be openable with a force not to exceed 15 pounds (67 N) when a force of 250 pounds (1100 N) is applied perpendicular to the door adjacent to the operating device.
5. The door assembly shall comply with the applicable *fire protection rating* and, where rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 716.5.9.3, shall be installed in accordance with NFPA 80 and shall comply with Section 716.
6. The door assembly shall have an integrated standby power supply.

7. The door assembly power supply shall be electrically supervised.
8. The door shall open to the minimum required width within 10 seconds after activation of the operating device.

Reason: This proposal is intended to clarify the IBC.

Our BHMA members are seeing code officials, specifiers, and other stakeholders questioning or attempting to apply the requirements of 1008.1.4.3 to the doors included in 1008.1.4.2. Currently, both IBC Sections 1008.1.4.2 and 1008.1.4.3 could be (incorrectly) interpreted as applying to the same types of sliding doors (power-operated horizontal sliding doors). However, the intent of the code is that these sections apply to doors of significantly different configurations.

The doors of 1008.1.4.2 are the more common power-operated doors such as the doors installed at the entrances to stores, businesses, hospitals, and the like. When a pedestrian is not present, these doors usually are in a closed position, and are powered open for passage, and then powered closed. The power operated doors included within the scope of the standards referenced in 1008.1.4.2 are rarely used where a fire-rated opening protective is required.

The doors in 1008.1.4.3 are an accordion-style folding door assembly which slides horizontally. In the opening, these doors are usually kept in an open position like many other fire-rated doors or smoke-rated doors protecting elevator lobbies, or other gathering areas. The doors in 1008.1.4.3 may travel on a track in a straight line, but may also travel on a track that has a curve or curves.

The proposed definition and text revisions are intended to not revise the technical requirements of the IBC.

Cost Impact: None

1008.1.2-E-Woestman.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal would eliminate design options for horizontal sliding doors. The definition could encompass room dividers. This proposal would only allow for one type of technology.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

John Woestman, Kellen Company, representing Builders Hardware Manufacturers Association (BHMA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 202
DEFINITIONS

~~**HORIZONTAL SLIDING ACCORDION FOLDING DOOR.** An accordion-folding style multiple-section track-hung moveable door assembly~~.

1008.1.2 (IFC [B] 1008.1.2) Door swing. Egress doors shall be of the pivoted or side-hinged swinging type.

Exceptions:

1. Private garages, office areas, factory and storage areas with an *occupant load* of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within or serving a single *dwelling unit* in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1008.1.4.1.
6. In other than Group H occupancies, special purpose horizontal sliding, accordion, or folding doors assemblies complying with Section 1008.1.4.3 are permitted in a *means of egress*.
7. Power-operated doors in accordance with Section 1008.1.4.2.
8. Doors serving a bathroom within an individual *sleeping unit* in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a *means of egress* from spaces with an *occupant load* of 10 or less.

Doors shall swing in the direction of egress travel where serving a room or area containing an *occupant load* of 50 or more persons or a Group H occupancy.

1008.1.4.3 (IFC [B] 1008.1.4.3) Special purpose ~~H~~horizontal sliding, accordion, or folding doors. In other than Group H occupancies, special purpose horizontal sliding, accordion, or folding door~~s~~ assemblies permitted to be a component of a *means of egress* in accordance with Exception 6 to Section 1008.1.2 shall comply with all of the following criteria:

1. The doors shall be power operated and shall be capable of being operated manually in the event of power failure.
2. The doors shall be openable by a simple method from both sides without special knowledge or effort.
3. The force required to operate the door shall not exceed 30 pounds (133 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required width.
4. The door shall be openable with a force not to exceed 15 pounds (67 N) when a force of 250 pounds (1100 N) is applied perpendicular to the door adjacent to the operating device.
5. The door assembly shall comply with the applicable *fire protection rating* and, where rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 716.5.9.3, shall be installed in accordance with NFPA 80 and shall comply with Section 716.
6. The door assembly shall have an integrated standby power supply.
7. The door assembly power supply shall be electrically supervised.
8. The door shall open to the minimum required width within 10 seconds after activation of the operating device.

Commenter's Reason: This proposal seeks to differentiate the means of egress requirements of the horizontal sliding doors addressed in Section 1008.1.4.3 of the IBC from other sections of the IBC addressing means of egress requirements of other horizontal sliding doors, and especially the power operated doors addressed by section 1008.1.4.2. No technical changes to the IBC are sought. This public comment attempts to address the committee's comments and stakeholder feedback regarding the proposal.

Below are several examples of the horizontal sliding doors addressed by this section of the IBC (Section 1008.1.4.3).

Door in normally-open position (left), and partially deployed (right). Source: www.wondoor.com

Source: www.wondoor.com

The doors addressed by Section 1008.1.4.3 are commonly in the normally-open position (hidden in their enclosure). In the event of fire or smoke, where these doors are installed in the means of egress, this section of the code requires the doors to be power operated but also openable manually to the required minimum egress width. Items 1 through 8 of Section 1008.1.4.3 when taken together, provide a unique set of requirements that apply only to doors of this type of configuration.

E54-12

Final Action: AS AM AMPC____ D

E56-12

202, 1008.1.4.1, Table 1008.1.4.1, 1008.1.4.1.1, 1008.1.4.1.2, Chapter 35 (IFC [B] 202, 1008.1.4.1, Table 1008.1.4.1, 1008.1.4.1.1, 1008.1.4.1.2, Chapter 80)

Proposed Change as Submitted

Proponent: John Woestman, Kellen Company, representing Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

Add the definition as follows:

SECTION 202
DEFINITIONS

BREAKOUT. For revolving doors, a process whereby wings or door panels can be pushed open manually for *means of egress* travel.

Revise as follows:

1008.1.4.1 (IFC [B] 1008.1.4.1) Revolving doors. Revolving doors shall comply with the following:

1. Revolving doors shall comply with BHMA A156.27 and shall be installed in accordance with the manufacturer's installation instructions.
2. ~~Each revolving door shall be capable of collapsing into a bookfold position with parallel egress paths providing an aggregate width of 36 inches (914 mm).~~ Each revolving door shall be capable of *breakout* in accordance with BHMA A156.27 and shall provide an aggregate width of not less than 36 inches (914 mm).
~~2.~~3. A revolving door shall not be located within 10 feet (3048 mm) of the foot of or top of *stairs* or escalators. A dispersal area shall be provided between the *stairs* or escalators and the revolving doors.
~~3.~~4. The revolutions per minute (rpm) for a revolving door shall not exceed ~~those shown in Table 1008.1.4.1.~~the maximum rpm as specified in BHMA A156.27.
5. An emergency stop switch shall be provided near each entry point of a revolving door within 48 inches (1220 mm) of the door and between 24 inches (610 mm) and 48 inches (1220 mm) above the floor. The activation area of the emergency stop switch button shall be not less than 1 inch (25 mm) in diameter and shall be red.
~~4.~~6. Each revolving door shall have a side-hinged swinging door which complies with Section 1008.1 in the same wall and within 10 feet (3048 mm) of the revolving door.
~~5.~~7. Revolving doors shall not be part of an *accessible route* required by Section 1007 and Chapter 11.

~~TABLE 1008.1.4.1 (IFC [B] TABLE 1008.1.4.1)~~
~~REVOLVING DOOR SPEEDS~~

~~INSIDE DIAMETER (feet-inches)~~	~~POWER-DRIVEN-TYPE SPEED CONTROL (rpm)~~	~~MANUAL-TYPE SPEED CONTROL (rpm)~~
~~6-6~~	~~11~~	~~12~~
~~7-0~~	~~10~~	~~11~~
~~7-6~~	~~9~~	~~11~~
~~8-0~~	~~9~~	~~10~~
~~8-6~~	~~8~~	~~9~~
~~9-0~~	~~8~~	~~9~~
~~9-6~~	~~7~~	~~8~~
~~10-0~~	~~7~~	~~8~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.~~

1008.1.4.1.1 (IFC [B] 1008.1.4.1.1) Egress component. A revolving door used as a component of a *means of egress* shall comply with Section 1008.1.4.1 and the following three conditions:

1. Revolving doors shall not be given credit for more than 50 percent of the required egress capacity.
2. Each revolving door shall be credited with no more than a 50-person capacity.
3. Each revolving door shall ~~be capable of being collapsed when a force of not more than 130 pounds (578 N) is applied within 3 inches (76 mm) of the outer edge of a wing~~ provide for egress in accordance with BHMA A156.27 with a *breakout* force of not more than 130 pounds.

1008.1.4.1.2 (IFC [B] 1008.1.4.1.2) Other than egress component. A revolving door used as other than a component of a *means of egress* shall comply with Section 1008.1.4.1. The ~~collapsing~~ *breakout* force of a revolving door not used as a component of a *means of egress* shall not be more than 180 pounds (801 N).

Exception: A ~~collapsing~~ *breakout* force in excess of 180 pounds (801 N) is permitted if the collapsing force is reduced to not more than 130 pounds (578 N) when at least one of the following conditions is satisfied:

1. There is a power failure or power is removed to the device holding the door wings in position.
2. There is an actuation of the *automatic sprinkler system* where such system is provided.
3. There is an actuation of a smoke detection system which is installed in accordance with Section 907 to provide coverage in areas within the building which are within 75 feet (22 860 mm) of the revolving doors.
4. There is an actuation of a manual control switch, in an *approved* location and clearly defined, which reduces the ~~holding~~ *breakout* force to ~~below the~~ not more than 130~~-~~pounds (578 N) ~~force level~~.

Add standard to Chapter 35 (IFC Chapter 80) as follows:

BHMA

A 156.27-11 Power and Manual Operated Revolving Pedestrian Doors

Reason: This proposal updates the requirements currently in the IBC for revolving doors and introduces the 2011 edition of BHMA A156.27 American National Standard for Power and Manual Operated Revolving Pedestrian Doors into the IBC.

Revolving doors currently being installed in commercial buildings range from 6 feet to 24 feet in diameter and include manually operated revolving doors and numerous types and sizes of automatic revolving doors (i.e. power operated revolving doors).

The latest edition of BHMA A156.27 includes in its scope a wide variety of manual and power operated revolving doors, many of which are not included within the scope of the current IBC requirements. The requirements in A156.27 include the maximum allowable door speed (RPM), based on type and size of revolving door, and ranges from maximum 12 RPM for the smallest manual revolving door to maximum 0.3 RPM for the largest power operated revolving door.

BHMA A156.27 includes requirements for egress including minimum egress width and maximum breakout force, and also includes requirements for signage, glazing, sensors, an emergency stop switch, and other criteria.

The existing Table 1008.1.4.1 is recommended to be deleted as there are five (5) expanded and updated tables in A156.27 addressing maximum allowable door speeds (RPM) for manually operated revolving doors and the various types and sizes of power operated revolving doors.

Cost Impact: Proposal updates IBC to current industry standards and practices resulting in no cost impact.

Analysis: A review of the standard proposed for inclusion in the code, BHMA A156.27-11 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1008.1.4.1-E-Woestman.doc

Public Hearing Results

Committee Action: **Disapproved**

For staff analysis of the content of the BMHA A156.27-11 standard relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org/cs/codes/Documents/2009-10cycle/ProposedChanges/Standards-Analysis.pdf :

Committee Reason: The scope of the referenced standard, BMHA A156.27-11, states that the standard is not for custom installation. There is some concern that this could be interpreted as not requiring compliance with the standard with any custom installation. The ICC Standards Review Committee felt that there were some non-mandatory language in the standard. The committee felt that Table 1008.14.1 in the code aided code official in determining compliance for revolving doors.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Woestman, Kellen Company, representing Builders Hardware Manufacturers Association (BHMA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.4.1 (IFC [B] 1008.1.4.1) Revolving doors. Revolving doors shall comply with the following:

1. Revolving doors shall comply with BHMA A156.27 and shall be installed in accordance with the manufacturer's installation instructions.
2. Each revolving door shall be capable of *breakout* in accordance with BHMA A156.27 and shall provide an aggregate width of not less than 36 inches (914 mm).
3. A revolving door shall not be located within 10 feet (3048 mm) of the foot of or top of *stairs* or escalators. A dispersal area shall be provided between the *stairs* or escalators and the revolving doors.
4. The revolutions per minute (rpm) for a revolving door shall not exceed the maximum rpm as specified in BHMA A156.27. Manual revolving doors shall comply with Table 1008.1.4.1(1). Automatic or power operated revolving doors shall comply with Table 1008.1.4.1(2).
5. An emergency stop switch shall be provided near each entry point of ~~a~~ automatic or power operated revolving doors within 48 inches (1220 mm) of the door and between 24 inches (610 mm) and 48 inches (1220 mm) above the floor. The activation area of the emergency stop switch button shall be not less than 1 inch (25 mm) in diameter and shall be red.
6. Each revolving door shall have a side-hinged swinging door which complies with Section 1008.1 in the same wall and within 10 feet (3048 mm) of the revolving door.
7. Revolving doors shall not be part of an *accessible route* required by Section 1007 and Chapter 11.

Table 1008.1.4.1(1)(IFC [B] Table 1008.1.4.1(1))
Maximum Door Speed Manual Revolving Doors

Revolving Door Maximum Nominal Diameter (ft-in)	Maximum Allowable Revolving Door Speed (rpm)
6-0	12
7-0	11
8-0	10
9-0	9
10-0	8

Table 1008.1.4.1(2) (IFC [B] Table 1008.1.4.1(2))
Maximum Door Speed Automatic or Power Operated Revolving Doors

Revolving Door Maximum Nominal Diameter (ft-in)	Maximum Allowable Revolving Door Speed (rpm)
8-0	7.2
9-0	6.4
10-0	5.7
11-0	5.2
12-0	4.8
12-6	4.6
14-0	4.1
16-0	3.6
17-0	3.4
18-0	3.2
20-0	2.9
24-0	2.4

(Portion of proposal not shown remains unchanged.)

Commenter's Reason: This proposal and public comment build on the existing requirements for revolving doors in the IBC, updates the IBC, and attempts to address the committee's comments.

Revolving doors range from (smaller) manually operated revolving door systems to automatic (power operated) revolving doors of small to large diameter (8' to 24' diameter). Several types of revolving doors are illustrated below.

Manual Revolving Doors (7' dia.)

Automatic Revolving Door (8' dia.)

Automatic Revolving Door (20' dia.)

This proposal references BHMA A156.27 which includes the same egress-related requirements currently in the IBC (i.e. breakout function and maximum forces, etc.) and includes numerous additional safety-related requirements for revolving doors which are currently not required by the IBC. For example, BHMA A156.27 requires manually operated revolving doors to contain governors to limit the rotational speed of the door and requires automatic, or power operated, revolving doors to incorporate numerous sensors and switches, and complex motor controls to safely operate the door.

Addressing the committee's reasons for disapproving this proposal:

1. Custom installations.
   Custom installation would likely be addressed in a manner similar to today. The mandatory requirements of this section of the IBC would apply (i.e. means of egress / breakout, emergency stop switches, maximum speed, etc.) as would the provisions of the proposed standard, BHMA A156.27. With approval of this proposal for the IBC, far fewer revolving door applications would not be addressed by IBC requirements.
2. Non-mandatory language in the proposed standard.
   ICC staff's analysis of the proposed standard states: "No permissive or unenforceable language was noted. No proprietary references were noted. The standard indicates that it was developed through a consensus process. The consensus process is ANSI."
   However, the ICC Standard Review Committee found "very occasional use of permissive language".
   Addressing the ICC SRC findings: in the proposed standard, the very occasional use of permissive language allows options for complying with mandatory requirements of the standard.

For example, sensors are required in specified locations on automatic revolving doors, and cushioning devices are also required in specified locations. The language in the standard allows these mandatory requirements to be met with the (required) sensor built into the (required) cushioning device, or the (required) sensor may be an item mounted separately from the (required) cushioning device.

3. Including Table 1008.1.4.1 in the code.
   Existing Table 1008.1.4.1 is replaced with two tables: one table for manual revolving doors, and a second table for automatic, or power operated, revolving doors.
   The table for automatic revolving doors is expanded to include revolving door diameters larger than currently included in Table 1008.1.4.1, and the maximum allowable RPM is revised downward (slower) for safety reasons and to be consistent with the current industry standard, BHMA A156.27.

BHMA A156.27 includes provisions for acceptable door speeds (max. RPM), egress / breakout requirements for the various types and configurations of revolving doors (consistent with current and proposed IBC requirements), glazing (consistent with Federal and IBC requirements for safety glazing), kinetic energy, and safety requirements such as emergency stop switches, sensors, and speed controls. These provisions enhance current IBC requirements.

E56-12

Final Action: AS AM AMPC____ D

E57-12
202, 1008.1.4.2 (IFC [B] 202, 1008.1.4.2)

Proposed Change as Submitted

Proponent: John Woestman, Kellen Company, representing Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

Add the following definition:

SECTION 202
DEFINITIONS

LOW ENERGY POWER-OPERATED DOOR. Swinging door which open automatically upon an action by an pedestrian, such as pressing a push plate or waving a hand in front of a sensor. The door closes automatically, and operates with decreased forces and decreased speeds. See also POWER ASSISTED DOOR and POWER OPERATED DOOR.

POWER-OPERATED DOOR. Swinging, sliding, or folding door which open automatically when approached by a pedestrian or open automatically upon an action by an pedestrian. The door closes automatically, and include provisions such as presence sensors to prevent entrapment. See also LOW ENERGY POWER OPERATED DOOR and POWER ASSISTED DOOR.

POWER-ASSISTED DOOR. Swinging door which opens by reduced pushing or pulling force on the door operating hardware. The door closes automatically after the pushing or pulling force is released, and function with decreased forces. See also LOW ENERGY POWER OPERATED DOOR and POWER OPERATED DOOR.

Revise as follows:

1008.1.4.2 (IFC [B] 1008.1.4.2) Power-operated doors. Where *means of egress* doors are operated or assisted by power~~, such as doors with a photoelectric-actuated mechanism to open the door upon the approach of a person, or doors with power assisted manual operation,~~ the design shall be such that in the event of power failure, the door is capable of being opened manually to permit *means of egress* travel or closed where necessary to safeguard *means of egress*. The forces required to open these doors manually shall not exceed those specified in Section 1008.1.3, except that the force to set the door in motion shall not exceed 50 pounds (220 N). The door shall be capable of swinging open from any position to the full width of the opening in which such door is installed when a force is applied to the door on the side from which egress is made. ~~Full-p~~Power-operated swinging doors, power-operated sliding doors, and power-operated folding doors shall comply with BHMA A156.10. Power-assisted swinging doors and low energy power-operated swinging doors shall comply with BHMA A156.19.

Exceptions:

1. Occupancies in Group I-3.
2. Horizontal sliding doors complying with Section 1008.1.4.3.
3. For a biparting door in the emergency breakout mode, a door leaf located within a multiple-leaf opening shall be exempt from the minimum 32-inch (813 mm) single-leaf requirement of Section 1008.1.1, provided a minimum 32-inch (813 mm) clear opening is provided when the two biparting leaves meeting in the center are broken out.

Reason: This proposal is intended to clarify the IBC and while not revising the technical requirements of the code.

The proposed definitions and text revisions are intended to more closely align the IBC with the standards currently referenced in Section 1008.1.4.2.

The doors of Section 1008.1.4.2 are the various types of power-operated doors such as the doors installed at the entrances to buildings, and may be installed within these same buildings.

Cost Impact: None.

1008.1.4.2-E-Woestman.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The definitions have some dangling clauses. Is the door supposed to close even if it is open only halfway. The text in 1008.1.4.2 added swinging and sliding in the door descriptions, but the types are not part of the definitions.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

John Woestman, Kellen Company, representing Builders Hardware Manufacturers Association (BHMA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 202
DEFINITIONS

LOW ENERGY POWER-OPERATED DOOR. Swinging door which opens automatically upon an action by a ~~an~~ pedestrian~~,~~ such as pressing a push plate or waving a hand in front of a sensor. The door closes automatically~~,~~ and operates with decreased forces and decreased speeds. See also POWER-ASSISTED DOOR and POWER-OPERATED DOOR.

POWER-OPERATED DOOR. Swinging, sliding, or folding door which opens automatically when approached by a pedestrian or opens automatically upon an action by a ~~an~~ pedestrian. The door closes automatically~~,~~ and includes provisions such as presence sensors to prevent entrapment. See also LOW ENERGY POWER-OPERATED DOOR and POWER-ASSISTED DOOR.

POWER-ASSISTED DOOR. Swinging door which opens by reduced pushing or pulling force on the door operating hardware. The door closes automatically after the pushing or pulling force is released, and ~~function~~ functions with decreased forces. See also LOW ENERGY POWER-OPERATED DOOR and POWER-OPERATED DOOR.

1008.1.4.2 (IFC [B] 1008.1.4.2) Power-operated doors. Where *means of egress* doors are operated or assisted by power, the design shall be such that in the event of power failure~~,~~ the door is capable of being opened manually to permit *means of egress* travel or closed where necessary to safeguard *means of egress*. The forces required to open these doors manually shall not exceed those specified in Section 1008.1.3, except that the force to set the door in motion shall not exceed 50 pounds (220 N). The door shall be capable of swinging open from any position to the full width of the opening in which such door is installed when a force is applied to the door on the side from which egress is made. Power-operated swinging doors, power-operated sliding doors, and power-operated folding doors shall comply with BHMA A156.10. Power-assisted swinging doors and low energy power-operated swinging doors shall comply with BHMA A156.19.

Commenter's Reason: This intent of this proposal and this public comment is to improve the code by defining / describing the types of doors this section of the code applies to while not revising the technical requirements of the code. We've attempted to address the committee's comments with revisions to the definitions and slight changes to 1008.1.4.2 (adding a comma, and deleting a comma).

Below is a summary of these doors:

Power-Operated Doors

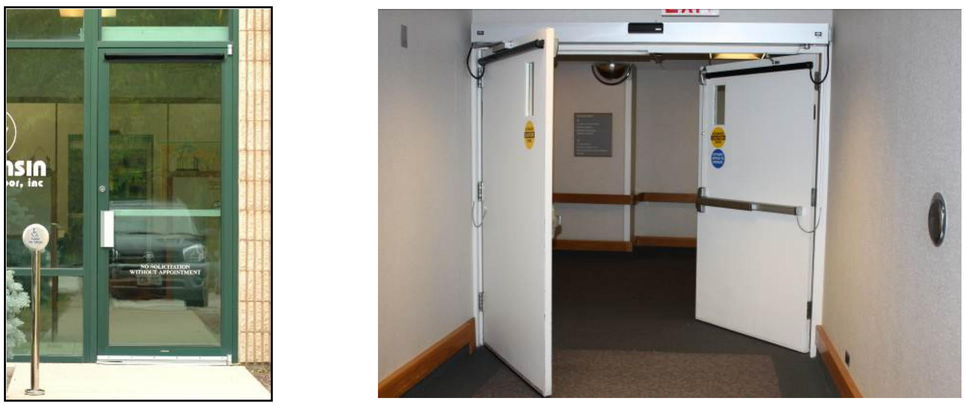
Power-operated doors are commonly installed at the busy entrances of commercial buildings. These relatively fast moving automatic doors have motion sensors or mats to activate the doors, and other sensors to protect pedestrians.

Power-Operated Doors – Three Examples

Low Energy Power-Operated Doors

To enhance accessibility in public buildings, side-hinged doors are commonly installed as low-energy power-operated doors. These doors operate at slower speeds and lower forces, compared to the faster moving power-operated door. Low energy power-operated doors are commonly activated by pressing a push plate, and open fully once activated. In addition, these doors can be activated by pushing or pulling on the door itself, to cause the door to open fully.

Notice the post mounted push plate, left image below, and the wall mounted push plate, right image below.



Low Energy Power-Operated Doors – Two Examples

Power-assisted doors

Power assisted doors reduce the force or effort it takes to open the door while it is being pushed or pulled. The user activates the door with a slight push or pull of the door handle. As soon as the push or pull force is removed, the door will start to close.

E57-12

Final Action: AS AM AMPC____ D

E59-12
1008.1.5 (IFC [B] 1008.1.5)

Proposed Change as Submitted

Proponent: David R. Scott, AIA, representing Target Corporation (David.Scott@Target.com)

Revise as follows:

1008.1.5 (IFC [B] 1008.1.5) Floor elevation. There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

Exceptions:

1. Doors serving individual dwelling units in Groups R-2 and R-3 where the following apply:
   1.1 A door is permitted to open at the top step of an interior flight of stairs, provided the door does not swing over the top step.
   1.2 Screen doors and storm doors are permitted to swing over stairs or landings.
2. Exterior doors as provided for in Section 1003.5, Exception 1, and Section 1020.2, which are not on an accessible route.
3. In Group R-3 occupancies not required to be Accessible units, Type A units or Type B units, the landing at an exterior doorway shall not be more than 73/4 inches (197 mm) below the top of the threshold, provided the door, other than an exterior storm or screen door, does not swing over the landing.
4. Variations in elevation due to differences in finish materials, but not more than 1/2 inch (12.7mm).
5. Exterior decks, patios or balconies that are part of Type B dwelling units, have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the dwelling unit.
6. <u>Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 and serving an occupant load of 5 or less shall be permitted to have the landings on both sides to be at different levels provided the elevation difference is not more than 7 inches (178 mm).</u>

Reason: Equipment spaces are utilized by personal familiar with the layout and function of such space. This would not constitute a hazard type situation stepping down from the equipment spaces.

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

1008.1.5-E-OLIPHANT

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This options if preferred over E58. This proposal addresses the issue of type of space and limits occupant load. The people using this area will be familiar with the space, so the concern for the step/threshold as a tripping hazard is limited.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Eirene Oliphant, MCP, BRR Architecture, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.5 (IFC [B] 1008.1.5) Floor elevation. There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

Exceptions:

1. Doors serving individual dwelling units in Groups R-2 and R-3 where the following apply:
   1.1 A door is permitted to open at the top step of an interior flight of stairs, provided the door does not swing over the top step.
   1.2 Screen doors and storm doors are permitted to swing over stairs or landings.
2. Exterior doors as provided for in Section 1003.5, Exception 1, and Section 1020.2, which are not on an accessible route.
3. In Group R-3 occupancies not required to be Accessible units, Type A units or Type B units, the landing at an exterior doorway shall not be more than 73/4 inches (197 mm) below the top of the threshold, provided the door, other than an exterior storm or screen door, does not swing over the landing.
4. Variations in elevation due to differences in finish materials, but not more than 1/2 inch (12.7mm).
5. Exterior decks, patios or balconies that are part of Type B dwelling units, have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the dwelling unit.
6. Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 and serving an occupant load of 5 or less shall be permitted to have ~~the~~ ~~landings~~ <u>a landing</u> on ~~both sides~~ <u>one side</u> to be ~~at different levels provided the elevation difference is~~ not more than 7 inches (178 mm) <u>above or below the landing on the egress side of the door</u>.

Commenter's Reason: The committee disapproved the E58 proposal believing that the proposed language would allow for both sides of the floor to be 7 inches below the threshold which would result in a 7 inch high threshold, thus creating a tripping hazard. The committee also suggested that a limit on the occupant load be provided. The only difference between E58 and E59 was the occupant load, otherwise the proposed code language was identical. The committee approved E59 due to the limited occupant load of 5. However, the tripping hazard language remains. This public comment is being provided in an effort to make sure the intent of the language was clear, that the floor level cannot be below 7 inches on both sides of the door.

E59-12

Final Action: AS AM AMPC____ D

E64-12
1008.1.9.3 (IFC [B] 1008.1.9.3)

Proposed Change as Submitted

Proponent: Jeff Sprout, AIA, Target, representing Target Corporation (jeff.sprout@target.com)

Revise as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3) Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main ~~exterior~~ door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   - 2.1. The locking device is readily distinguishable as locked;
   - 2.2 A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and

     Exception: Buildings shall not be considered "occupied" after business hours in multiple-exit buildings where employees, security and cleaning crews have access to other exits without requiring the use of a key or in small buildings with one exit.
   - 2.3. The use of the key-operated locking device is revokable by the *building official* for due cause.
3. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.

Reason: Provide clarification to the intent of the required signage in that it does not pertain to "after business hours" when employees, security and cleaning crews have access to other exits without requiring the use of a key or to small building that require only one exit. The above statement is supported by the code commentary as provided for Exception 2.

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

1008.1.9.3-E-SPROUT

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed language has not limited the number of employees that could be in the building 'after business hours'. There are no qualifications for travel distances or number of exist available to staff when the front doors are locked.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jeff Sprout, AIA, representing Target Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.3 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In building in occupancy Group A having a occupant load of 300 or less, Groups B, F, M and S, and in placed of religious worship, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   2.1. The locking device is readily distinguishable as locked;
   2.2 A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background. <u>For the purpose of this provision, buildings shall not be considered to be "occupied" after business hours</u>; and
   2.3 The use of a key-operated locking device is revocable by the *building official* for due cause.

   ~~**Exception:** Buildings shall not be considered "occupied" after business hours in multiple-exit buildings where employees, security and cleaning crews have access to other exits without requiring the use of a key or in small buildings with one exit.~~

3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with the listed fire door test procedures.

Commenter's Reason: Committee comments included how to address the number of employees in the building after business hours, as well as addressing qualifications for travel distances or number of exits available to staff when the front doors are locked. The code commentary indicates that the locking arrangement is only permitted on the main exit and therefore, the employees, security and cleaning crews will have access to other exits without requiring the use of a key. This allowance is also available to small buildings with just one exit. Inherently, the number of employees after business hour will be limited to a small number and who will be familiar with the building surroundings and location of other exits in multiple exit buildings. The location or these other exits would need to follow travel distance requirements elsewhere in the code.

E64-12
Final Action: AS AM AMPC____ D

E65-12
1008.1.9.3 (IFC [B] 1008.1.9.3)

Proposed Change as Submitted

Proponent: Lee J. Kranz, City of Bellevue, Washington, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov)

Revise as follows:

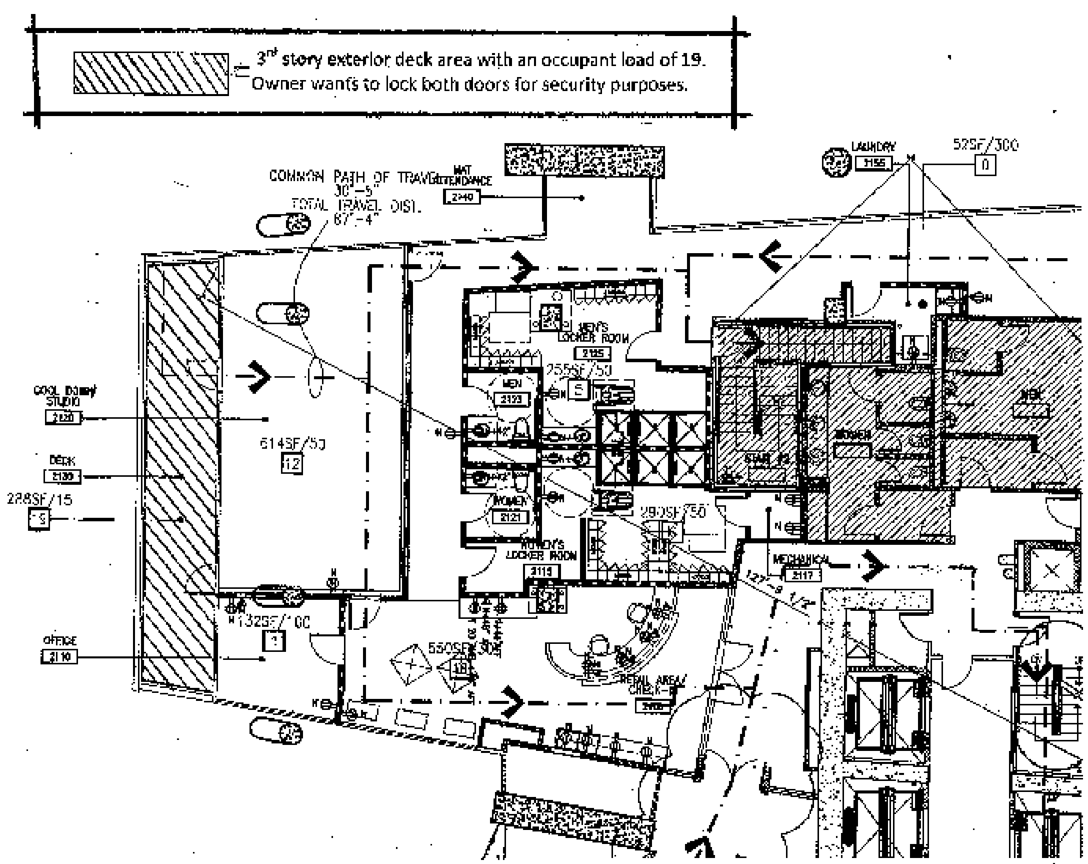
1008.1.9.3 (IFC [B] 1008.1.9.3) Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   2.1. The locking device is readily distinguishable as locked;
   2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   2.3. The use of the key-operated locking device is revokable by the *building official* for due cause.
3. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.
6. Where occupants must re-enter the building for egress purposes, doors serving outdoor areas of Group R-3 occupancies and individual sleeping units or dwelling units of Group R-2 occupancies with an occupant load of 10 or less are permitted to be equipped with locks or latches provided such devices are openable from the inside without the use of a key or special knowledge or effort.
7. Egress doors serving outdoor areas having an occupant load of 300 or less where single or multiple paths of egress travel from the outdoor area are required to pass through the building are permitted to be equipped with locks or latches provided
   7.1 The locking device is readily distinguishable as locked on the interior side.
   7.2 A readily visible durable sign is posted on the interior side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED. The sign shall be in letters 1 inch high on a contrasting background.
   7.3 The use of the key-operated locking device is revocable by the building official for due cause.

Reasoning:
Item #6: Currently there are no provision in the code that allow locks or latches to be installed on doors serving outdoor areas of R-3 or R-2 sleeping units or dwelling units where the occupants must re-enter the building for egress purposes. Exception #2 of IBC Section 1004.5 is unclear in this regard. It is common practice to install locks or latches on exterior doors serving these outdoor areas to maintain security. Occupant loads exceeding 10 persons would not be allowed to use the provision, similar to item #4 of this section.

Item #7: Currently egress doors serving outdoor areas, where single or multiple paths of egress travel are required to pass through the building, are not permitted to have locks or latches. For security purposes, building owners or tenants typically install locks on required egress doors from these areas. When occupants must re-enter the building, as is typical for elevated decks where an exterior stair from the deck is impractical, IBC Section 1004.5 requires an unobstructed path of egress from these outdoor areas, similar to any occupied room in the building.

The sketch below illustrates this situation. The deck shown is on the 4th floor of the building. The installation of an exterior stairway is not practical. The owner wants to lock the doors for security purposes but this is a problem because, per IBC Section 1004.5, occupants must be able to egress from the deck at any time.



Cost Impact: The code change proposal will increase the cost of construction. This is due to the cost of installing a sign above the door and a locking device which is distinguishable as "locked".

1008.1.9.3 #2-E-KRANZ

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There are other alternatives available to allow for this real world condition of outdoor areas exiting through a building. For new item 6, what is the justification for not allowing key locks for private balconies? There was no justification for the 300 occupant load limit in new Item 7. Since these are such different issues, they should be submitted as separate code changes.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Lee J Kranz, City of Bellevue Washington, representing WABO TCD, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.3 (IFC [B] 1008.1.9.3) Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exists:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship , the main exterior door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   2.1. The locking device is readily distinguishable as locked;
   2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background; and
   2.3. The use of the key-operated locking device is revokable by the building official for due cause.
3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts has no doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.

~~6. Where occupants must re-enter the building for egress purposes, doors serving outdoor areas of Group R-3 occupancies and individual sleeping units or dwelling units of Group R-2 occupancies with an occupant load of 10 or less are permitted to be equipped with locks or latches provided such devices are openable from the inside without the use of a key or special knowledge or effort.~~

6.~~7~~. Egress doors serving outdoor areas having an occupant load of 100 ~~300~~ or less where single or multiple paths of egress travel from the outdoor area are required to pass through the building are permitted to be equipped with locks or latches provided:
   6.1 ~~7.1~~ The locking device is readily distinguishable as locked on the interior side;
   6.2 ~~7.2~~ A readily visible durable sign is posted on the interior side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED. The sign shall be in letters 1 inch high on a contrasting background;
   6.3 A two-way communication system complying with Sections 1007.8.1 and 1007.8.2 shall be provided on the egress side.
   6.4 ~~7.3~~ The use of the key-operated locking device is revocable by the building official for due cause.

Commenter's Reason: IBC Section 1004.5 requires an unobstructed path of egress from outdoor areas where single or multiple paths of egress travel are required to pass through the building. This is typical of any occupied room in the building when the path of egress travel must be through the building. Currently egress doors serving outdoor areas are not permitted to have locks or latches. For security purposes, building owners or tenants typically install locks on required egress doors from these areas in violation of the code. Many building officials allow the locks and latches on doors serving the outdoor areas using the modification provisions of Sections 104.10 & 104.11. Since this situation occurs on a regular basis it makes sense to provide a reasonable standard for safety of the occupants.

The MOE Committee in Dallas made 3 suggestions to modify this proposal. They include: 1) elimination of item #6 permitting locks and latches on R-2 and R-3 outdoor areas, 2) reduce the maximum occupant load of the outdoor area in item #7, and 3) include provision for a two-way communication device accessible from the outdoor area. All 3 of these suggestions have been made to the attached public comment.

The two-way communication system requirements are currently included in IBC Section 1007.8.1 & 1007.8.2. Section 1007.8.1 specifies connection to a fire command center or central control point approved by the fire department. If the central control point is not constantly attended then connections to a monitoring location or 911 dispatch is permitted.

Approval of the revised proposal is recommended.

E65-12

Final Action: AS AM AMPC____ D

E66-12
1008.1.9.6 (IFC [B] 1008.1.9.6)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1008.1.9.6 (IFC [B] 1008.1.9.6) Special locking arrangements in <u>doors</u> <u>in</u> ~~Group~~ <u>Groups I-1 assisted living facilities and</u> I-2. Approved, special egress locks shall be permitted in a Group <u>I-1 assisted living facilities or</u> I-2 ~~occupancy~~ <u>occupancies</u> where the clinical needs of persons receiving care require such locking. Special egress locks shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an approved automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with Items 1 through 7 below.

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center, a nursing station or other approved location.
4. A building occupant shall not be required to pass through more than one door equipped with a special egress lock before entering an exit.
5. The procedures for the operation(s) of the unlocking system shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the International Fire Code.
6. All clinical staff shall have the keys, codes or other means necessary to operate the locking devices.
7. Emergency lighting shall be provided at the door.

   Exception: Items 1 through 4 shall not apply to doors to areas where persons which because of clinical needs require restraint or containment as part of the function of a psychiatric treatment area.

Reason: The current text allows special provisions in the path of egress for Group I-2 when patient care, most often due to issues of elopement, allows for staff to control access to the exits. This allowance should be permitted in assisted living facilities in order to allow proper care for residents in the initial stages of Alzheimer's, therefore, this allowance needs to be extended to Group I-1 assisted living facilities.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: Increase

1008.1.9.6-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Increasing the scope to include Group I-1 assisted living facilities provides for sensible on-site security for residents in assisted living facilities where there may be elopement concerns for residents (i.e., Alzheimer or dementia wards). The CTC committee may need to put in a public comment to coordinate these limits with the Group I-1, Condition 1 and Condition 2 approved in G31-12.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldasarra, Code Technologies Committee – Open stairway study group, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.6 (IFC [B] 1008.1.9.6) Special locking arrangements in doors in Groups I-1 ~~assisted living facilities~~ and I-2. Approved, special egress locks shall be permitted in a Group I-1 ~~assisted living facilities~~ or I-2 occupancies where the clinical needs of persons receiving care require such locking. Special egress locks shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an approved automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with Items 1 through 7 below.

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center, a nursing station or other approved location.
4. A building occupant shall not be required to pass through more than one door equipped with a special egress lock before entering an exit.
5. The procedures for the operation(s) of the unlocking system shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the International Fire Code.
6. All clinical staff shall have the keys, codes or other means necessary to operate the locking devices.
7. Emergency lighting shall be provided at the door.

Exception: Items 1 through 4 shall not apply to doors to areas where persons which because of clinical needs require restraint or containment as part of the function of a psychiatric treatment area.

Commenter's Reason: Elopement potential exists in all Group I-1, therefore this option should not be limited to just assisted living. This would not affect revisions made to this section in E67, which clarified the requirements for this type of lock.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Care Facilities". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/CareFacilities.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E66-12
Final Action: AS AM AMPC____ D

E69-12
1008.1.9.6 (IFC [B] 1008.1.9.6)

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care and Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1008.1.9.6 (IFC [B] 1008.1.9.6) Special locking arrangements in Group I-2. Approved, special egress locks shall be permitted in a Group I-2 occupancy where the clinical needs of persons receiving care require such locking. Special egress locks shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an approved automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with Items 1 through 7 below.

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center, a nursing station or other approved location.
4. A building occupant shall not be required to pass through more than one door equipped with a special egress lock before entering an exit.
5. The procedures for the operation(s) of the unlocking system shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the International Fire Code.
6. All clinical staff shall have the keys, codes or other means necessary to operate the locking devices.
7. Emergency lighting shall be provided at the door.

~~Exception~~ <u>Exceptions</u>:

<u>1.</u> Items 1 through 4 shall not apply to doors to areas where persons which because of clinical needs require restraint or containment as part of the function of a ~~psychiatric~~ treatment area.

<u>2.</u> <u>Items 1 through 4 shall not apply to doors to areas where a listed egress control system is utilized to reduce the risk of child abduction.</u>

Reason: This section deals with the use of electric locks to enhance the capabilities of egress control. Egress control serves three primary purposes. These are to control the elopement of ambulatory patients not capable of self preservation; the containment of patients that, due to their mental condition, could do harm to others; the prevention of the abduction of babies and children. Exceptions allow for the use of listed child abduction security systems and even mechanical locks (non-electric.)

This proposal is submitted by the ICC Ad Hoc Committee for Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

This proposal is being co-sponsored by the ICC Code Technology Committee. The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None

1008.1.9.6#1-E-WILLIAMS-ADHOC.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: While the issue of child abduction is important to consider, the proposal does not limit the exception to specific areas such as the nursery or pediatric wards.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

John Williams, Adhoc Health Care – MOE study group, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.6 (IFC [B] 1008.1.9.6) Special locking arrangements in Group I-2. Approved, special egress locks shall be permitted in a Group I-2 occupancy where the clinical needs of persons receiving care require such locking. Special egress locks shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an approved automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with Items 1 through 7 below.

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center, a nursing station or other approved location.
4. A building occupant shall not be required to pass through more than one door equipped with a special egress lock before entering an exit.
5. The procedures for the operation(s) of the unlocking system shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the International Fire Code.
6. All clinical staff shall have the keys, codes or other means necessary to operate the locking devices.
7. Emergency lighting shall be provided at the door.

Exceptions:

1. Items 1 through 4 shall not apply to doors to areas where persons which because of clinical needs require restraint or containment as part of the function of a treatment area.
2. Items 1 through 4 shall not apply to doors to areas where a listed egress control system is utilized to reduce the risk of child abduction <u>from nursery and obstetric areas of a Group I-2 hospital</u>.

Commenter's Reason: This issue of protection against child abduction is an important one for hospitals. However, we also understand the code development committee's concern that the proposed exception could be read to allow for an entire hospital to be locked down. The modification will limit these systems to the high risk areas of the nursery and obstetric areas only.

The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

Public Comment 2:

Wade Rudolph, CBET, CHFM, Sacred Heart Hospital, representing Wisconsin Healthcare Engineers Association Codes & Standards Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1008.1.9.6 (IFC [B] 1008.1.9.6) Special locking arrangements in Group I-2. Approved, special egress locks shall be permitted in a Group I-2 occupancy where the clinical needs of persons receiving care require such locking. Special egress locks shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an approved automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with Items 1 through 7 below.

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center, a nursing station or other approved location.
4. A building occupant shall not be required to pass through more than one door equipped with a special egress lock before entering an exit.
5. The procedures for the operation(s) of the unlocking system shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the International Fire Code.
6. All clinical staff shall have the keys, codes or other means necessary to operate the locking devices.
7. Emergency lighting shall be provided at the door.

Exceptions:

1. Items 1 through 4 shall not apply to doors to areas where persons which because of clinical needs require restraint or containment as part of the function of a treatment area.
2. Items 1 through 4 shall not apply to doors to areas where a listed egress control system is utilized to reduce the risk of child abduction <u>from maternity, pediatric, or adolescent units in a Group I-2 hospital</u>.

Commenter's Reason: The proposal as submitted by John Williams, CBO, Chair, ICC Ad Hoc Committee on Healthcare should be accepted as modified.

The committee made a reasonable recommendation to limit the areas in healthcare where there types of systems should be allowed. The modified language is provided to meet the request of the committee in order to gain adoption.

I am submitting this request on behalf of the Wisconsin Healthcare Engineers Association Codes & Standards committee representing over 700 members in the State of Wisconsin.

Thank you for your time and consideration of my comments.

E69-12

Final Action: AS AM AMPC____ D

E74-12
1008.1.9.7 (IFC [B] 1008.1.9.7)

Proposed Change as Submitted

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care and Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1008.1.9.7 (IFC [B] 1008.1.9.7) Delayed egress locks*. Approved, listed*, delayed egress ~~locks~~ locking systems, shall be permitted to be installed on doors serving any occupancy except Group A, E, and H occupancies in buildings that are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved* automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors unlock in accordance with Items 1 through 6 below. A building occupant shall not be required to pass through more than one door equipped with a delayed egress lock before entering an *exit.*

1. The doors unlock upon actuation of the *automatic sprinkler system* or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center.
4. The initiation of an irreversible process which will release the latch in not more than 15 seconds when a force of not more than 15 pounds (67 N) is applied for *1 second* to the release device. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the door lock has been released, by the application of force to the releasing device, relocking rearming shall be by manual means only.

   Exception: Where approved, a delay of not more than 30 seconds is permitted on a delayed egress door.

5. A sign shall be provided on the door located above and within 12 inches (305mm) of the release device reading: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 (30) SECONDS.

   Exception: Where approved, the installation of a sign is not required when it interferes with the safety of the residents in Group I occupancies.

6. Emergency lighting shall be provided at the door.

Reason: The intent is for all proposals for Section 1008.1.9.7 to work together. Three changes are submitted in order to keep the discussions separate.

The new exception to Item 5 - Providing escape instructions to first stage Alzheimer's disease patients who often still can read is unwise. Staff is there to assist in a fire.

This proposal is submitted by the ICC Ad Hoc Committee for Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

This proposal is being co-sponsored by the ICC Code Technology Committee. The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None

1008.1.9.7#1-E-WILLIAMS-ADHOC.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The signage is necessary at doors with delayed egress locking systems for visitors within the Group I-1 facilities. Disapproval is consistent with committee action on E75-12.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

John Williams, Adhoc Health Care – MOE study group, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

IBC 1008.1.9.7 (IFC [B] 1008.1.9.7) Delayed egress locks*. Approved, listed*, delayed egress locking systems, shall be permitted to be installed on doors serving any occupancy except Group A, E, and H occupancies in buildings that are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved* automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors unlock in accordance with Items 1 through 6 below. A building occupant shall not be required to pass through more than one door equipped with a delayed egress lock before entering an *exit.*

1. The doors unlock upon actuation of the *automatic sprinkler system* or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center.
4. The initiation of an irreversible process which will release the latch in not more than 15 seconds when a force of not more than 15 pounds (67 N) is applied for *1 second* to the release device. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the door lock has been released, by the application of force to the releasing device, relocking rearming shall be by manual means only.

   Exception: Where approved, a delay of not more than 30 seconds is permitted on a delayed egress door.

5. A sign shall be provided on the door located above and within 12 inches (305mm) of the release device reading: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 (30) SECONDS.

   Exception: Where approved, in Group I occupancies, the installation of a sign is not required ~~when the instructions compromise the safety of the residents in Group I occupancies~~ where persons who because of clinical needs require restraint or containment as part of the function of the treatment area.

6. Emergency lighting shall be provided at the door.

Commenter's Reason: When housing dementia patient, especially first stage Alzheimer patients, reading is often still in their capabilities. They are ambulatory, often in good physical condition, but not capable of self preservation. Their greatest dangers are elopement into traffic, ice and snow, darkness and wildlife. The intent of the proposed exception is to address this important safety issue. Families are relying on these facilities to keep their loved ones safe. Allowance for this exception is where approved by the code official.

The MOE committee had a concern that the instruction signage at delayed egress locks was needed for visitors. In all Group I facilities, staff is trained to assist in evacuation of all occupants, including residents and visitors. In addition, delayed egress systems already include connection to both the sprinkler system and the fire detection system, both required under this section. In the event of a activation of the fire alarm or sprinkler system or power failure, all delayed egress doors unlock from the inside and allow unobstructed egress. Dementia units are staffed to assist residents and visitors in fire and weather emergencies with practiced emergency plans. Having a direct signage at the door adds to the likelihood that there will be elopements. All doors with delayed egress systems will still be required to have exit signs.

Where facilities that are faced with a choice between delayed egress with escape instructions at each door, or going to a full lockdown such as controlled egress, the facility will always pick pursuit of the latter due to concerns for patient safety.

Several of the locking options do allow locking occupants in where there are staff releases the locks. This option would allow a facility to address patient safety without totally relying on staff to open exit doors in a fire event.

The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

E74-12

Final Action: AS AM AMPC____ D

E76-12
1008.1.9.7(New) [IFC [B] 1008.1.9.7(New)]

Proposed Change as Submitted

Proponent: Bryan M Romney, Building Official, University of Utah, Salt Lake City, Utah, representing self

Add new text as follows:

1008.1.9.7 (IFC [B] 1008.1.9.7) Security locking arrangements. Approved special security egress locking systems shall be permitted on Group A occupancies including, but not limited to, museums, art galleries, special collections libraries and courtrooms; and Group B or M occupancies; for doors in the means of egress serving rooms or spaces where security needs of persons or building contents required such locking. Special egress locks shall be permitted in these occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an approved automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with all of the following:

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from an approved location that is constantly attended when the building is occupied.
4. Doors equipped with a security locking arrangement are monitored by either direct line of sight or remote monitoring from the constantly attended station.
5. A building occupant shall not be required to pass through more than one door equipped with a special security egress locking system before entering an exit.
6. The procedures for the operation of the special security egress locking system shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the International Fire Code.
7. All security staff or persons identified in the procedures for Item 6 shall have the keys, codes, or other means necessary to operate the locking devices.
8. Emergency lighting shall be provided at the door.

(Renumber subsequent sections)

Reason: Chapter 10 does not provide a method for special locking or controlled egress except for Group I-1 and I-3 Occupancies. Other occupancy groups have needs for special locking arrangements either for securing persons or building contents. Examples include courtrooms where people poising a flight risk need special secure egress considerations. Research labs and animal housing facilities frequently require controlled egress systems such as card of biometric ingress and egress control systems. Libraries with rare book collections, art galleries, museums or mercantile occupancies where building contents area at risk of being stolen have needs for special security egress locking systems. This code addition would permit the code official to approve special locking arrangements in other occupancy groups where a demonstrated need exists. The procedure by which the special locking arrangement functions is to be reviewed and approved by the code official as outlined in Item 6. This item would allow the code official to approve special security egress locking systems under prescriptive requirement of Chapter 10 without having to approve an alternate design or method outlined in Section 104.11. This code addition represents a significantly more defensible code provisions than the more interpretive alternative design route. This code addition allows an already existing code provisions for controlled egress doors in Group I-2 occupancies to be allowed for other occupancy groups where a demonstrated need exists. No new or unproven code protocol is created in this code addition, only an existing, proven, and verified provision is being extended to other occupancy groups which for years have had critically security needs not allowed by the code.

Cost Impact: No initial construction cost impact. The IFC may require ongoing inspections of the Chapter 4 emergency planning and preparedness protocol compliance.

1008.1.9.7-E-ROMNEY.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The allowance for this type of locking arrangement for all Group B and M is too broad. In areas where high security is needed, allowances for this suggested type of locking arrangement could be addressed through alternative means. Stronger approval language is needed. A reference to UL294 would be consistent with other committee actions to the locking options.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bryan M. Romney, University of Utah representing self, requests Approval as Modified by this Public comment.

Modify the proposal as follows:

1008.1.9.7 (IFC [B] 1008.1.9.7) Security locking arrangements. *Approved* Special security egress locking systems shall be permitted when approved by building official in Group A-3, B, and M Occupancies ~~on Group A including, but not limited to museums, art galleries, special collections libraries and courtrooms; and Group B, or M occupancies~~; for doors in the means of egress serving rooms or spaces where security needs of persons or building contents ~~required~~ require such locking. Special egress locks shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an approved automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with ~~all of the following:~~ Items 1 through 9.

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from an approved location that is constantly attended when the building is occupied.
4. Doors equipped with a security locking arrangement are monitored by either direct line of sight or remote monitoring from the constantly attended station.
5. A building occupant shall not be required to pass through more than one door equipped with a special security egress locking system before entering an exit.
6. The procedures for the operation of the special security egress locking system shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the International Fire Code.
7. All security staff or persons identified in the procedures for Item 6 shall have the keys, codes, or other means necessary to operate the locking devices.
8. Emergency lighting shall be provided at the door.
9. All components of door locking system shall be listed in accordance with UL 294.

(Renumber subsequent sections)

Commenter's Reason: Chapter 10 does not provide a method for special locking or controlled egress except for Group I-2 (Section 1008.1.9.6) and Correctional Facility (Section 1008.1.9.10) Occupancies. Other occupancy groups have needs for special locking arrangements either for securing persons or building contents. Examples include courtrooms where people posing a flight risk need special secure egress considerations. Research labs and animal housing facilities frequently require controlled egress systems such as card or biometric ingress and egress control systems. Libraries with rare book collections, art galleries, museums or mercantile occupancies where building contents are at risk of being stolen have needs for special security egress locking systems. Airports frequently control egress from terminal and concourse areas to prevent unauthorized access to exterior flight deck or tarmac areas.

This code addition would allow the code official to approve special locking arrangements in Occupancy Groups A-3, B, and M where a demonstrated need exists. The intent of this special security egress locking system is to control egress under normal building conditions and not restrict egress under emergency situations. Item 6 requires the protocol for operation of this system to be reviewed and approved by the code official.

This code change would allow the code official to approve special security egress locking systems under the prescriptive requirements of Chapter 10 without having to deal with the risks of an alternate design or method outlined in Section 104.11. This code addition represents a significantly more defensible code provision than the more interpretive alternative design method.

This code addition allows an already existing code provision for controlled egress doors in Group I-2 occupancies (Section 1008.1.9.6) to be extended to other occupancy groups where a demonstrated need exists. No new or unproven code protocol is created in this code change; only an existing, proven, and verified protocol is being extended to other occupancy groups which have equally critical security needs not permitted by the code. This code addition will provide a means for the code official to approve a special locking system at the design stage rather than discovering a noncompliant locking system during final inspection or after the Certificate of Occupancy is issued.

The Means of Egress Committee rejected the original proposed code change in Dallas because it was felt that the proposed code section was too broad and open-ended. This public comment by the proponent is to address both of the Committee's concerns and limit the usage of controlled egress systems to specific occupant groups with low to medium fire hazard ratings. The proponent also added to the original proposal that the building official is to approve all applications of the controlled egress system, thus eliminating an expectation of entitlement. The proponent added the requirement that the door locking system is to comply with UL 294. This standard is included so as to be consistent with other locking systems found in Chapter 10.

The proponent has the endorsement of Bonneville and Utah Chapters of ICC.

E76-12

Final Action: AS AM AMPC____ D

E85-12

1022.6 (New), 1023.7 (New), 1025.4 (New) [IFC 1022.6 (New), 1023.7 (New), 1025.4 (New)]

Proposed Change as Submitted

Proponent: Lee J. Kranz, City of Bellevue, Washington, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov)

Add new text as follows:

1022.6 (IFC [B] 1022.6) Standpipes. Class 1 standpipe hose connections shall be provided in accordance with Item 1 or 5 of Section 905.4 and NFPA 14.

(Renumber subsequent sections)

1023.7 (IFC [B] 1023.7) Standpipes. Class 1 standpipe hose connections shall be provided in accordance with Item 3 of Section 905.4 and NFPA 14.

1025.4 (IFC [B] 1025.5) Standpipes. Class 1 standpipe hose connections shall be provided in accordance with Item 2 of Section 905.4 and NFPA 14.

(Renumber subsequent sections)

Reason: Placing references to Section 905.4 and NFPA 14 standpipe requirements in exit stairways, horizontal exits and exit passageways will help designers and reviewers to include this requirement early in the design process. During the means of egress design process, the requirement for standpipes for horizontal exits and exit passageways are frequently overlooked and may have significant cost impacts to correct. Including the standpipe references in Sections 1023 and 1025 will make the design team aware of the requirement early in the design process and help insure cost impacts are considered at the appropriate time. Adding the requirement in Section 1022 is for consistency.

The intent is to have an IFC change to clarify that standpipes should be located within the enclosure for interior exit stairways. Literally the current text, by saying all required stairways, would require standpipes on exit access stairways and exterior exit stairway. If it is felt that standpipes should be provided in these locations, a modification would be to add this same language in a new Section 1009.3.1.8 for exit access stairways and 1026.7 for exterior exit stairways.

Cost Impact: None

1023.7-E-Kranz.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee agreed that placement of stand pipes in a building is an important element that sometimes can be missed during the planning stage/building review. However, the proposed text could be interpreted to require stand pipes for all buildings, not just where required. It was suggested that a more appropriate reference would be 905.3.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Lee J. Kranz, City of Bellevue Washington representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1022.6 (IFC [B] 1022.6) Standpipes. Where required by IBC Section 905.4, item 1 or 5, Class 1 standpipe hose connections shall be installed ~~provided~~ in accordance with ~~Item 1 or 5 of Section 905.4 and~~ NFPA 14.

(Renumber subsequent sections)

1023.7 Standpipes. Where required by IBC Section 905.4, item 3, Class 1 standpipe hose connections shall be installed ~~provided~~ in accordance with ~~IBC Section 905.4, item 3 and~~ NFPA 14.

1025.5 Standpipes. Where required by IBC Section 905.4, item 2, Class 1 standpipe hose connections shall be installed ~~provided~~ in accordance with ~~IBC Section 905.4, item 2 and~~ NFPA 14.

(Renumber subsequent sections)

Commenter's Reason: The MOE Committee in Dallas agreed that placing references to the standpipe provisions in Sections 1022, 1023 and 1025 was important but indicated that the text, as submitted, could be interpreted to require standpipes in all situations where interior exit stairways, exit passageways or horizontal exits were provided, regardless of the exceptions contained in Section 905.4. The provisions have been re-worded to clarify the intent.

Placing references to Section 905.4 standpipe requirements in sections 1022, 1023 and 1025 will help designers and reviewers to be aware of this important requirement and will insure that the standpipes, if required, are considered early in the design process to reduce costs during construction. The reference to NFPA 14 installation standards is consistent with IBC Section 905.2.

E85-12

Final Action: AS AM AMPC____ D

E90-12
1009.3 (IFC [B] 1009.3)

Proposed Change as Submitted

Proponent: Robert J Davidson, Davidson Code Concepts LLC, representing self (rjd@davidsoncodeconcepts.com)

Revise as follows:

1009.3 (IFC [B] 1009.3) Exit access stairways. Floor openings between stories created by exit access stairways shall be enclosed.

Exceptions:

1. In other than Group I-2 and I-3 occupancies, exit access stairways that serve, or atmospherically communicate between, only two stories, are not required to be enclosed.
2. Exit access stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.
3. In buildings with only Group B or M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.

~~4. In other than Groups B and M occupancies, exit access stairway openings are not required to be enclosed provided that the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the floor opening does not connect more than four stories, the area of the floor opening between stories does not exceed twice the horizontal projected area of the exit access stairway, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.~~

4~~5~~. Exit access stairways within an atrium complying with the provisions of Section 404 are not required to be enclosed.

5~~6.~~ Exit access stairways and ramps in open parking garages that serve only the parking garage are not required to be enclosed.

6~~7~~. Stairways serving outdoor facilities where all portions of the means of egress are essentially open to the outside are not required to be enclosed.

7~~8~~. Exit access stairways serving stages, platforms and technical production areas in accordance with Sections 410.6.2 and 410.6.3 are not required to be enclosed.

8~~9.~~ Stairways are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.

9~~10~~.In Group I-3 occupancies, exit access stairways constructed in accordance with Section 408.5 are not required to be enclosed.

Reason: The purpose of this code change is to delete the allowance for connecting up to four stories with an unenclosed exit access stairway. This language is the result of a re-write of code language last cycle that was purported to be editorial in nature. When I attempted to point out this change was expanding allowance of the connection of four stories in testimony at the final action hearings I was repeatedly interrupted by the supporters of the proposal and in their testimony they denied there was a change or increase in the allowance for interconnecting floor levels.

If you review the previous language found in the 2009 IBC at Section 708.2, Exception 2 you will find that this allowance did not permit a stairway **that was a portion of the means of egress** to be unenclosed under this concept. Since an “extra” stairway not need for, nor allowed to be considered a portion of the means of egress, would be an added cost that used up valuable square footage, this application of the code was rare. (That is if in fact it was done as provided for by the code and no credit for egress including travel distance was taken)

2009 International Building Code

708.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this section.

Exceptions:

2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening or **stairway that is not a portion of the means of egress** protected according to Item 2.1 or 2.2.
   2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator or stairway and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories .

With the revised language the code now allows unenclosed "exit access stairways" to connect up to four stories of a building. This is a major technical change; it allows the use of unenclosed stairways that ARE part of the means of egress. The purpose of adding the term "exit access stairway" to the code was to provide for recognition of the stairs for use in exit access provided the travel distance was measured. See 2012 IBC, Section 1016.3.1 below. So we find that the change was not just editorial, it was a significant reduction in safety provided from the spread of smoke or heat.

2012 International Building Code

1016.3.1 Exit access stairways and ramps. Travel distance on exit access stairways or ramps shall be included in the exit access travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stair and landings. The measurement along ramps shall be made on the walking surface in the center of the ramp and landings.

The problem with this section is not just a matter of increased allowances from one edition to another contrary to presentation. The section in question, 2012 IBC, Section 1009.3 Exception 4, is in direct conflict with the "atrium" provisions of Section 404.1 wherein additional fire protection features are required when we have an atrium, which is defined as an opening connecting two or more stories "other than enclosed stairways"… etc. Actually, if you apply the allowance for connecting floor levels with unenclosed stairs, you currently have an atrium by definition and design both in the older edition of the code and the present edition. Also note that there is no qualifier as to the size of an opening when dealing with atriums. It is just recognition that we have an opening that can allow the upward travel of smoke and heat due to the lack of an enclosing shaft.

SECTION 404
ATRIUMS

404.1 General. In other than Group H occupancies, and where permitted by Section 712.1.6, the provisions of Sections 404.1 through 404.9 shall apply to buildings or structures containing vertical openings defined as "Atriums."

ATRIUM. An opening connecting two or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505.

Now objectors may argue that this is a matter of two different features, but a plain reading of the definition of an atrium and recognition of why we add fire protection features regardless of the size of the atrium clearly identifies that there is no difference. Whether I have a large atria with an open stairway in the middle, or a small atria with a stairway up through it does not change the fact that it is a path upward for smoke and heat. Since the atrium and the unenclosed exit access stairs present the same hazard, upward travel of smoke and heat, why such a major difference in the required fire protection features?

The new language is a major change from the last edition of the code, contrary to how it was presented to the committee and the membership, it allows a means of egress path where you might be traveling down into the smoke and/or heat, and it is in conflict with long recognized protection features for atriums, i.e, unenclosed holes in floor/ceiling assemblies,

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

1009.3-E-Davidson.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Section 1009.3, Exception 4 is a long standing allowance in the code. No technical or anecdotal information was provided to indicate that this allowance is a safety issue. Removal of this exception would take out the option of the opening as well as the stairway.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Robert J Davidson, Davidson Code Concepts, LLC, representing self, requests Approval as Submitted.

Commenter's Reason: The committee reason indicated that *Section 1009.3, Exception 4 is a long standing allowance in the code. No technical or anecdotal information was provided to indicate that this allowance is a safety issue*. This is not factual, the use of stairways that are part of the means of egress, (in this case 'exit access stairways), was not permitted by the previous code. The code change that provided this language was testified to as editorial. It can't be editorial if it wasn't previously allowed.

In this case language was improperly slipped into the code during the last cycle and when it gets identified the committee faults the person that identifies the sleight of hand for not having technical data to support the fix. Does this make sense? What about the lack of technical justification for the so called "editorial" changes that occurred?

Totally ignored by the committee in discussion during the hearing and in the reason statement is the fact that based upon current code language if you connect 3 or more floors with one of these stairways you have an atrium that requires the installation of all of the fire protection features found in Section 404.1. The fact that the code already has such requirements for atriums documents the "safety issue" the committee claims was not indicated.

E90-12

Final Action: AS AM AMPC____ D

E91-12

1009.6, 1009.8, 1009.8.1-1009.8.5(New) [IFC [B] 1009.6, 1009.8, 1009.8.1-1009.8.5(New)]

Proposed Change as Submitted

Proponent: David W. Cooper, Stairway Manufacturing and Design Consultants representing Stairway Manufacturers' Association (sma@stairways.org)

Revise as follows:

1009.6 (IFC [B] 1009.6) Walkline. The walkline across *winder* treads and landings shall be ~~concentric~~ parallel to the direction of travel and concentric through the turn. The walkline shall be ~~and~~ located 12 inches (305 mm) from the side where the *winders* are narrower or from the side of shortest distance through the turn at a landing. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear ~~*stair*~~ width at the walking surface ~~of the *winder*~~. If *winders* are adjacent within the *flight*, the point of the widest clear *stair* width of the adjacent *winders* shall be used.

1009.8 (IFC [B] 1009.8) Stairway landings. There shall be a floor or landing at the top and bottom of each ~~*stairway*~~ *flight of stairs*. ~~The width of landings shall not be less than the width of *stairways* they serve. Every landing shall have a minimum width measured perpendicular to the direction of travel equal to the width of the *stairway*. Where the *stairway* has a straight run the depth need not exceed 48 inches (1219 mm). Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into a landing. When *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1007.6.1, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.~~

Exception: *Aisle stairs* complying with Section 1028.

1009.8.1 (IFC [B] 1009.8.1) Stairway landing width. The minimum width of landings shall be not less than the required width of the stairway. Every landing shall have a width at the top and bottom of each flight no less than the width of the *flight* at the junction with the landing. The minimum width of a landing at any point shall be not less than the width of the narrowest flight served as measured perpendicular to the walkline.

1009.8.2 (IFC [B] 1009.8.2) Stairway landing depth. At landings of straight run stairways and at stairway landing turns of 90 degrees or less between adjoining flights, the minimum landing depth shall be not less than the smaller of the minimum landing width or the value from Table 1009.8.2. Landings shall be measured between the vertical planes of the foremost projection of the tread and landing nosings at the intersections with the walkline.

Table 1009.8.2 (IFC [B] Table 1009.8.2)
Landing Depth

Range of stairway turn at landing (degrees)		Minimum Landing Depth	
Greater than	**Less than or Equal to**	**Stairways other than spiral stairways and stairways within dwelling units and sleeping units (inches)**	**Spiral stairways and stairways within dwelling units and sleeping units (inches)**
85	90	21	18
80	85	23	19
75	80	24	20
70	75	26	21
65	70	27	22
60	65	29	23
55	60	30	24
50	55	32	25
45	50	33	26
40	45	35	27
35	40	36	28
30	35	38	29
25	30	39	30
20	25	41	31
15	20	42	32
10	15	44	33
5	10	45	34
0	5	47	35
0	0	48	36

For SI: 1 inch = 25.4 mm

1009.8.3 (IFC [B] 1009.8.3) Stairway landing shape. Walls and guards at the sides of landings shall be permitted to be curved or segmented.

1009.8.4 (IFC [B] 1009.8.4) Obstructions at stairway landings. The required width and depth of landings shall be unobstructed.

Exception: Encroachments complying with Section 1005.7.

1009.8.5 (IFC [B] 1009.8.5) Wheelchair spaces at stairway landings. Where *wheelchair spaces* are located on the *stairway* landing in accordance with Section 1007.6.1, the *wheelchair space* shall not be located in the required width or depth of the landing and doors shall not swing over the *wheelchair spaces*.

Reason: The intent of this proposal is to clarify stairway landing requirements. These provisions are not intended to be applicable to the unique configurations required within assembly seating areas. Those are addressed in Section 1028.

This proposal separates the component requirements of this section, allows a more precise understanding needed for both design and enforcement of required width and depth and provides a needed minimum landing depth requirement. In addition it provides a new requirement for landing shape that has previously been left to interpretation with needed explanation only offered within the code commentaries.

Landing Width: It is not uncommon that the widths of the flights vary within a stairway and the widths of different stairways sharing the same landing at a common floor level also vary. In fact different stairway widths may be required as passenger loads increase in the direction of egress. The current language is ambiguous as it does not clearly state what "The" width is when there is more than one stairway width or flight width at a landing.

Landing Depth is as critical as tread depth: Just as critical to good stairway design as tread depth is the depth of the landing. Landings should be designed to allow enough space to turn. Likewise and as the turning diminishes the landing should be of sufficient depth to prevent over stepping. Currently the code confuses landing depth as an element of its width without a specific depth requirement. The only specific reference to landing depth within this section serves to establish a "need not exceed dimension" of 48 inches (36 inches residential) for stairways with a straight run. Landing depth is especially critical at stairway landings that turn less than 90 degrees. Landing turns that are greater than 90 degrees are not addressed in this proposal because sufficient landing depth is provided by nature of the geometry. The intent of this proposal is not to increase the depth required at landings by the most common interpretations of the current code but to provide a clear application of the concept of landing depth at the walkline as experienced by the user. This proposal clarifies the current rectilinear requirements and provides a design solution that works regardless of the shape of the landing.

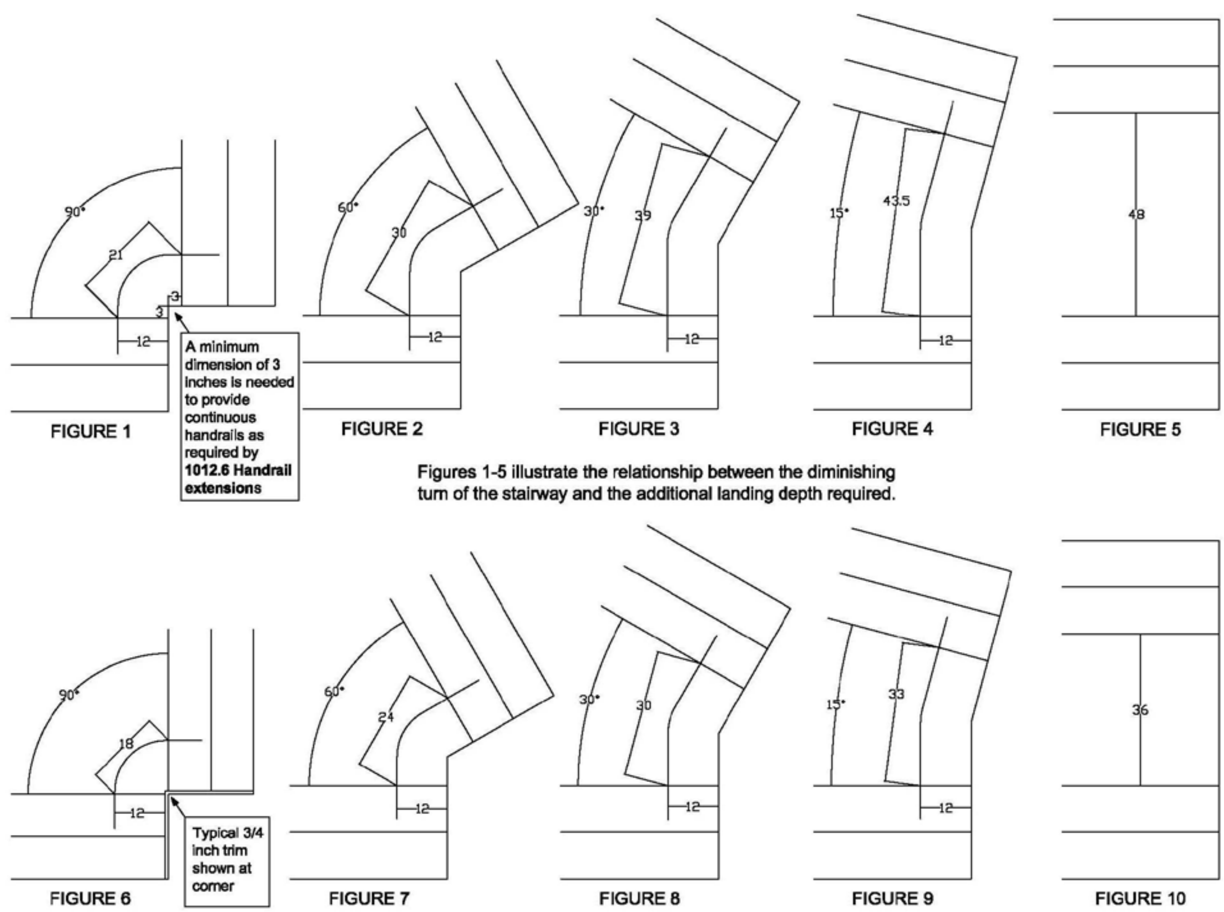
The Walkline can be used to regulate landing Depth: In order to regulate landing depth at the walkline, 1009.6 *Walkline*, has been modified to include landings. The modification recognizes that the walkline has both straight elements that are parallel and curved elements that are concentric and relates the walkline to both winders and landings. The walkline is referenced in a new landing depth section and a relationship is provided for controlling the depth of a landing where flights meet. The measuring criteria for landing depth is congruous with the criteria for measuring tread depth as found in 1009.7.2 *Riser height and tread depth*.

As illustrated in Figures 1 - 10 this proposal requires the landing depth increase as the angle of the turn diminishes to prevent overstepping of the landing and allow the space required to negotiate the turn. This correlates with the 48 inch “need not to exceed” depth of landings specified for stairways with straight runs currently in the code. Figure 1 and 6 shows a minimal 90 degree landing as built in accordance with the code. The landing in figure 1 has the minimum dimension necessary to provide for the continuous handrail connection as required in **1012.6 *Handrail extensions***. The minimum landing currently possible has a depth at the walkline as shown of 21 inches and is the minimum allowed by this proposal for a landing turn of 90 degrees. Since the code currently has a “need not exceed limit” of 48 inches applicable to the condition where the stairway is straight run a simple linear relationship between these two conditions allows for calculation of the data in **Table 1** increasing the landing depth by a constant increment as the turning decreases . Figures 2-5 clearly illustrate examples from the table.

Figure 6 shows a typical residential landing and figures 7-10 again illustrate examples from the table and the incremental increase needed for both spiral stairways and residential applications.

It should be noted that this proposal further provides a viable landing depth whether or not the adjoining flights are curved as it is related to the degree of turning only at the landing of the stairway.

Landing depth required at connecting flights as regulated at the walkline



Figures 6-10 illustrate the landing depth for spiral and residential stairways .

Minimum Landing Depth: If the landing depth, determined from the table, exceeds the minimum stairway width then the minimum stairway width shall be the minimum landing depth. If the stairway width exceeds the landing depth from the table then the landing depth from the table is the minimum landing depth.

Spiral stairways and stairways with in dwelling units: Figures 5-10 illustrate the landing conditions for stairways within dwelling units and spiral stairways and coordinates closely with the 2012 IRC. It allows a smaller 90 degree value of 18 inches where section **1012.6 *Handrail Extensions*** does not apply and correlates the incremental increase in depth with the minimum depth of 36 inches for residential stairways with a straight run. Particularly in residential applications this proposal helps to define the difference between a landing and a winder.

Landing Shape: The shape of landings is not regulated in the code and is sometimes interpreted to permit only rectangular shapes. Clearly landings take different shapes dependent upon the angle at which flights meet. The unused outside corner of landings that is beyond the width measured perpendicular to the direction of travel is not needed for egress. Although this is explained in the ICC commentaries this proposal incorporates a new section titled landing shape to provide for consistent interpretation and enforcement.

Doors and Wheelchair Space at Landings: The language for obstructions has been updated to reference 1005.7. The requirements are the same, but the new language would be consistent with text in aisle, corridors and exit passageways. The language for wheelchair spaces is existing.

Cost Impact: This will not affect the cost of construction.

1009.6-E-Coooper.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal provides technical criteria for stairway landings of unusual shape which are currently not addressed in the code. However, it is not clear how the Table 1009.8.2 can be used for angles between the specific angles specified or how a designer would measure the angle of a stairway. Since the understanding of the table really needs the graphics provided in the reason for clarification, perhaps this could be considered as alternative means and covered in the commentary. Some of the language deleted from 1009.8 deals with means of egress width and accessibility requirements. This should not be lost.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consultants, representing Stairway Manufacturers' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.6 (IFC [B] 1009.6) Walkline. The walkline across *winder* treads and landings shall be parallel to the direction of travel and concentric through the turn. The walkline shall be located 12 inches (305 mm) from the side where the *winders* are narrower or from the side of shortest distance through the turn at a landing. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear width at the walking surface. If *winders* are ~~adjacent~~ adjoining within the *flight*, the point of the widest clear ~~*stair*~~ width at the walking surface of the ~~adjacent~~ adjoining *winders* shall be used.

1009.8 (IFC [B] 1009.8) Stairway landings. There shall be a floor or landing at the top and bottom of each *flight of stairs*.

Exception: *Aisle stairs* complying with Section 1028.

1009.8.1 (IFC [B] 1009.8.1) Stairway landing width. The minimum width of landings shall be not less than the required width of the stairway. Every landing shall have a width at the top and bottom of each flight no less than the width of the *flight* at the junction with the landing. The minimum width of a landing at any point shall be not less than the width of the narrowest flight served as measured perpendicular to the walkline.

1009.8.2 (IFC [B] 1009.8.2) Stairway landing depth. At ~~landings of~~ straight run stairway~~s~~ landings having no landing turn measuring 0 degrees and at stairway landing turns of less than 90 degrees ~~or less~~ between adjoining flights, the minimum landing depth shall be 44 inches (1118 mm) minus 1¼ inches (31.8 mm) for each 5 degrees increment of turn at the landing up to 90 degrees as ~~not less than the smallest of the minimum landing width or the value from Table 1009.8.2. Landing shall be~~ measured between the vertical planes of the foremost projection of the tread and landing nosings at the intersections with the walkline. Landing turns of 90 degrees shall have a minimum of depth of 21½ inches (546 mm) at the walkline.

Exception: Spiral stairways and stairways within dwelling and sleeping units shall have a minimum landing depth of 36 inches (914 mm) minus 1 inch (25.4 mm) for each 5 degrees increment of turn at the landing up to 90 degrees as measured between the vertical planes of the foremost projection of the tread and landing nosings at the intersections with the walkline. Landing turns of 90 degrees shall have a minimum of depth of 18 inches (457 mm) at the walkline.

~~**Table 1009.8.2 (IFC [B] Table 1009.8.2)**~~
~~**Landing Depth**~~
(Delete table in its entirety.)

1009.8.3 (IFC [B] 1009.8.3) Stairway landing shape. ~~Walls and guards at the~~ The sides of landings at adjoining walls and guards shall be ~~permitted~~ allowed to be curved or segmented.

1009.8.4 (IFC [B] 1009.8.4) Obstructions at stairway landings. The required width and depth of landings shall be unobstructed.

Exception: Encroachments complying with Section 1005.7.

1009.8.5 (IFC [B] 1009.8.5) Wheelchair spaces at stairway landings. When *wheelchair spaces* are located on the *stairway* landing in accordance with Section 1007.6.1, the *wheelchair space* shall not be located in the required width or depth of the landing and doors shall not swing over the *wheelchair spaces*.

Commenter's Reason: The modification preserves the committee's interest in addressing the technical criteria for landings that is not currently addressed in the code. In particular

- the distinction between width and depth
- the depth of landings at the walkline
- the depth of landings at both curved and angular flights that meet at a landing
- the periphery shape of landings are addressed
- based on current minimum depths allowed

The table that confused the committee has been removed and substituted with simple arithmetic that results in the landing depth dimension. Part of the confusion noted by the committee was that the data in the table was rounded and thereby misrepresented. A corrected table is shown here to clarify that the increments are equal and lineal and comply with the calculations made from the modified code text. The drawings submitted with the original proposal are no longer needed to understand the code text which now stands alone. By qualifying that landings of straight run stairs have 0 degrees of turn the needed clarification the committee requested for ease of use has been provided.

Changes in the walkline section correct a submission error by substituting parallel text from the previous sentence and offering the more specific term "adjoining" to replace the somewhat subjective term "adjacent".

The essential requirements related to egress width and accessibility that the committee noted as deleted and critical, were in fact not eliminated but appeared on the next page of the monologue, simply relocated in new sections 1009.8.1, 1009.8.4 and 1009.8.5. Section 1009.8.4 provides an updated reference to1005.7. The requirements are the same, but the new language would be consistent with text in aisle, corridors and exit passageways. The language in 1009.8 for wheelchair spaces is intact, simply relocated to 1009.8.5.

This is a much needed change that will address many issues that are inconsistently interpreted and often require reference to the commentary or other resources not in common use by designers, contractors, or enforcing officials. The committee recognized this and their other stated concerns have all been addressed in this modification.

This change allows us to consistently regulate landing depth with the same fundamentals as tread depth and relate it clearly to the users' walkline on the stairway regardless of the stairway plan-configuration. It is based on those requirements already understood in the code and does not change them but simply fills in the blanks that have been missing answers and left to interpretation. Your thorough consideration and approval as modified will be greatly appreciated by all that use the code.

E91-12

Final Action: AS AM AMPC____ D

E94-12
1009.7.5.3 (IFC [B] 1009.7.5.3)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1009.7.5.3 (IFC [B] 1009.7.5.3) Solid Risers. Risers shall be solid.

Exceptions:

1. Solid risers are not required for *stairways* <u>that serve as the means of egress from areas exempted from accessibility in accordance with Section 1103.2.</u> ~~that are not required to comply with Section 1007.3~~, ~~provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).~~
<u>2.</u> <u>Solid risers are not required within Type B or non-accessible dwelling or sleeping units.</u>
<u>3.</u> <u>Means of egress stairways shall be permitted to have openings between treads that do not permit the passage of a sphere with a diameter of 4 inches (102 mm).</u>
~~2~~<u>4</u>. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. ~~There are no restrictions on the size of the opening in the riser.~~
~~3~~<u>5</u>. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1009.12.
~~4~~<u>6</u>. Solid risers are not required for *alternating tread devices* constructed in accordance with Section 1009.13.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

The intent of this proposal is coordination with ADA requirements for solid risers on stairways as well as provide for a more logical and consistent application of solid risers.

The 1991 ADA only scoped stairways that connected levels that did not have an accessible route. The 2010 ADA Standard scopes stairways that are part of a means of egress, not just stairways that are part of an accessible means of egress. Therefore, the current Section 1009.7.5.3, Exception 1 was not coordinated with either the 1991 or 2010 ADA stairway provisions.

If an area is not required to be accessible, the route to that space is also exempted from ADA requirements; therefore, means of egress stairways from these areas are not covered by ADA. IBC Section 1103.2 has similar exceptions for accessible areas. For example, 1103.2.7 exempts areas raised for purposes of life safety, fire safety or security. With the proposed revisions in Section 1009.7.5.3, exception 1, stairways serving these areas are not required to have solid risers.

The new exception 2 would allow open risers on stairways within dwelling units or sleeping units that were covered by ADA (i.e., Accessible units or Type A units). Open risers are a common with stairways that provide access to basements within a residence.

One of the reasons for providing closed risers is to limit the chance that a cane could catch between risers. The 4” maximum opening would limit this as well as meet the 4” opening limits currently in the code for child protection.

Current exception 2 (new exception 4) has the last sentence deleted. This text is not needed, plus it could lead code users to think that other exceptions had size limitations.

Cost Impact: None

1009.7.5.3-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Application of Exception #3 is too broad. The proponent asked for disapproval so that CTC and the proponent of E95 can work together to clarify what openings are permitted. Section 504.3 of the 2010 ADA Standard for Accessible Design does specify solid risers. The intent is to clarify which size opening should be permitted and still have the risers perform as if they were solid.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.7.5 (IFC [B] 1009.7.5) ~~Solid Risers~~ Riser Opening Limitations. Risers shall ~~be solid~~ not have openings that allow passage of a sphere ½ inches (12.7 mm) in diameter.

Exceptions:

~~1. Solid risers are not required for stairways that serve as the means of egress from areas exempted from accessibility in accordance with Section 1103.2.~~

~~2~~1. ~~Solid risers are not required~~ Risers within ~~Type B or non-accessible~~ dwelling or sleeping units not required to be Accessible or Type A units, provided ~~that~~ the openings ~~between the lower adjacent tread, floor, or landing and the lower edge of the riser that~~ do not allow ~~permit the~~ passage of a sphere ~~with a diameter of~~ 4 inches (102 mm) in diameter.

~~3. Means of egress stairways shall be permitted to have openings between the lower adjacent tread, floor, or landing and the lower edge of the riser that do not permit the passage of a sphere with a diameter of 4 inches (102 mm).~~

~~4~~2. ~~Solid risers are not required~~ Risers for occupancies in Group I-3 or in Group F, H and S occupancies ~~other than~~ in areas not accessible to the public shall have no opening limitation.

~~5~~3. ~~Solid risers are not required~~ Risers for *spiral stairways* constructed in accordance with Section 1009.12 shall have no opening limitation.

~~6~~4. ~~Solid risers are not required~~ Risers for *alternating tread devices* constructed in accordance with Section 1009.13 shall have no opening limitation.

~~7~~5. ~~Solid risers are not required~~ Risers for ship ladders constructed in accordance with Section 1009.14 shall have no opening limitation.

Commenter's Reason: The intent of this public comment is coordination with ADA intent for solid risers but acknowledging what types of openings should be permitted. Generally, most stairways will have risers with a maximum opening size of ½ inch. Within residential units (other than Accessible or Type A units) stairways shall be permitted tread with a 4 inch opening similar to the guard requirements. Solid treads are not required in jails or not public areas in factories and storage for safety reasons. Solid risers would not allow adequate foot placement on the treads for spiral stairways, alternating tread devices or ships ladders.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "IBC Coordination with the new ADAAG". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E94-12

Final Action: AS AM AMPC____ D

E95-12
1009.7.5, 1009.7.5.3 (IFC [B] 1009.7.5, 1009.7.5.3)

Proposed Change as Submitted

Proponent: David W. Cooper / Stairway Manufacturing and Design Consultants / Representing: Stairway Manufacturers' Association (sma@stairways.org)

Revise as follows:

~~1009.7.5.3 (IFC [B] 1009.7.5.3)~~ 1009.7.5 (IFC [B] 1009.7.5) Solid Risers. Risers shall be solid.

Exceptions:

1. Solid risers are not required for stairways that serve as the means of egress from areas exempted from accessibility in accordance with Section 1103.2. ~~are not required to comply with Section 1007.3,~~
2. Solid risers are not required within Type B or non-accessible dwelling or sleeping units provided that the openings between the lower adjacent tread, floor, or landing and the lower edge of the riser that do not permit the passage of a sphere with a diameter of 4 inches (102 mm).
3. Means of egress stairways shall be permitted to have openings between the lower adjacent tread, floor, or landing and the lower edge of the riser that do ~~provided that the opening between treads does~~ not permit the passage of a sphere with a diameter of 4 inches (102 mm).

~~2~~4. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. ~~There are no restrictions on the size of the opening in the riser.~~

~~3~~5. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1009.12.

~~4~~6. Solid risers are not required for *alternating tread devices* constructed in accordance with Section 1009.13.

7. Solid risers are not required for ship ladders constructed in accordance with Section 1009.14

~~1009.7.5~~ 1009.7.6 (IFC [B] ~~1009.7.5~~ 1009.7.6) Nosing and riser profile. The radius of curvature at the leading edge of the tread shall be not greater than 9/16 inch (14.3 mm). Beveling of *nosings* shall not exceed 9/16 inch (14.3 mm). Risers shall be ~~solid and~~ vertical or sloped under the tread above from the underside of the *nosing* above at an angle not more than 30 degrees (0.52 rad) from the vertical.

~~1009.7.5.1~~ 1009.7.6.1 (IFC [B] ~~1009.7.5.1~~ 1009.7.6.1) Nosing projection size. The leading edge (*nosings*) of treads shall project not more than 1 ¼ inches (32 mm) beyond the tread below.

~~1009.7.5.2~~ 1009.7.6.2 (IFC [B] ~~1009.7.5.2~~ 1009.7.6.2) Nosing projection uniformity. All *nosing* projections of the leading edges shall be of uniform size, including the projections of the *nosings* leading edge of the floor at the top of a *flight*.

(Renumber subsequent sections)

Reason: Section **1009.7.5 Nosing and riser profile** is a constant source of controversy and misunderstanding. The reference to solid risers does not belong in the section that describes the profile or outline of a step. Notably masked in exception 1 by double negatives is the requirement for the limitation of openings in risers.

This proposal clarifies the scoping for use of solid risers and coordinates with the new ADA guidelines as outlined by the CTC. **Solid risers**, as a new and separate section subsection of **1009.7 Treads and risers** will appear prior to Nosing and riser profile. This allows easier identification of the opening limitation between treads and adjoining floors or landings that was previously misunderstood or not found. Exceptions 2 and 3 are similar to the CTC's proposal but assures that an opening limitation applies to Type B units as well as egress stairs and also provides that if an opening is used in the riser, it is in the lower portion of the riser height, as shown in **Figure 1**, allowing design options that may provide additional heal clearance in descent and the appropriate design of tread nosings compliant with ADA guidelines that are important in ascent.

It is worth noting that the stairs covered in exception 2 would likely be means of egress stairs and would be covered by exception 3. If the committee wishes to modify this proposal by eliminating exception 2 in its entirety it would seem to work as well with less verbiage.

The out of place reference to solid risers has been eliminated from 1009.7.5 *Nosing and riser profile*. The profile of a stair nosing and riser are aptly described without the misplaced reference to the composition of risers. The content of the exceptions has been moved from 1009.7.5 *Nosing and riser profile* to the new section and coordinated with ADA guidelines.

Exception 7 adds ship ladders that were not previously included but should be as their use is made safer with the additional space for overhang of the toes in both ascent and in the typical backing down descent common to ladder use.

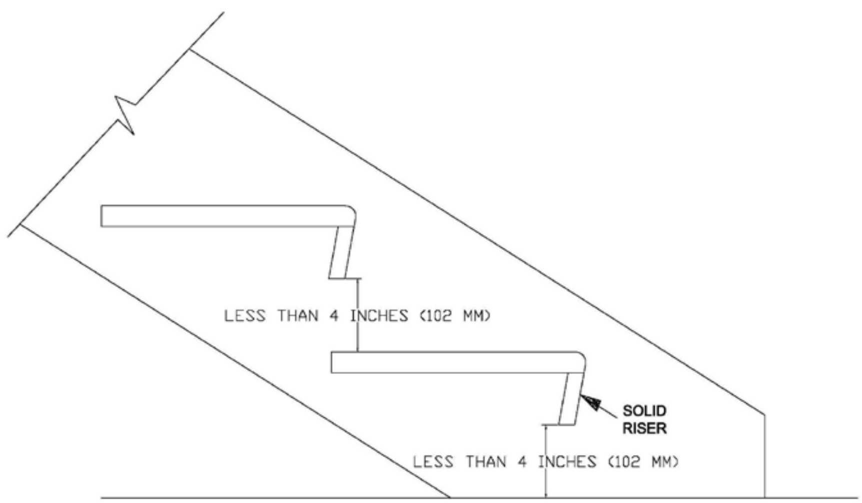


FIGURE 1

Cost Impact: This will not affect the cost of construction

1009.7.5 #2-E-Cooper.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: While the committee agreed that the proponents of E94 and E95 should work together regarding coordination with openings in stairway risers and ADA, they felt that the addition of ships ladders in section was valid.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

David W. Cooper, Stair Manufacturing and Design Consultants, representing Stairway Manufacturers' Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.7.5 (IFC [B] 1009.7.5) ~~Solid Risers~~ Riser Opening Limitations. ~~Risers shall be solid.~~ Openings in risers between the walking surface of the adjacent tread, floor, or landing below and the lower edge of the riser above shall not allow passage of a sphere 2½ inches (63.5 mm) in diameter. Openings in risers 2-1/2 inches (63.5 mm) or higher above the walking surface of the adjacent tread, floor or landing below shall not allow the passage of a sphere ½ inch (12.7 mm) in diameter.

Exceptions:

1. ~~Solid risers are not required for stairways that serve as the means of egress from areas exempted from accessibility in accordance with Section 1103.2.~~
~~2~~1. Other than within Accessible and Type A dwelling and sleeping units, in Group R-3 occupancies; within *dwelling and sleeping units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling and sleeping units* in Group R-2 occupancies; opening in risers shall not allow ~~Solid risers are not required within Type B or non-accessible dwelling or sleeping units provided that the openings between the lower adjacent tread, floor, or landing and the lower edge of the riser that do not permit~~ the passage of a sphere ~~with a diameter of~~ 4 inches (102 mm) in diameter ~~through the allowed opening~~.
3. ~~Means of egress stairways shall be permitted to have openings between the lower adjacent tread, floor, or landing and the lower edge of the riser that do not permit the passage of a sphere with a diameter of 4 inches (102 mm).~~
~~4~~2. ~~Solid risers are not required~~ Risers for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public shall have no opening limitation.
~~5~~3. ~~Solid risers are not required~~ Risers for *spiral stairways* constructed in accordance with Section 1009.12 shall have no opening limitation.
~~6~~4. ~~Solid risers are not required~~ Risers for *alternating tread devices* constructed in accordance with Section 1009.13 shall have no opening limitation.
~~7~~5. ~~Solid risers are not required~~ Risers for ship ladders constructed in accordance with Section 1009.14 shall have no opening limitation.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification preserves the intents of the original proposal but better clarifies the requirements and exceptions while making needed changes to coordinate with the 2010 ADA Standard. After working with the CTC to coordinate with the ADA Standard we saw no substantiation to support only a ½" sphere rule limitation, and further find that it would represent a substantial safety hazard where the removal of snow and debris on stairs is an issue.

The title clearly reflects that the issue is to limit the openings in risers. Both the A117.1 and 2010 ADA standards require that "Risers shall not be open" but does not require solid risers. Limitation of the openings in risers should be the requirement.

The 2½ inches opening in the lower portion of the riser serves to restrict penetration of canes and crutches and allows for removal of snow and ice accumulations that foreshorten the tread depth and stair width causing safety issues for all, especially crutch and cane users who by nature take a wider "stance" with their supportive mobility aid. "White" canes are typically used at an angle of approximately 40 degrees or more from the horizontal to detect the bottom riser of a flight on approach. "White" canes are not used in this manner on stairs. Once the step is detected, the cane is folded or held vertical and the stair is ascended without the use of the cane at an angle that would allow penetration of the riser. Supportive crutches and canes follow the user from behind on ascent and lead in descent to prevent "pole vaulting" making the riser inaccessible to the tip and lower extension of the mobility aid because it is in a near vertical position or at an opposing angle. The standards already provide a sphere rule limitation of ½ inch in treads to provide the needed surface to support the tips of supportive mobility aids. Such limitation is not required in the riser surface but should be allowed to provide for commonly used "expanded" metal or "mesh" products.

The original exceptions one and three have been eliminated to coordinate with the new 2010 ADA standard.

The original exception two has been modified to clarify the limited residential applications where a larger sphere rule in the bottom portion of the riser is acceptable and provide for compliance by allowing needed freedom of design.

The remaining exceptions have been modified to more clearly emphasize that no limits apply to the openings in the risers in each of the cited applications.

Public Comment 2:

Glenn Mathewson, representing North American Deck and Railing Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1009.7.5 (IFC [B]1009.7.5) ~~Solid~~ Risers opening limitations. ~~Risers shall be solid.~~ Openings in risers between the walking surface of the adjacent tread or landing below and the lower edge of the riser above shall not permit the passage of a sphere 4 inches (102 mm) in diameter.

Exceptions

1. ~~Solid risers are not required for stairways that serve as the means of egress from areas exempted from accessibility in accordance with Section 1103.2.~~
2. ~~Solid risers are not required within Type B or non-accessible dwelling or sleeping units provided that the openings between the lower adjacent tread, floor, or landing and the lower edge of the riser that do not permit the passage of a sphere with a diameter of 4 inches (102 mm).~~
3. ~~Means of egress stairways shall be permitted to have openings between the lower adjacent tread, floor, or landing and the lower edge of the riser that do not permit the passage of a sphere with a diameter of 4 inches (102 mm).~~
~~4~~1. ~~Solid risers are not required for occupancies~~ Openings shall not be limited in Group I-3, ~~or in Group~~ F, H and S occupancies ~~other than~~ in areas not accessible to the public. ~~There are no restrictions on the size of the opening in the riser.~~

~~5~~2. ~~Solid risers are not required for~~ Openings shall not be limited on *spiral stairways*, ~~constructed in accordance with Section 1009.12.~~
~~6. Solid risers are not required for~~ *alternating tread devices*, ~~constructed in accordance with Section 1009.13.~~
~~7. Solid risers are not required for~~ and ship ladders constructed in accordance with Section 1009.14

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The proposed section title is more appropriate for the nature of the subject and is consistent language with Section 1013.4 "Opening Limitations" (for guards). In regions with snowfall, solid risers will collect compacted snow in the inside corner created between a solid riser and a tread. Snow is pushed into the corner by the toe or heel of stair users. The compacted snow may form into ice and remain for extended periods, ultimately shortening the length of the tread depth. The use of partially open risers allows the snow to be pushed through the riser, and creates an inherently safer stairway to all users, regardless of the maintenance practices of snow removal.

The committee did not provide any comment in their disapproval regarding the intent of the proposed modifications in E94 and E95, and rather seemed concerned about the language. Therefore, the modifications in this public comment are designed to streamline the text of both proposals, while providing an equivalent intent.

The language of Section 1009.7.5 is unnecessarily complicated and the exceptions essentially become the rule. The inclusion of exception #3 in both E94 and E95 regarding "means of egress stairways" allows partially open risers in every stairway, and thus becomes the general provision.

It is unnecessary to specify the other IRC sections related to spiral stairways and alternating tread devices, as these are IBC-defined terms. By definition, if you are dealing with one of these stairway types, you will always have to comply with the provisions of their specific IBC sections. This is unrelated to their unrestricted riser openings in this section. Ships ladders are not defined, and thus the reference to their respective chapter is appropriate.

E95-12
Final Action: AS AM AMPC____ D

E98-12
1009.10 (IFC [B] 1009.10)

Proposed Change as Submitted

Proponent: David W. Cooper, Stairway Manufacturing and Design Consultants representing Stairway Manufacturers' Association (sma@stairways.org)

Revise as follows:

~~1009.10~~1009.4 (IFC [B] ~~1009.10~~1009.4) ~~Vertical~~ Total rise. A *flight* of *stairs* shall not have a total vertical rise greater than ~~12 feet (3658 mm)~~ 147 inches (3734 mm) between floor levels or landings.

Exceptions:

1. *Aisle stairs* complying with Section 1028.
2. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.
3. *Spiral stairways* used as a *means of egress* from *technical production areas*.

(Renumber subsequent sections)

Reason: This section has been renamed to use the term "Total rise" that is common to the industry however the adjective "vertical" remains within the requirement for clear definition by all. The use of industry terms has been substantiated throughout the code.

The elevation of 147 inches is a multiple of the maximum riser heights of, 7 inches (178 mm) commercial and 7-3/4 inches (197 mm) residential, allowed for IBC stairways. (See Table 1) This minor change of just 3 inches (76 mm) in the total rise of the flight would in many cases eliminate the cost of incorporating a landing and the space required, in many instances reducing costs of construction. As can be seen in the table below this change would require no additional steps in the stair than the current code requires and a change in riser height of just 5/32 inch (4 mm) or less when the minimum number of risers is desired. This represents no discernable difference consequential to the user.

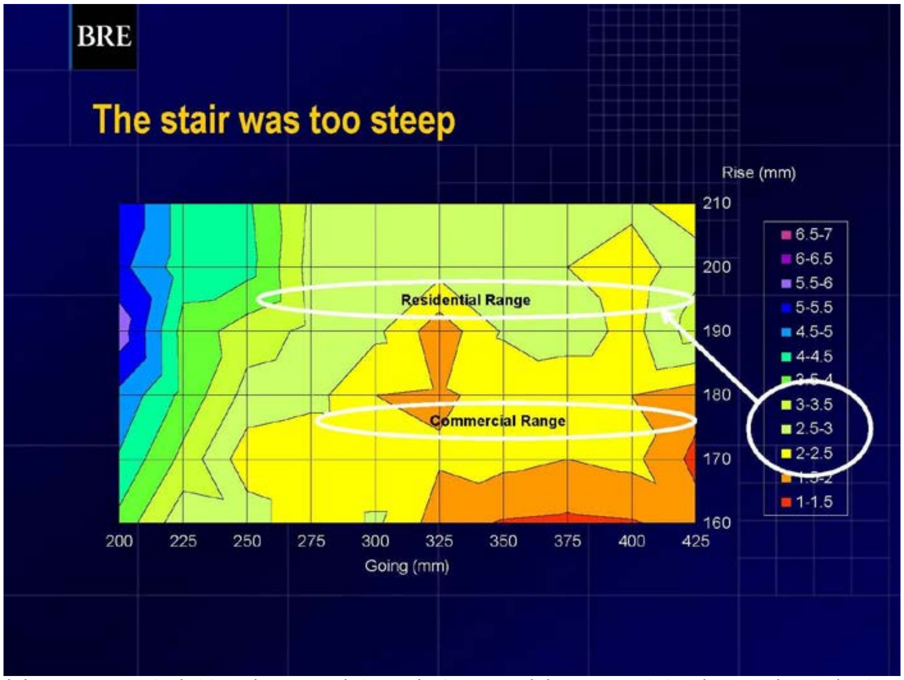


Figure 1 Residential Range = 7.58" (193mm) – 7.74" (197mm), Commercial Range = 6.84" (174mm) – 7" (178mm) see Table 1
Please note that the described circled ranges have been added to figures 1&2 by the proponent for the purpose of explanation.

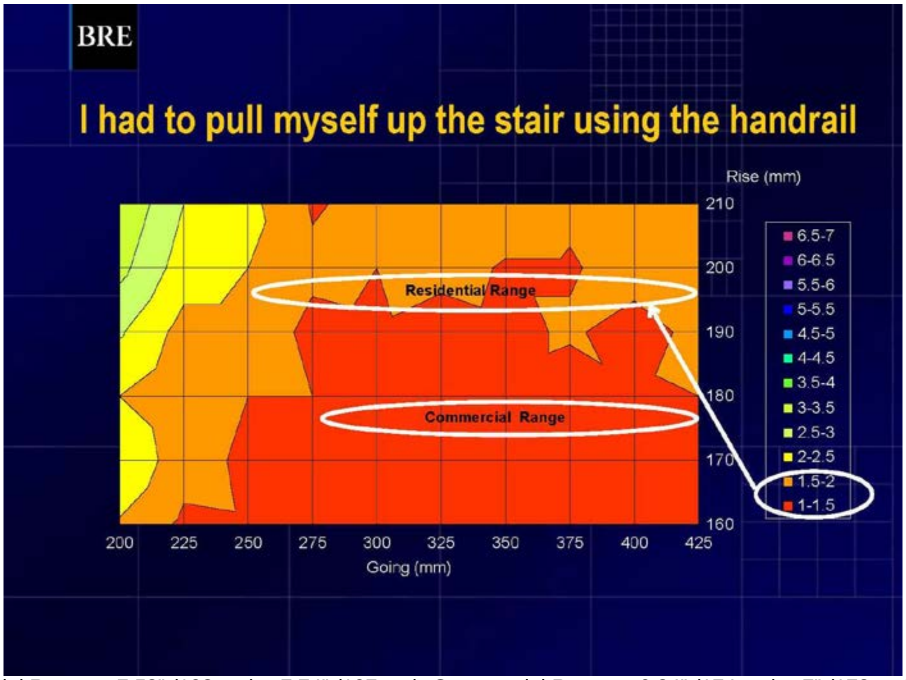


Figure 2 Residential Range = 7.58" (193mm) – 7.74" (197mm), Commercial Range = 6.84" (174mm) – 7" (178mm) see Table 1
Please note that the described circled ranges have been added to figures 1&2 by the proponent for the purpose of explanation.

	Vertical Rise	# Risers	Riser Height Inches	Change in Riser Height inches	Riser Height mm	Change in Riser Height mm
Most Occupancies	144	21	6.86		174	
	147	21	7.00	0.14	178	4
Dwelling Units	144	19	7.58		193	
	147	19	7.74	0.16	197	4

Table 1

Testing in support of this proposal, as shown in the data presentations (Figure 1 and 2) from; "The Influence of Rise and Going Combinations on Stair Safety" by M S Roys, June 2004, 7th World Conference on Injury Prevention and Safety Promotion, Vienna[1], the minor variation in rise does not produce any consequential effect that can be noticed by users when comparing riser heights within the range in question. *Please note that the circled ranges have been added to figure 1 & 2 by the proponent for the purpose of explanation*. Figures one and two can be related to the perceived energy required in ascent as described by the subjective rating of the steepness of the stair and the need to pull oneself up the stair using the handrail. In these figures the user's ratings are on a scale of 1-7 and color coded. The visual display of the data shows little difference in the users ratings over the range in question.

Additional testing data from this same study further illustrates little difference in the user's perception of riser height. When asked to rate descent of the stairway in response to the statement "I felt safe when walking down the stair" the risers heights of 6.69 inches, 7.09 inches, 7.48 inches (170 mm, 180 mm, 190 mm) all were rated the same with a tread depth of 10.83 inches (275 mm). Compared with the same tread depth the riser heights of 7.87 inches, 6.30 inches (200 mm, 160 mm) were within approximately 0.5 points on a scale of 7 points further indicating little difference being perceived by the users. This provides further validation that the change proposed is reasonable and will not affect stair safety.

Relocation of Section – Vertical Rise is the first consideration and arguably most significant factor in determining the design of a stairway. It is of consequence to the number of treads and landings affecting width, headroom, and step geometry. This section is buried in the code and the fact that it is overlooked is of consequence. This proposal moves the section to head the stairway geometry requirements to assimilate the sequence of use in design.

Construction cost reduction – It is common for the total rise to exceed 144 inches (3658 mm) with oversight of the requirement or minor changes in floor systems and finish flooring options. This requires the addition of an intermediate landing. Adding a landing increases the footprint of the stairway and the cost if the space is available.

Understanding and Compliance – This change will not increase the number of risers needed in the stairway or make the stairway less safe, or add any significantly perceived increase in energy to climb the stairway. This needed change provides a direct relationship between the vertical rise requirement and the requirements for riser height that would assure better understanding and compliance.

Bibliography:

1. "The influence of rise and going combinations on stair safety"; M.S. Roys, 7th World Conference on Injury Prevention and Safety Promotion, Vienna, June 2004

Cost Impact: This will reduce the cost of construction.

1009.10-E-Cooper.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee recognized that with the suggested 147" maximum run that the number of risers would not increase within the run; and the new height is an allowance for using 7 inches for all risers within the run. However, the committee felt that the data presented should include if the injury rate would be different with this increased stairway run.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consultants, representing Stairway Manufacturers' Association, requests Approval as Submitted.

Commenter's Reason: The committee's concern for increased injury is unfounded. Injury data is not available. The NEISS does not categorize stair accident data regarding stair dimensions. The conclusive data presented from the study of persons using stairs of various dimensions shows that the users experience does not change within the range of this possible minor increase in riser height using the same number of risers as is currently allowed. The increase is less than 5/32 of an inch. The risers of the stair would not exceed the allowed limitations of maximum riser height of 7" inches public and 7 ¾ residential. This is a reasonable change adding only 3 inches to the allowed total rise of a stairway based on current research and testing done long since the legacy of 144 inches was adopted.

This needed change will be of consequence in reducing the cost of construction by eliminating the additional space for the landing that is currently required and simplification of structural support of flights separated by a landing. It not only shortens the overall span of the stairway, it serves to decrease the distance the user needs to traverse.

E98-12

Final Action: AS AM AMPC____ D

E99-12
1009.11 (IFC [B] 1009.11)

<u>Proposed Change as Submitted</u>

Proponent: David W. Cooper, Stairway Manufacturing and Design Consultants representing Stairway Manufacturers' Association (sma@stairways.org)

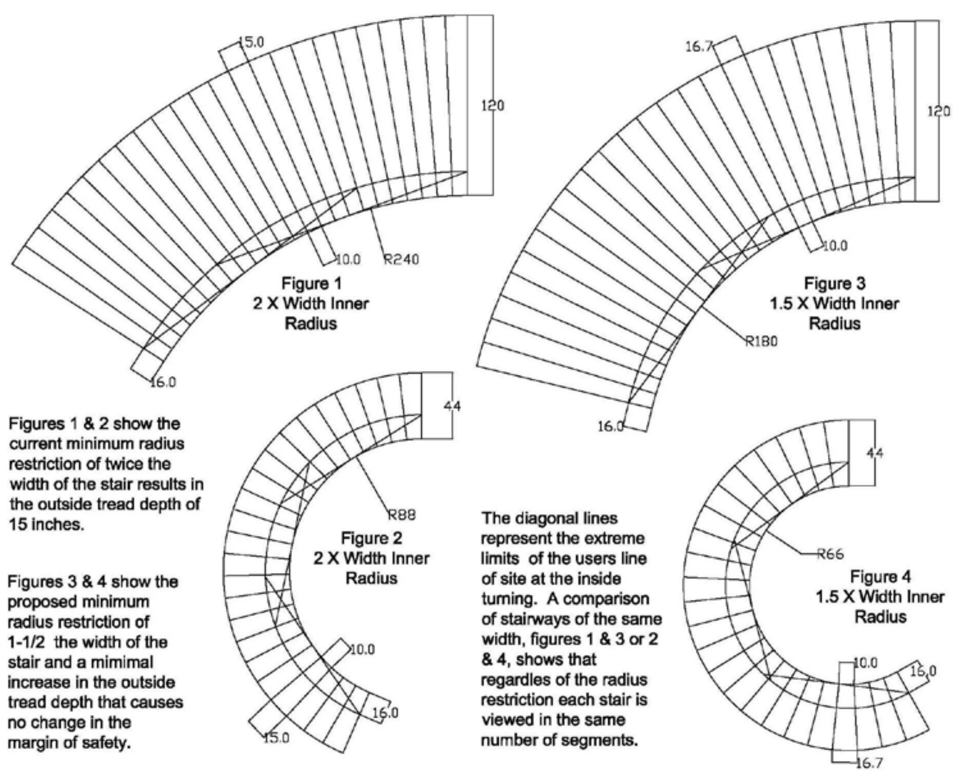
Revise as follows:

1009.11 (IFC [B] 1009.11) Curved stairways. Curved *stairways* with *winder* treads shall have treads and risers in accordance with Section 1009.7 and the smallest radius shall not be less than ~~twice~~ <u>1.5 times</u> the required width of the *stairway*.

Exception: The radius restriction shall not apply to curved *stairways* for occupancies in Group R-3 and within individual *dwelling units* in occupancies in Group R-2.

Reason: The current radius restriction of twice the radius has little basis other than a rule of thumb handed down from the legacy codes and causes unnecessary restriction of curved stairway design without enhancing the safety of the user. Reducing the smallest radius restriction to 1.5 times the width is a more reasonable standard that will allow greater freedom of design. See **Figures 1 - 4** illustrating that only a slight increase in tread depth of less than 1¾ inches is realized at the outside radius and that the additional turning of the stairway does not substantially affect the view of other users that would be proximal on the stairway.

The examples below illustrate that a reduction in the minimum radius restriction will not affect the safe use of curved stairways due to tread depth or the turning of the stairway.



The dimension used for the line of sight indicated by the diagonal lines drawn across the stairs is sixteen inches accommodating the required handrail and the proximal position of the stairway passenger. The position is based on the most common lateral displacement of 350 mm (13.8 inches)[1] from the center of the handrail to the center of the body for the handrail slope of 33º that is common to IBC compliant stairways. Added to this is half the allowed handrail width of 2¼ inches and the minimum clearance of 1½ inches totaling 16.4 inches.

The inconsequence of the minor increase in tread depth width is substantiated by testing performed by Mike Roys[2] as shown in **Figure 5**. Both the 15 inch (381 mm) and 16.7 inch (424 mm) tread depths lie in the same range of preference as indicated within the red circle. *The circle was added by the proponent for the purpose of explanation*.

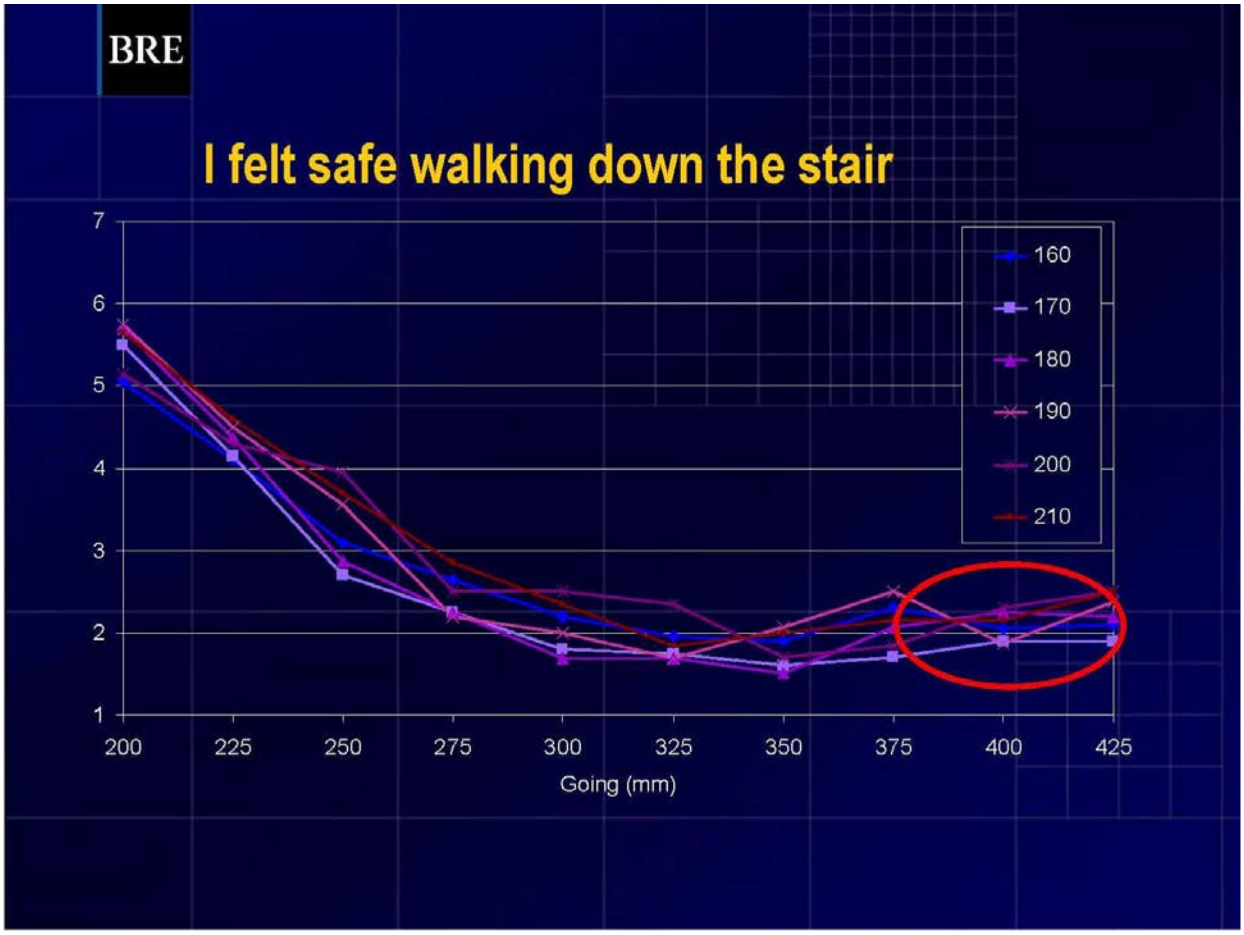


Figure 5

Bibliography

1. "Biomechanical Assessment of Handrail Parameters With Special Consideration to the Needs of Elderly Users"; B.E. Maki, et al, West Park Research, May 5, 1983
2. "The influence of rise and going combinations on stair safety"; M.S. Roys, 7th World Conference on Injury Prevention and Safety Promotion, Vienna, June 2004

Cost Impact: This will not affect the cost of construction.

1009.11-E-Cooper.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee wanted to know if the increased curvature would increase the egress time or not.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David W. Cooper, Stair Manufacturing and Design Consultants, representing Stairway Manufacturers' Association, requests Approval as Submitted.

Commenter's Reason: The committee failed to raise the question of increased egress time with the proponent during testimony yet cited it as their reason to disapprove. The supporting information provided shows that there is no change in the users experience traversing the slightly larger step realized at the outer most portion of the stair. The increase of only 1.7 inches would not require the user to take any additional steps in traverse of the stairway and would therefore, of its own, not increase the time of egress.

Also related to egress speed is the range of visual perception both of the stairway and other users ahead on the stairway. The line of sight is clearly shown in figures 1 through 4 as not being changed in terms of the stairway segments in view at the tightest side of the turn. Finally the proposed change in the degree of turning required at each step is negligible if perceivable at all by the user.

Recent WTC egress research shows a clear advantage to eliminating landing turns to speed stairway egress. Curved stairways offer a design alternative that allows for a continuous flow without sharp turns, and increased visual perception of the path ahead compared to multiple flights separated by landing turns. Curved stairways do not require the needed change of stride required to negotiate landings that causes significant backups in crowded egress situations. The legacy code is over restrictive. The proposed decrease in the minimum radius is reasonable, based on current research and testing and will not affect safe egress but rather offer greater flexibility in design.

E99-12

Final Action: AS AM AMPC____ D

E103-12
1011.6.3 (IFC [B] 1011.6.3)

<u>Proposed Change as Submitted</u>

Proponent: John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care

Revise as follows:

1011.6.3 (IFC [B] 1011.6.3) Power source. *Exit* signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Chapter 27.

Exception<u>s</u>:

<u>1.</u> *Approved exit* sign illumination means that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.

<u>2. Group I-2 hospital exit sign illumination shall not be provided by unit equipment battery only.</u>

Reason: The IBC and IFC both have the same requirements. NFPA is less restrictive for UL listings of equipment. NFPA 70 is not referenced by IBC/IFC as does NFPA 99. IBC/IFC permit batteries.

This proposal is submitted by the ICC Ad Hoc Committee for Healthcare (AHC). The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 5 open meetings and over 80 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx

1017.3-E-WILLIAMS-ADHOC.doc

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: The requirement matches federal requirements for hospitals already in place and improves the reliability of the exit signage. The committee suggested that perhaps better wording would to require what the signage needed to be connected to rather than an exception for batteries. This might limit the mis-interpretation that remote batteries might be an option.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1011.6.3 (IFC [B] 1011.6.3) Power source. *Exit* signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Chapter 27.

Exceptions:

1. *Approved exit* sign illumination means that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.
2. Group I-2 ~~hospital~~ Condition 2 exit sign illumination shall not be provided by unit equipment battery only.

Commenter's Reason: Code change E103 is a technical change which proposes to revise the exception to note that exit sign illumination for hospitals is not to be provided by unit equipment batteries only. This was approved by the committee in Dallas. The purpose of this public comment is limited to the editorial coordination of terminology with the approval of Code change G257 (see below). In this case, hospitals are Group I-2 Condition 2. Since G257 deals only with terminology, this public comment is being submitted to E102 in order to focus the attention on the coordination of terminology issue.

At the Code Development Hearing, the IBC - General committee approved as modified G257-12 which created two occupancy conditions for Group I-2, similar to what is currently in the IBC for Group I-3. The end result is that where warranted based on the type of occupancy, the code would designate Group I-2 hospitals as Group I-2 Condition 2. As indicated in the reason statement for G257, the benefit of the condition concept, when compared to creating new use groups, (i.e. Group I-5 or I-6) is that a majority of code requirements would still apply to all Group I-2 occupancies.

Following the successful action on G257, the ICC Ad Hoc Committee for Healthcare (AHC) did a word search of the IBC along with a review of code changes submitted in the 2012 Cycle which are unique to hospitals and nursing homes to determine whether or not the condition designation was necessary in order to distinguish between the two typical Group I-2 occupancies – hospitals (Condition 2) and nursing homes (Condition 1). As noted above, the majority of the code requirements do not differentiate based on these two types of Group I-2 and as such the number of instances where the Group I-2 condition designation is necessary is kept to a minimum. Code change E103 is one such application where the Group I-2 Condition 2 designation is warranted and therefore this public comment is being submitted by the AHC.

The AHC was established by the ICC Board of Directors to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. The AHC is composed of building code officials, fire code officials, hospital facility engineers, and state healthcare enforcement representatives. The goals of the committee are to ensure that the ICC family of codes appropriately addresses the fire and life safety concerns of a highly specialized and rapidly evolving healthcare delivery system. This process is part of a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. Since its inception in April, 2011, the AHC has held 7 open meetings and over 100 workgroup calls which included members of the AHC as well as any interested party to discuss and debate the proposed changes. All meeting materials and reports are posted on the AHC website at: http://www.iccsafe.org/cs/AHC/Pages/default.aspx.

Staff analysis: Code change G257 was Approved as Modified at the Code Development Hearings and a public comment has not been submitted. Accordingly it has been placed on the consent agenda.

E103-12

Final Action: AS AM AMPC____ D

E104-12
1012.8 (IFC [B] 1012.8)

Proposed Change as Submitted

Proponent: Gene Boecker, AIA, Code Consultants, Inc, representing self (geneb@codeconsultants.com)

Revise as follows:

1012.8 (IFC [B] 1012.8) Projections. On ramps, the clear width between handrails shall be 36 inches (914 mm) minimum. Projections into the required width of stairways and ramps at each side shall not exceed 41/2 inches (114 mm) at or below the handrail height. Projections into the required width shall not be limited above the minimum headroom height required in Section 1009.5. Projections due to intermediate handrails shall not constitute a reduction in the egress width provided that each intermediate handrail is not wider than 2-1/4 inches (57 mm).

Reason: The intent, when this provision was originally added, was to allow intermediate handrails to not count against the required width since it was required on wide stairs and provided added safety on ramps. Because the prior code text was unclear what effect a handrail had on the allowed projections into the stair or ramp and what that did for the overall capacity of the egress element some change was necessary. When a person moves on a stair or ramp, using the handrail, the arm is over the railing. The person on the other side of the railing does likewise. This type of condition does not effectively reduce the capacity of the egress element and increases safety by virtue of the handrail itself.

However, double railings widen the space between columns of people on ramps and stairs and can reduce capacity. A set of handrails separated by 10 inches may be helpful in providing each column with a handrail but it should be taken into consideration when calculating the capacity of the ramp or stair. The proposal uses a 2-1/4 inch dimension to allow for non-circular handrails which might meet the requirements of Section 1012.3.1 for Type I handrails. Thus, if a single railing (or multiple single railings) is placed within a stair or ramp, each railing, if less than 2-1/4 inches in width, would not count to decrease the capacity of the egress element or required width.

However, if a set of double railings would be provided within the stair or ramp, the minimum overall width of a double railing would be 4 inches (two 1-1/4 inch railings, plus 1-1/2 inch clear between railings per Section 1012.3.1 and 1012.7). This would need to be deducted from the total width of the stair or ramp.

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

1012.8-E-Boecker.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed language could be interpreted to not allow a double handrail no matter how wide the stairway. This is needed for stairways with heavy traffic moving in two directions, such as schools during passing periods. The proponent should come back with a proposal that addresses limits for the typical double handrail.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

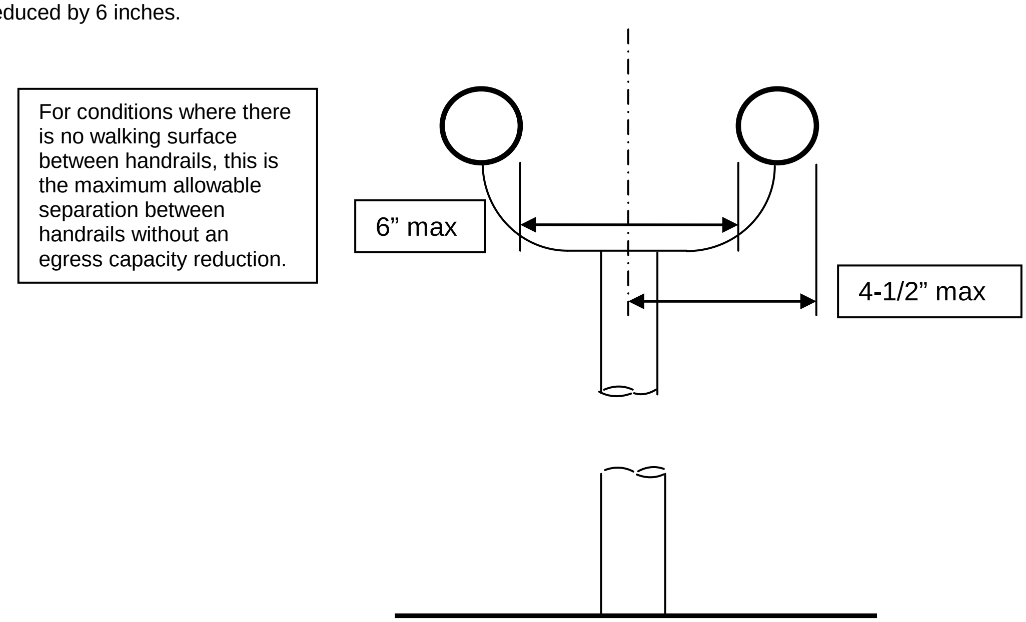
Gene Boecker, AIA, Code Consultants, Inc (CCI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1012.8 (IFC [B] 1012.8) Projections. On ramps, the clear width between handrails shall be 36 inches (914 mm) minimum. Projections into the required width of stairways and ramps at each side shall not exceed 41/2 inches (114 mm) at or below the handrail height. Projections into the required width shall not be limited above the minimum headroom height required in Section 1009.5. Projections due to intermediate handrails shall not constitute a reduction in the egress width ~~provided that each intermediate handrail is not wider than 2-1/4 inches (57 mm).~~ Where a pair of intermediate handrails are provided within the stairway width without a walking surface between the pair of intermediate handrails and the distance between the pair of intermediate handrails is greater than 6 inches (152 mm), the available egress width shall be reduced by the distance between the closest edges of each such intermediate pair of handrails that is greater than six inches (152 mm).

Commenter's Reason: The committee didn't think that the language was adequate for what to do when a pair of handrails is provided. The proposal addresses that by offering a method to calculate the egress width. The illustration shows in simple terms the dimension that must be deducted from the overall width of the stairway. Because handrails are allowed to protrude on the sides without reducing the egress width and a single intermediate handrail does not reduce the egress width, this solution is the simplest method for evaluating conditions where two handrails are provided without a walking surface between them.

If the handrails touch one another then there is no reduction. However, because at least 1-1/2 inches must be provided for clearance around the handrail according to Section 1012.7, the handrails must be at least 1-1/2 inches apart. In this configuration, no reduction is applied. If the handrails are 6 inches apart, and a thin barrier was provided at mid-point as a wall, the configuration would be like two stairways, side-by-side. On each side of the thin barrier, the handrail would be projecting 4-1/2 inches (half of six inches plus the 1-1/2 inch diameter railing) into the stair, exactly what is allowed by Section 1012.8. Therefore the maximum between handrails is 6 inches. If the pair of railings is located 12 inches apart, the stairway width available for egress would be reduced by 6 inches.



This methodology addresses the committee's concerns and recognizes that fact the intermediate handrails are capable of reducing the available width in stairways if designed in such a manner that it is not possible to walk on both sides of the handrails. ICC staff have indicated that there have been attempted designs with 12 -18 inches between handrails, based on the original language. This clearly infringes on the ability of the stair to convey the proper number of people to egress since it reduces the effective width. The proposal addresses that issue and also the concerns of the committee and other testifying, that the provisions recognize allowed protrusions.

E104-12

Final Action: AS AM AMPC____ D

E106-12
1013.3 (IFC [B] 1013.3)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1013.3 (IFC [B] 1013.3) Height. Required guards shall not be less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces,
2. On the line connecting the leading edges of the tread nosings, and
3. On ramps from the ramp surface at the guard.
4. From a seatboard where a guard would be required at the walking surface and the seatboard is part of the guard or adjacent to the guard.

Exceptions:

1. For one- and two- family dwellings and townhouses in Group R-2 and R-3, ~~For occupancies in Group R-3 not more than three stories above grade in height and~~ required guards within individual dwelling units and in areas serving the dwelling unit ~~in occupancies in Group R-2 not more than three stories above grade in height with separate means of egress, required guards~~ shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces or ~~fixed seating~~ seatboard.
2. For Group R-2 and R-3 units, required guards within the dwelling unit shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface or seatboard.
3~~2.~~ For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
4~~3~~. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
5~~4~~. The guard height in assembly seating areas shall comply with Section 1028.14.
6.~~5.~~ Along alternating tread devices and ship ladders, guards whose top rail also serves as a handrail, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread nosing.

Reason: The purpose of this change is to require higher guards when a fixed bench is part of or immediately adjacent to a guard. The concern is child safety for when children stand on a seat and possibly tip over the guard. The reference back to the floor surface in new Item 4 is to clarify where the measurement for the drop-off for where a guard is required is different from the measurement for the guard height.

The changes to Exception 1 is to coordinate better with IRC. The guard height is permitted to be 36" both inside and outside the individual dwelling unit. Where a balcony or deck had a bench constructed as part of the guard, the guard height above the bench would be 36".

New exception 2 is to allow a 36" high guard along an interior balcony or mezzanine within a Group R-2 multi-story apartment. This would allow guards and handrails along stairways (current exceptions 2 and 3) to not have a large change in elevation at the top landing to meet up with the guard. For these buildings, if there is an exterior balcony for a unit, the guard height would be 42" minimum. That would include measurement from a bench if it was constructed as part of the guard.

The intent of this proposal is to coordinate with the proposal for perimeter guards along assembly seating being proposed by the ICC 300 Bleacher Safety Committee. It is not the intent for these provisions to apply to fixed assembly seating arrangements.

There types of facilities have issues of line-of-sight, requirements for handrails and guards along aisle that are stepped, ramped or level, crowd issues, etc. that are more appropriately handled in Section 1028.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None

1013.3-E-Baldassarra-CTC.docx

Public Hearing Results

Committee Action: Disapproved

Committee Reason: 'Seatboard' is not defined in relation to this specific area. Seatboards are understood in bleachers, but requirements for guards in assembly seating areas are addressed in Section 1028 and ICC 300. If there is an understanding of what a seatboard might be, there is no indications of how close a seatboard has to be to be considered adjacent, and there no requirements for the seat to be fixed or not. A suggestion was requiring where the seatboard was within 36 inches horizontal of the falling hazard, similar to the guard requirements. Measuring the height for the guard from a different elevation (i.e., seatboard) other than the floor where the drop off is determined is confusing.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1013.3 (IFC [B] 1013.3) Height. Required *guards* at open-sided walking surfaces, including stairways, ramps, porches, balconies or landings, shall not be less than 42 inches (1067 mm) high measured vertically above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads ~~as follows:~~

~~1. From the adjacent walking surfaces,~~
~~2. On the line connecting the leading edges of the tread nosings, and~~
~~3. On ramps from the ramp surface at the guard.~~
~~4. From a seatboard where a guard would be required at the walking surface and the seatboard is part of the guard or adjacent to the guard.~~

Exceptions:

1. For one- and two- family dwellings and townhouses in Group R-2 and R-3, required guards within individual dwelling units and in areas serving the dwelling unit shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces or ~~seatboard~~ fixed seating.
2. For Group R-2 and R-3 units, required guards within the dwelling unit shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface or ~~seatboard.~~ fixed seatiing
3. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
4. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
5. The guard height in assembly seating areas shall comply with Section 1028.14.
6. Along alternating tread devices and ship ladders, guards whose top rail also serves as a handrail, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread nosing.

Commenter's Reason: The reason for disapproval of this change was due to the term "seatboard' being undefined. This modification mirrors the approved text from the IRC (Section R312.1.2) in an effort to both clarify the terminology and to achieve consistency with the IRC. The IRC does not use the term "seatboard" but rather "fixed seating". The public comment retains the 42" guard height (IRC is 36") and the IBC exceptions are retained, with the change from "seatboard" to "fixed seating", as the IBC scope is different than that of the IRC. In addition, there seemed to be some confusion at the Code Development Hearings regarding this being applied to assembly seating. Guards for assembly seating are clearly regulated by Exception 5 which requires compliance with Section 1028.14. Similarly, concerns were noted at the hearing with the term "adjacent" as it may be viewed as interpretive. A word search of the term "adjacent" in the IBC uncovered that it is used 219 times in the IBC.

The picture below clearly illustrates the hazard to children falling over the guard where the adjacent fixed seating becomes a walking surface for a child.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Climbable Guards". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/ClimbableGuards.aspx Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E106-12

Final Action: AS AM AMPC____ D

E112-12
1014.3.1 (New) [IFC [B] 1014.3.1 (New)]

Proposed Change as Submitted

Proponent: Brad Emerick, P.E., City and County of Denver Fire Prevention representing the Fire Marshals Association of Colorado (FMAC) (brad.emerick@denvergov.org)

Add new text as follows:

1014.3.1 (IBC [F] 1014.3.1) Paths of egress travel. From the terminus of the *common path of egress travel*, two separate and distinct paths shall be provided that diverge at a minimum rate of 7 feet for every 10 feet of travel along the paths. Divergence shall continue until one of the following is attained:

1. The paths are separated by a distance equal to the separation required by Section 1015.2.1, or
2. An exit access doorway or exit is reached by one of the paths.

   Exception: Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the divergence rate shall not be less than 5 feet for every 10 feet traveled along the paths until Item 1 or 2 above is attained.

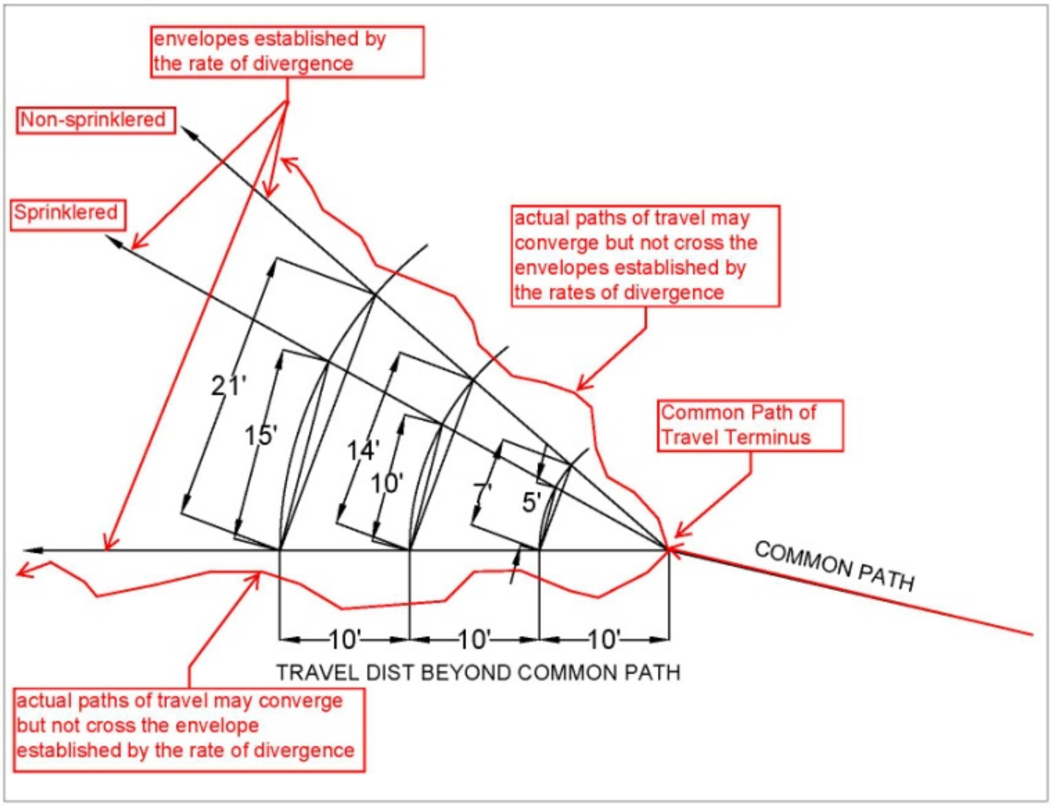
Reason: The only place in the code requiring “two separate and distinct paths” is in a definition. Though it’s not always possible, in general, requirements should be in the body of the code.

In addition, the letter of the code allows the “two separate and distinct paths” required in the definition of Common Path of Egress Travel to parallel each other (even converge as long as they do not merge) with no minimum separation distance. The only criteria are that the paths be “separate and distinct” which are not defined. Because no minimum separation is established, the primary intent of two paths (i.e., that a single incident cannot block both) is repeatedly contested. Previous proposals to codify the concept that these paths be divergent were voted down in part because a fixed separation could not be applied at the point where the Common Path of Egress Travel terminates (terminus).

The proposed section attempts to address these by establishing a minimum divergence rate in the body of the code based on distance traversed from the terminus of the common path. An exception is proposed that is consistent with the reduced exit or exit access separation permitted for a sprinklered building (i.e., sprinklered ~ 2/3 non-sprinklered).

Though the divergence rates of 45 degrees (non-sprinklered) and 30 degrees (sprinklered) were in the original draft of this proposal, the rates of 7 feet per 10 feet of travel (approximately a 42 degree angle) and 5 feet per 10 feet of travel (approximately a 29 degree angle) are expressed in a way that is easier to verify on drawings and in the field.

The figure below depicts a common path of travel coming in from the lower right, and the two rates of divergence (sprinklered and non-sprinklered) from its terminus. The straight lines with arrows represent the envelopes established by the proposed divergence rates. To keep the number of lines on the drawing to a minimum, both rates are measured from a common horizontal line. The squiggly red lines outside the non-sprinklered divergence rate represent actual travel paths and attempt to illustrate that in a non-sprinklered building, these paths may converge as long as they do not cross the envelope established by the minimum divergence rate of 7 feet for every 10 feet of travel. The sprinklered divergence rate is depicted for comparison.



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

1014.3.1(new)-E-Emerick.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This is an overly complex solution to a problem that may not exist. In addition, it may conflict with other provisions in the code such as the stairway separation of 30 feet permitted in high rise buildings and allowances for protected paths of travel.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Brad Emerick, PE, Denver Fire Department Fire Prevention Division, representing Fire Marshal's Association of Colorado (FMAC), requests Approval as Submitted.

Commenter's Reason: The Means of Egress (MOE) is a pedestrian path through a building to a safe location outside the building. The code regulates the width, change in elevation, obstacles, length, protection level, etc., of this path. Initially, only a single path is required from any point in a building (*the common path of egress travel* or CPT). If at the CPT terminus, occupants traveling on the CPT have not reached an exit or exit discharge, then they are to be provided "separate and distinct access to two exits or exit access doorways" (previously "two separate and distinct paths…to two exits"). This segment of the MOE path – between the end of the CPT and the exit access doorway or exit – is the only portion not regulated clearly by the code.

The intent is to have the two paths diverge at some minimum rate in order to preclude a single event from blocking both. Mandating the paths separate at 180° is not reasonable – but neither is permitting the paths to parallel each other with only a body-width separation (which is permitted by the letter of the code). Every divergence rate in between is open to the interpretation of "separate and distinct" which fosters inconsistency.

Several designs have been proposed in our jurisdiction where the two paths parallel each other 6 to 10 feet apart and unfortunately one was permitted on appeal. On that particular application two exits were separated by 1/3 the diagonal dimension of the area served but were both located along a 10-foot wide hallway extending away from the dining area. The CPT ended prior to all occupants reaching the first exit but occupants had to pass by the first exit to reach the second. Though the paths were parallel, because they were separated by about 10 feet, they were deemed separate and distinct (citing the letter of the code). In reality this configuration is just an extension the CPT and violates the intent of the code.

This proposal would establish minimum, reasonable divergence rates for the two paths required from the end of the CPT. Two rates are proposed that are consistent with the exit or exit access separation permitted for sprinklered and non-sprinklered buildings. Under this proposal, the paths are only required to diverge until they are separated by a distance equal to the separation required for exit access doorways or exits, or until one of the paths reaches an exit access doorway or exit – whichever occurs first.

Though the divergence rates of 45 degrees (non-sprinklered) and 30 degrees (sprinklered) were originally contemplated for this proposal, the rates of 7 feet per 10 feet of travel (an approximately 42 degree angle) and 5 feet per 10 feet of travel (an approximately 29 degree angle) are expressed in a way that is easier to verify on drawings and in the field.

E112-12

Final Action: AS AM AMPC____ D

E121-12
Table 1018.1 (IFC [B] Table 1018.1)

Proposed Change as Submitted

Proponent: Thomas S. Zaremba, Roetzel & Andress, Glazing Industry Code Committee ("GICC") and Primary Fire Rated Glazing Manufacturers (tzaremba@ralaw.com)

Revise as follows:

TABLE 1018.1 (IFC [B] TABLE 1018.1)
CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	**OCCUPANT LOAD SERVED BY CORRIDOR**	**REQUIRED FIRE-RESISTANCE RATING (hours)[c]**	
		Without sprinkler system	With sprinkler system
H-1, H-2, H-3	All	Not permitted	1
H-4, H-5	Greater than 30	Not permitted	1
A, B, ~~E,~~ F, M, S, U	Greater than 30	1	0
<u>E</u>	<u>Greater than 30</u>	<u>1</u>	<u>1</u>
R	Greater than 10	Not permitted	0.5
I-2[a]	All	Not permitted	0
I-1, I-3	All	Not permitted	1[b]

Reason: According to a June 2011 NFPA Research Report: "U.S. fire departments responded to an estimated average of ***6,260 structure fires*** in educational properties in 2005-2009, annually. These fires caused annual averages of ***85 civilian fire injuries*** and ***$112 million in direct property damage***. The majority of fires and losses in educational properties were in nursery through high schools." Source: Evarts, *Structure Fires in Educational Properties,* NFPA Fire Analysis and Research Division (June 2011); emphasis added.

Day Care Centers averaged 590 structure fires; 8 injuries; and $4.5 Million in direct property damage annually while K-12 educational facilities averaged an annual 4510 structure fires; 68 injuries; and $95 Million in direct property damage. Source: Evarts, *Structure Fires in Educational Properties,* NFPA Fire Analysis and Research Division (June 2011).

Most educational facilities built since the late 1970s are required to have automatic sprinkler and other fire/smoke alarm systems which, according to FEMA, likely explains why no deaths from school structure fires were reported in 2002. As displayed in the 2002 FEMA Table below, fires in educational facilities were generally less damaging than non-residential fires; ***however***, it is important to note that ***fires in schools were generally more injurious than other non-residential structure fires***.

LOSS MEASURES FOR SCHOOL STRUCTURE FIRES
(2002)

Loss Measure	All Non-Residential Structure Fires	School Structure Fires
$ Loss/Fire	$21,505	$15,956
Injuries/1,000 Fires	***14.4***	***22.0***
Fatalities/1,000 Fires	1.1	0.0

Source: FEMA, *Topical Fire Research Series, School Fires,* Vol. 4, Issue 6 (December 2004); emphasis added.

Clearly, the documented number of fires, injuries and the extensive damage done annually to educational occupancies, warrants increased fire protection for students, teachers, property and fire service members entering the buildings after fires are reported, either to rescue students that may be missing from the evacuation count, or to just put out the fires.

In the past, the principal impediment to adopting added fire protection features has been the increased cost of construction. However, SSOE Group, a world-wide architectural firm with extensive experience in the design of educational occupancies, recently completed a study of the costs associated with adding fire rated exit corridors to schools with automatic sprinkler systems. SSOE took the actual costs of three different schools that it had actually designed recently with automatic sprinkler systems and determined the additional costs necessary to fire rate their exit corridors in accordance with the 2009 edition of the IBC.

SSOE used three different schools as the basis for its report. The first is a 69,200 sq.ft. elementary school. The second is a 175,502 sq.ft. middle school. The third is a 401,797 sq.ft. high school.

SSOE's summary comparing the costs to install automatic sprinkler systems to the costs of fire rating the exit corridors in these schools is set out below. From SSOE's summary, it is clear that adding fire rated corridors actually costs **less** than it does to install automatic sprinkler systems.

COST SUMMARY	Elementary school	Middle School	High School
Total Building Cost less equipment	$10,427,000.00	$18,929,000.00	$42,851,000.00
Automatic sprinkler systems			
Initial cost	$188,916.00	$367,688.01	$643,280.31
Maintenance over life cycle	$5,476.78	$5,476.78	$5,476.78
Fire protection totals	$194,392.78	$373,164.79	$648,757.08
Fire rated exit corridors			
Initial commissioning cost	$1,580.00	$4,385.00	$7,116.00
FRJS	$38,710.00	$107,432.50	$174,342.00
Costs for door upgrades	$15,550.00	$17,450.00	$55,350.00
Pv of Annual inspection costs	$10,588.44	$25,193.18	$33,590.90
Cost difference for fire rated glazing	$83,910.00	$115,740.00	$121,640.00
Duct penetrations	$16,924.80	$24,403.20	$41,229.60
Other penetrations	$5,266.67	$14,616.67	$23,720.00
PV of Additional penetrations over life cycle	$1,825.59	$4,563.98	$4,563.98
Fire rated exit corridor totals	$174,355.50	$313,784.53	$461,552.48
Fire rated corridor costs as a percentage of Automatic Sprinkler System	89.69%	84.09%	71.14%
Fire rated corridor costs as a percentage of Total Building Costs	**1.67%**	**1.66%**	**1.08%**

Adding fire rated exit corridors to E-occupancies will result in inherently safer school buildings at less cost than including automatic sprinkler systems. Moreover, according to the SSOE report, the added cost of adding fire rated corridors represents less than 2% of the total cost to build these schools or only:

1. 1.6% of the total $10.427 million cost to build the 69,200 sq. ft. elementary school;
2. 1.6% of the total $18.929 million cost to build the 172, 502 sq. ft. middle school; and
3. 1.08% of the total $42.851 million cost to build the 401,797 sq. ft. high school.

Finally, the base schools used in the SSOE were built with an expected life of fifty (50) years. When the costs of adding fire rated corridors are amortized over the 50 year anticipated life of these school buildings, the added cost is absolutely nominal.

As to those schools affected by the proposal, it would add compartmentalization and provide redundant life safety and fire protection features to E-occupancies to the same level of fire protection that is currently required in a number of I-occupancies (including assisted living facilities, congregate care facilities, halfway houses and social rehabilitation facilities). If adopted, this proposal would affect only E-occupancies (including day care centers) that are greater than 12,000 sq. ft. in size.

E-occupancies are a special case. They involve children. Fire and life safety protections should be redundant in E-occupancies, especially given the large number of fires experienced annually; the large number of injuries related to fires that are experienced annually; the large dollar losses experienced annually from fires in school properties; and the small overall cost to add fire rated corridors.

As the number of students served by our school systems increases with increasingly smaller adult-to-student ratios, the small added cost of construction should ***not*** be any impediment to the increased level of protection that this proposal would provide our children, their teachers and the fire service.

We urge the Committee to support this proposal.

Bibliography:
1. Evarts, *Structure Fires in Educational Properties,* NFPA Fire Analysis and Research Division (June 2011).
2. FEMA, *Topical Fire Research Series, School Fires,* Vol. 4, Issue 6 (December 2004).
3. SSOE, *Fire Rated Corridor Construction in Schools* (December 2011).

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

T1018.1-E-Zaremba.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Correlation between a 1 hour rated corridor and a reduction in fire loss has not been provided. Fire data provided showed that current school design has one of the best safety records for life and property. Another concern raised was the situation of lock downs during an attach event within the school. Lock downs can be for dangerous situations outside the school. No data has been provided to indicate how a rated corridors will protect against an internal attack. To build for a combined sprinkler failure, lock down situation and fire attack scenario is too restrictive for everyday design. The increase in cost would not just be walls, but would also include fire rated doors, fire dampers, etc., therefore adding this requirement would be a significant increase in cost without sufficient justification. In addition, school administration now often requires teachers to keep door open for visual communication with the classrooms. Teachers and students use classroom doors continually during passing periods. Closers, as required on fire doors, would be a conflict with both situations.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment :

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee and Primary Fire Rated Glazing Manufacturers; and Robert J Davidson, Davidson Code Concepts, LLC, representing self; requests Approval as Submitted.

Commenter's Reason (Zaremba): The question posed by this code change is whether sprinklered E-occupancies should also have rated exit corridors?

The Committee disapproved it. Proponents are asking the membership to revisit this question and adopt E121-12 "as submitted."

E121-12 presents documented evidence that:

- Educational properties sustained an estimated annual average of ***6,260 structure fires*** between 2005 and 2009.
- During that time period, these school fires caused annual averages of ***85 injuries*** and ***$112 million*** in direct ***property damage***.
- Day care facilities averaged ***590 structure fires***, ***8 injuries*** and ***$4.5 million*** in direct ***property damage*** annually.
- K-12 educational facilities sustained an annual average of ***4,510 structure fires***, ***68 injuries*** and ***$95 million*** in direct ***property damage***.
- In 2002, on average, school structural fires resulted in ***22 injuries per 1,000 fires***, significantly higher than the 14.4 injuries sustained per 1,000 fires in non-residential structure fires.

In disapproving the proposal, the Committee misinterpreted this data. In its reason statement, the Committee concluded that this "[f]ire data … showed that current school design has one of the best safety records for life and property." In fact, however, the data shows that:

- there are a very large number of school structural fires annually,
- school structural fires have a significantly higher number of injuries per 1,000 fires than other non-residential occupancies, and
- school fires cause millions of dollars in property damage every year.

The Committee also said that adopting E121-12 would represent "a significant increase in cost without sufficient justification." Proponents will address increased cost and justification for E121-12 separately below.

Respecting cost, Proponents of E121-12 submitted detailed information from a Report prepared by SSOE (an architectural firm operating world wide) to provide the Committee, and now the Membership, with accurate information as to the additional costs necessary to add fire rated corridors to three different types and sizes of sprinklered school buildings.

First, the cost data for the three schools presented with E121-12 are ***actual*** costs. SSOE was able to use actual costs because it actually designed the three sprinklered schools it used in its Report. The first school was a 69,200 sq. ft. elementary. The second was a 175,502 sq. ft. middle school and the third was a 401,797 sq. ft. high school. Second, it should be noted that, in its reason statement, the Committee said that "[t]he increase in cost would not just be walls, but would also include fire rated doors, fire dampers, etc.," suggesting that Proponents had presented data that only included the added costs of fire rating the corridor walls. The Committee misunderstood the data that was presented because it clearly included ***all*** costs necessary to completely fire rate the exit corridors of all three schools, including their walls, doors, windows, fire dampers, etc.

Significantly, The SSOE report concluded that the added cost to fire rate the exit corridors of these schools was actually ***less*** than the costs actually incurred to install automatic sprinkler systems. In that regard, adding rated corridors would cost approximately 8% less than it cost to install sprinklers in the smallest of the three schools (the elementary school); 15% less than it cost to install sprinklers in the middle school; and 29% less than it cost to install sprinklers in the high school.

More importantly, the SSOE Report concluded that adding fire rated exit corridors would only add:

- 1.6% (or $174,355.50) to the $10.427 million actual cost to build the 69,200 sq. ft. elementary school,
- 1.6% (or $313,784.53) to the $18.929 million actual cost to build the 172,502 sq. ft. middle school, and
- 1.08% (or $461,552.48) to the $42.851 million actual cost to build the 401,797 sq. ft. high school.

SSOE designed each of these school buildings to have a useful life of fifty or more years. When the relatively small added cost to fire rate the exit corridors is amortized over the useful lives of these buildings, that additional $4,000 to $10,000 per year cost can only be considered nominal.

Even though adding fire rated corridors would add only 1.6%, or less, to the total costs of these buildings, the question remains: Are these cost increases, no matter how small, justified?

To answer that question, it is safe to assume that ***no*** safety system can ever be considered foolproof or infallible. This premise can be found in a 1998 code change proposal that was submitted during the process of drafting the ICC. There, two Fire Prevention Officers representing the California Fire Chief's Association, proposed a change to the First Draft of the International Building Code (T1006.3.1-3). In it, they proposed that corridors in Educational (and six other) occupancies should have a required fire resistance rating of 2 hours with or without sprinklers. In support of their proposal, they said that: "In California, fire sprinkler systems fail. Safe egress for tenants through corridors cannot be ***solely*** dependent upon fire sprinkler systems." (Emphasis added.)

From that premise, the analysis moves to a proposal submitted in 1999 by the legendary John G. "Gus" Degenkolb, a Los Angeles Battalion Chief and Fire Protection Engineer. He proposed a 0.5 hour rated corridor in E- (and six other) occupancies (E225-99). His rational was, simple: "A corridor is defined as an enclosed exit access component that defines and provides a path of egress travel to an exit. Once in a corridor, movement is restricted to travel within the enclosing walls and along the length of the corridor until a door to another atmosphere is provided. As such, it should have some level of resistance to the transmission of smoke from the area adjacent to the corridor."

His rational was not based solely on logic, but on ***actual fire tests*** that he and others conducted in a Los Angeles school building, less than a year after the deaths of 95 students and teachers in the Our Lady of the Angels School fire in Chicago, Illinois. The report of these tests are found in "*Operation School Burning,*" published by the National Fire Protection Agency (1959).

Four findings from "*Operation School Burning*" are instructive in answering the question: Are cost increases related to adopting E121-12 justified?

The first relevant finding from *Operation School Burning* is that "smoke (specifically as it pertains to visibility and irritant effects) was the principal life safety hazard" and that in the absence of automatic sprinklers "untenable smoke conditions were reached in 2 to 7 minutes from the start of the fire on at least one entire floor above the fire." A second finding was that "[w]ith a complete automatic sprinkler system, untenable smoke conditions were not reached in any corridors except two local areas closest to the test fire." A third finding was that: "[W]hen the test fire was arranged so as to provide extensive shielding against sprinkler water distribution, untenable smoke conditions developed in the corridor of fire origin and those above." The fourth finding was that: "Partial automatic sprinklers (sprinklers installed in corridors and stairways but not over the test fire) did not prevent smoke spread throughout the building even when installed to provide a water curtain between the test fire and the corridors."

In the absence of redundancy, these findings suggest that if there is a sprinkler failure over the site of a fire in a school, whether due to a water supply failure, an obstruction in water distribution, or a simple sprinkler head failure, "untenable smoke" could pose a significant life safety hazard to students and teachers in a matter of minutes.

Based on NFPA's "*U.S. Experience with Sprinklers"* by John R. Hall, Jr. (March 2012), we know that "[s]prinklers operated in 91% of all reported structure fires large enough to activate sprinklers…. When sprinklers operated, they were effective 96% of the time, resulting in a combined performance of operating effectively in 88% of all reported fires where sprinklers were present in the area and the fire was large enough to activate them."

Stated otherwise, for whatever reason, sprinklers may fail to operate effectively in 12% of the fires where sprinklers are present in the area and the fire is large enough to activate them. If a sprinkler fails in the area of a fire in one of the more than ***6,000 school structure fires*** that history tells us are likely to occur annually in this country, then, according to "*Operation School Burning*," in the absence of the redundancy of fire rated corridors, "untenable smoke conditions" may well be reached in a matter of minutes.

Redundant safety systems in the form of automatic sprinklers ***and*** fire rated construction capable of containing the propagation of smoke and fire into exit corridors are ***both*** necessary to ensure the safety of our schools. Paraphrasing Gus Degenkolb, the exit corridors through which our students and teachers travel to reach a safe atmosphere should have some level of resistance to smoke or flame in areas adjacent to the corridor. Currently, if a school is sprinklered, exit corridors can be constructed from materials having no reliable ability to resist either smoke or flame.

Proponents submit that the small increase in cost and slight inconvenience associated with fire rating the exit corridors of sprinklered Educational Occupancies is more than adequately justified by the inherently safer school buildings that will result from the adoption of E121-12 as submitted.

Proponents urge you to support the adoption of E121-12 as submitted by voting against the standing motion to disapprove E121-12 and by voting in favor of a motion to adopt E121-12 as submitted.

Commenter's Reason (Davidson): *"Correlation between a 1 hour rated corridor and a reduction in fire loss has not been provided. Fire data provided showed that current school design has one of the best safety records for life and property."*

Past fire data was based on old assumptions, i.e., when the fire alarm went off students immediately lined up and exited the building. Since the events at Columbine High School and other schools across the U.S. that have been subjected to violent events the operation of the schools has changed and now "lock downs" are routine, i.e., once a lock down is enacted classroom doors are locked and staff and students are under orders to ignore fire alarms since they may be used to generate vulnerable victims. So the parameters that the old trade-off for sprinkler protection has changed and is no longer relevant. If the code has any basis at all, when a safety parameter code language is based upon is eliminated, the code should be modified relative to that change. It is irresponsible to go forward relying on old data that is no longer relevant.

"Another concern raised was the situation of lock downs during an attach event within the school. Lock downs can be for dangerous situations outside the school. No data has been provided to indicate how a rated corridors will protect against an internal attack. To build for a combined sprinkler failure, lock down situation and fire attack scenario is too restrictive for everyday design."

Correct, lock downs can be for events outside the school and guess what, the same lock down rules apply, lock your doors and ignore the fire alarm. Because of this there are many more chances of fire occurring during a lock down event. The protection concerning an interior attack is if a fire occurs at that time either accidentally or started by the actors committing the crime. The committee believing that we should not recognize the possibility of a lock down and fire occurring at the same time and the inability of the sprinkler system to handle the fire can only be done by ignoring factual testimony and a complete lack of knowledge of events that have already occurred. In the Columbine High School attack they had propane cylinders rigged to explode and cause a catastrophic fire, fortunately the failed to go off. Similar attacks discovered and stopped in the planning stages included similar plans. Even the recent attack in Aurora included an explosion and fire expectation in the apartment building. Do we need for one of these events to be successful before we recognize the need to change in response to changing societal norms?

"In addition, school administration now often requires teachers to keep door open for visual communication with the classrooms."

I don't know where this statement arose from, but it is not factual. Classroom doors are typically kept shut to keep out the noise of someone in the hallway and to secure the classroom. Industry even markets locking systems specific to classrooms to lock them to the hallway side. School policy typically requires doors to be secured at the start of a class and kept secured throughout to eliminate ease of access by those that wish to harm teachers or students.

The I-Codes have added requirements for lock down plans to be submitted to the fire code official and for fire alarm systems to utilize an emergency voice/alarm communication system to ensure there is a method to inform staff and students when to evacuate after they ignore the fire alarm. The final piece needed is to protect the egress corridor from the effects of a fire that may occur or be started by the actor.

We protect prisoners in an I-3 with fire-resistance rated corridors, why would we not do that for our children as well?

E121-12

Final Action: AS AM AMPC____ D

E126-12
1019.4, 1026.5 (IFC [B] 1019.4, 1026.5)

Proposed Change as Submitted

Proponent: Steve Pfeiffer representing City of Seattle, Department of Planning & Development (steve.pfeiffer@seattle.gov)

Revise as follows:

1019.4 (IFC [B] 1019.4) Location. Exterior egress balconies shall have a minimum ~~fire~~ separation ~~distance~~ of 10 feet (3048 mm) measured at right angles from the exterior edge of the egress balcony to:

1. Adjacent lot ~~line~~ lines;
2. Other portions of the building; ~~and from~~
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.

1026.5 (IFC [B] 1026.5) Location. *Exterior exit stairways* and *ramps* shall have a minimum ~~fire~~ separation ~~distance~~ of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramp*, including landings, to:

1. Adjacent lot ~~line~~ lines;
2. Other portions of the building; ~~and from~~
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.

Reason: The purpose of this change is to clarify that an exterior exit stairway or egress balcony needs a minimum 10 feet separation where a building wraps around on itself, such as a U-shaped building. The phrase "at right angles" was added because the definition of fire separation distance measures from a wall rather than the exterior edge.

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

1019.4-E-Pfeiffer.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent asked for additional time to reconsider some of the language in the proposal. There may be a concern with use of the term 'fire separation' when dealing with a single building. Right angles may not be the correct way to measure protection at a curved wall.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Steven Pfeiffer, City of Seattle, representing Department of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1019.4 (IFC [B] 1019.4) Location. Exterior egress balconies shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the egress balcony to:

1. Adjacent lot lines;
2. Other portions of the building;
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.

For the purpose of this section other portions of the building shall be treated as separate buildings.

1026.5 (IFC [B] 1026.5) Location. *Exterior exit stairways* and *ramps* shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramp*, including landings, to:

1. Adjacent lot lines;
2. Other portions of the building;
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.

For the purpose of this section other portions of the building shall be treated as separate buildings.

Commenter's Reason: This modification is proposed to clarify that an exterior exit stair or ramp, or exterior egress balcony always needs a minimum 10 feet separation, even where a building wraps around on itself, such as a U-shaped building. If both of a building's egress balconies or exterior stairways are within 10 feet of each other, a single fire could compromise both. The original proposal changed "fire separation distance" to "separation distance" which created a problem when measuring to the centerline of a street or alley. The original proposal would have not have allowed the separation between exterior balconies or stairways to be measured to the centerline of the street. This comment retains the provision that distance be measured at right angles because that provision is taken from the current definition of "fire separation distance".

E126-12
Final Action: AS AM AMPC____ D

E127-12

1015.2.2, 1021.1, Table 1021.1(New), 1021.2, Table 1021.2(1), Table 1021.2(2), 1021.2.1, 1021.2.2, 1021.2.3, 1021.2.4, 1021.2.5, 1021.3, 1021.3.1, 1021.4 (IFC [B] 1015.2.2, 1021.1, Table 1021.1(New), 1021.2, Table 1021.2(1), Table 1021.2(2), 1021.2.1, 1021.2.2, 1021.2.3, 1021.2.4, 1021.2.5, 1021.3, 1021.3.1, 1021.4)

Proposed Change as Submitted

Proponent: Wayne Jewell, Green Oak Township, representing self and Steve Thomas, Colorado Code Consulting, representing self

Revise as follows:

1015.2.2 (IFC [B] 1015.2.2) Three or more exits or exit access doorways. Where access to three or more *exits* is required, at least two *exit* doors or *exit access doorways* shall be arranged in accordance with the provisions of Section 1015.2.1. Additional required exit or exit access doorways shall be arranged a reasonable distance apart so that if one becomes, blocked, the others will be available.

SECTION 1021 (IFC [B] 1021)
NUMBER OF EXITS ~~AND EXIT CONFIGURATION~~

1021.1 (IFC [B] 1021.1) General. Each story and occupied roof shall have the minimum number of independent exits, or access to exits, as specified in ~~this section~~ Table 1021.1**.** A single exit or access to a single exit shall be permitted in accordance with Section 1021.2. The required number of exits, or exit access stairways or ramps providing access to exits, from any story shall be maintained until arrival at grade or a public way.~~ Exits or access to exits from any story shall be configured in accordance with this section. Each story above the second story of a building shall have a minimum of one interior or exterior exit stairway, or interior or exterior exit ramp. At each story above the second story that requires a minimum of three or more exits, or access to exits, a minimum of 50 percent of the required exits shall be interior or exterior exit stairways, or interior or exterior exit ramps.~~

~~Exceptions:~~

1. ~~Interior exit stairways and interior exit ramps are not required in open parking garages where the means of egress serves only the open parking garage.~~
2. ~~Interior exit stairways and interior exit ramps are not required in outdoor facilities where all portions of the means of egress are essentially open to the outside.~~

TABLE 1021.1 (IFC [B] TABLE 1021.1)
MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY

Occupant Load per Story	Minimum Number of Exits or Access to Exits From Story
1-500	2
501-1,000	3
More than 1,000	4

1021.2 (IFC [B] 1021.2) Single exits ~~from stories.~~ A single exit or access to a single exit shall be permitted ~~Two exits, or exit access stairways or ramps providing access to exits,~~ from any story or occupied roof, ~~shall be~~ provided ~~where~~ one of the following conditions exists:

1. The occupant load, ~~or~~ number of dwelling units and exit access travel distance does not exceed~~s~~ ~~one of~~ the values in Table 1021.2(1) or 1021.2(2).
~~2. The exit access travel distance exceeds that specified in Table 1021.2(1) or 1021.2(2) as determined in accordance with the provisions of Section 1016.1.~~
~~3. Helistop landing areas located on buildings or structures shall be provided with two exits, or exit access stairways or ramps providing access to exits.~~

~~**Exceptions:**~~

~~1~~2. Rooms, areas and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit or access to a single exit.
~~2~~3. Group R-3 occupancy buildings shall be permitted to have one exit.
~~3~~4. Parking garages where vehicles are mechanically parked shall be permitted to have one exit or access to a single exit,
~~4. Air traffic control towers shall be provided with the minimum number of exits specified in Section 412.3.~~
~~5. Individual dwelling units in compliance with Section 1021.2.3.~~
5~~6.~~ Group R-3 and R-4 congregate residences shall be permitted to have one exit or access to a single exit.
6. ~~**1021.2.3 (IFC [B] 1021.2.3) Single-story or multi-story dwelling units.**~~ Individual single-story or multi-story dwelling units shall be permitted to have a single exit or access to a single exit ~~within and~~ from the dwelling unit provided that all of the following criteria are met:
   - 6.1 The dwelling unit complies with Section 1015.1 as a space with one means of egress and
   - 6.2 Either the exit from the dwelling unit discharges directly to the exterior at the level of exit discharge, or the exit access outside the dwelling unit's entrance door provides access to not less than two approved independent exits.

~~7. Exits serving specific spaces or areas need not be accessed by the remainder of the story when all of the following are met:~~
   - ~~7.1 The number of exits from the entire story complies with Section 1021.2.4;~~
   - ~~7.2 The access to exits from each individual space in the story complies with Section 1015.1; and~~
   - ~~7.3 All spaces within each portion of a story shall have access to the minimum number of approved independent exits based on the occupant load of that portion of the story but not less than two exits.~~

TABLE 1021.2(1) (IFC [B] TABLE 1021.2(1))
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane	R-2[a, b]	4 dwelling units	125 feet
Fourth story above grade plane and higher ~~above~~	NP	NA	NA

For SI: 1 foot = 3048 mm.
NP – Not Permitted
NA – Not Applicable
a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1029.

b. This Table is used for R-2 occupancies consisting of dwelling units. For R-2 occupancies consisting of sleeping units, use Table 1021.2(2).

TABLE 1021.2(2) (IFC [B] TABLE 1021.2(2))
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM OCCUPANTS STORY	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
First story above or below grade plane ~~basement~~	A, B[b], E F[b], M, U, S[b]	49 occupants	75 feet
	H-2, H-3	3 occupants	25 feet
	H-4, H-5, I, R-1, R-2[a,c], R-4	10 occupants	75 feet
	S	29 occupants	100 feet
Second story above grade plane	B, F, M, S	29 occupants	75 feet
Third story above grade plane and ~~above~~ higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.
NP – Not Permitted
NA – Not Applicable
a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1029.
b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum travel distance of 100 feet.
c. This Table is used for R-2 occupancies consisting of sleeping units. For R-2 occupancies consisting of dwelling units, use Table 1021.2(1).

1021.2.1 (IFC [B] 1021.2.1) Mixed occupancies. Where one exit, or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2(1) or Table 1021.2(2) for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1012.3(1) for each occupancy does not exceed one. Where dwelling units are located on a story with other occupancies, the actual number of dwelling units divided by 4 plus the ratio from the other occupancy does not exceed one.

1021.2.2 (IFC [B] 1021.2.2) Exits from specific space. Exits serving specific spaces or areas need not be accessed by the remainder of the story when all of the following are met:

1. The number of exits from the entire story complies with Section ~~1021.4.1~~ 1021.1;
2. The access to exits from each individual space in the story complies with Section 1015.1; and
3. All spaces within each portion of a story shall have access to the minimum number of approved independent exits based on the occupant load of that portion of the story but not less than two exits.

~~**1021.2.2 (IFC [B] 1021.1.2) Basements.** A basement provided with one exit shall not be located more than one story below grade plane.~~

~~**1021.2.3 (IFC [B] 1021.2.3) Single-story or multi-story dwelling units.** Individual single-story or multi-story dwelling units shall be permitted to have a single exit within and from the dwelling unit provided that all of the following criteria are met:~~

~~1. The dwelling unit complies with Section 1015.1 as a space with one means of egress and~~
~~2. Either the exit from the dwelling unit discharges directly to the exterior at the level of exit~~

~~discharge, or the exit access outside the dwelling unit's entrance door provides access to not less than two approved independent exits.~~

~~**1021.2.4 (IFC [B] 1021.2.4) Three or more exits.** Three exits, or exit access stairways or ramps providing access to exits at other stories, shall be provided from any story or occupied roof with an occupant load of 501-1,000. Four exits, or exit access stairways or ramps providing access to exits at other stories, shall be provided from any story or occupied roof with an occupant load greater than 1,000.~~

~~**1021.2.5 (IFC [B] 1021.2.5) Additional exits.** In buildings over 420 feet in height, additional exits shall be provided in accordance with Section 403.5.2.~~

~~**1021.3 (IFC [B] 1021.3) Exit configuration.** Exits, or exit access stairways or ramps providing access to exits at other stories, shall be arranged in accordance with the provisions of Section 1015.2 through 1015.2.2. Exits shall be continuous from the point of entry into the exit to the exit discharge.~~

~~**1021.3.1 (IFC [B] 1021.3.1) Access to exits at adjacent levels.** Access to exits at other levels shall be by stairways or ramps. Where access to exits occurs from adjacent building levels, the horizontal and vertical exit access travel distance to the closest exit shall not exceed that specified in Section 1016.1. Access to exits at other levels shall be from an adjacent story.~~

> ~~**Exception:** Landing platforms or roof areas for helistops that are less than 60 feet (18 288 mm) long, or less than 2,000 square feet (186 m^2) in area, shall be permitted to access the second exit by a fire escape, alternating tread device or ladder leading to the story or level below.~~

1021.3 ~~1021.4~~ (IFC [B] 1021.3 ~~1021.4~~) Vehicular ramps. Vehicular ramps shall not be considered as an exit access ramp unless pedestrian facilities are provided.

Reason: The intent of this proposal is to reorganize Section 1020 for clarity.

1015.2.2 – Separation for the 3rd exit was deleted by E82-04/05 as too subjective, however, this language should be reinserted because now there is no language to describe where additional exits are located.
1021.1 –The word 'independent' is added for clarity (no one should consider a double door as two exits). The minimum number of MOE have been moved into a table format for clarity and ease of reference for other requirements. The exceptions are not needed since the number required is based on exit and/or access to exits. Open parking and outdoor stadiums are exit access stairways from each floor above grade.
New Table 1021.1 – Requirements from 1021.1 and 1021.2.4 are relocated together into Table format. Allowances are extended to be number of exits and/or number of access to exits (i.e., exit access doorways, exit access stairways, exit access ramps).
1021.2 – This section is revise for a positive where permitted approach rather than exceptions.

- Item 1 & 2 – combined
- Existing item 3 – deleted because already addressed in 412.7.3 – need to be consistent in references for MOE
- New Item 2 and 4 – revised for exit and exit access
- Existing Exception 4 – deleted because already addressed in 412.3 - need to be consistent in references for MOE
- Existing Exception 5 - addressed in new Item 6
- New Item 5 - revised for exit and exit access
- New Item 6 – revised for exit and exit access; relocated from 1021.2.3. No reason to be separate section.
- Existing Exception 7 – Since this is exit configuration, not single exit, it has been relocated to new 1021.2.2.

Table 1021.2(1) and 1021.2(2) – Revise headings to limit number of basements to 1.
1021.2.1 – The additional sentence adopts the same ratio formula currently in the code but addresses what you would do when dwelling units were in the mix (i.e., there is no occupant load).
New 1021.2.2 – this was Section 1021.2 Exception 7. Relocated since this is exit configuration for situations where one exit may be within a tenant space and blocked from access from other tenants on the floor.
Existing 1021.2.2 - Deleted. Basements are now addressed in Table 1021.2(1) and 1021.2(2) so not needed here.
Existing 1021.2.3 – deleted and relocated to 1021.2 new Item 6.
Existing 1021.2.4 – deleted and relocated to Table 1021.1
Existing 1021.2.5 – deleted –3rd stairway is not a required means of egress stairway and already addressed in 403.5.2. Code users should either reference all MOE in Chapter 4 or rely on Chapter 4 and not reference anything.
Existing 1021.3 - Delete. Now addressed in 1015.2 and 1015.2.1

Existing 1021.3.1 - Delete. Now addressed in 1015.2 and 1015.2.1. Helistops in exception are addressed in 412.7.3.

Cost Impact: None

1020-E- Jewell-Thomas.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal clarifies the number of exits and separation of exits. There was some concerns regarding the additional sentence in Section 1015.2.2 regarding separation for the third and fourth exits. While not a specific measurement, the added language that says 'not blocked' should provide at least a limited indication of what would be an appropriate level of separation.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ali M. Fattah P.E., representing City of San Diego Development Services Department, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 1021.2(1) (IFC [B] TABLE 1021.2(1))
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement <u>level immediately below grade</u>, first, second or third story above grade plane	R-2[a, b]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

(Portions of proposal remained unchanged.)

Commenter's Reason: The Means of Egress Committee approved this code change submitted by Colorado Consulting modifying the requirements for single exit buildings. We are concerned that table 1021.2 (1) does not address the case where multiple basement exist below a buildings and we believe that the table applies to a single basement below grade plane. We are also concerned that a residential building on a sloped site may have multiple basements and that grade and not grade plane should be the differentiating factor. We request that the membership approve the proposed modification to the committee's action.

E127-12
Final Action: AS AM AMPC____ D

E132-12
1021.2 (IFC [B] 1021.2)

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., Senior Engineer, Reid Middleton, Inc., representing Washington Association of Building Officials, Technical Code Development Committee (pbrazil@reidmiddleton.com)

Revise as follows:

1021.2 (IFC [B] 1021.2) Exits from stories. Two *exits*, or *exit access stairways* or *ramps* providing access to *exits*, from any story or occupied roof shall be provided where one of the following conditions exists:

1. The *occupant load* or number of *dwelling units* exceeds one of the values in Table 1021.2(1) or 1021.2(2).
2. The *exit access* travel distance exceeds that specified in Table 1021.2(1) or 1021.2(2) as determined in accordance with the provisions of Section 1016.1.
3. *Helistop* landing areas located on buildings or structures shall be provided with two *exits*, or *exit access stairways* or *ramps* providing access to *exits*.

   Exceptions:

   1. Rooms, areas and spaces complying with Section 1015.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*~~,~~ are permitted to have one *exit*.
   2. Group R-3 occupancy *buildings* shall be permitted to have one *exit*.
   3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit*.
   4. Air traffic control towers shall be provided with the minimum number of *exits* specified in Section 412.3.
   5. Individual *dwelling units* in compliance with Section 1021.2.3.
   ~~6. Group R-3 and R-4 congregate residences shall be permitted to have one *exit*.~~
   6.~~7.~~ *Exits* serving specific spaces or areas need not be accessed by the remainder of the story when all of the following are met:
      6.1.~~7.1.~~ The number of *exits* from the entire story complies with Section 1021.2.4;
      6.2.~~7.2.~~ The access to *exits* from each individual space in the story complies with Section 1015.1; and
      6.3.~~7.3.~~ All spaces within each portion of a story shall have access to the minimum number of *approved* independent *exits* based on the *occupant load* of that portion of the story, but not less than two exits.

Reason: Exception #6 was added by Proposal E5-09/10 but a reason for the exception was not given in the reason statement accompanying the proposal and there is no corresponding provision in the 2009 IBC. Note that the deletion has no effect on Group R-3 occupancies in that are permitted to have one exit by Exception #2.

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

1021.2-E-Brazil.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: There is a question as to if there is a conflict with Table 1022.2.2 and Section 1021.2 for Group R-4 single exit provisions. Section 1021.2 Item 6 should be deleted until the issue can be fully discussed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Jonathan Siu, City of Seattle, Department of Planning & Development, representing Washington Association of Building Officials, Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1021.2 Exits from stories. Two *exits*, or *exit access stairways* or *ramps* providing access to *exits*, from any story or occupied roof shall be provided where one of the following conditions exists:

1. The *occupant load* or number of *dwelling units* exceeds one of the values in Table 1021.2(1) or 1021.2(2).
2. The *exit access* travel distance exceeds that specified in Table 1021.2(1) or 1021.2(2) as determined in accordance with the provisions of Section 1016.1.
3. *Helistop* landing areas located on buildings or structures shall be provided with two *exits*, or *exit access stairways* or *ramps* providing access to exits.

Exceptions:

1. Rooms, areas and spaces complying with Section 1015.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit*.
~~2. Group R-3 occupancy buildings shall be permitted to have one *exit*.~~
2.~~3.~~ Parking garages where vehicles are mechanically parked shall be permitted to have one *exit*.
3.~~4.~~ Air traffic control towers shall be provided with the minimum number of *exits* specified in Section 412.3.
4.5. Individual *dwelling units* in compliance with Section 1021.2.3.
5. 6. Group R-3 and R-4 ~~congregate residences~~ occupancies shall be permitted to have one *exit*.
6.~~7.~~ *Exits* serving specific spaces or areas need not be accessed by the remainder of the story when all of the following are met:
   6.1 ~~7.1~~. The number of *exits* from the entire story complies with Section 1021.2.4;
   6.2 ~~7.2~~. The access to *exits* from each individual space in the story complies with Section 1015.1; and
   6.3 ~~7.3~~. All spaces within each portion of a story shall have access to the minimum number of *approved* independent *exits* based on the *occupant load* of that portion of the story, but not less than two exits.

Commenter's Reason: The intent of this proposal is to clean up the text that allows a single means of egress from R occupancies. While the Means of Egress Committee approved the original proposal as submitted, it has come to our attention there is a possibility the approved text is not consistent with the Fair Housing Act. Although there was no testimony to that effect in Dallas, we are submitting this public comment to head off the possibility of creating a conflict between the IBC and the Fair Housing Act.

The question of consistency with the Fair Housing Act revolves around how R-4 occupancies are treated. Our understanding of the Act is R-4 occupancies cannot be treated differently than R-3 occupancies. By deleting the exception for single exits for R-4 congregate residences, it could be construed that the code is treating the two occupancies differently. However, "congregate residences" is not a term that is used in the IBC anymore, so referring to R-4 congregate residences does not make sense. All the uses listed in Section 310.6 for an R-4 occupancy classification could be construed to be "congregate residences." On the other hand, if the "congregate care facilities" in Section 310.6 is thought to correspond with "congregate residences," we do not see a justification for limiting the application of this section to just congregate care facilities—all the uses listed in Section 310.6 are of similar hazard, else they would be placed in a different occupancy (most likely an I occupancy). For those reasons, we have proposed reinserting the exception for R-4's and to allow a single exit for all R-4 occupancies, not just congregate residences (whatever those are, in the context of the IBC).

For R-3 occupancies, the intent of the original proposal was to delete redundant text that allows R-3 occupancies to have one exit—both Exceptions 2 and 6 in the 2012 IBC allows this. Apparently, the Means of Egress Committee agreed with us that Exception 2 covered Exception 6. Since this public comment changes Exception 6 (now Exception 5 in the public comment) to apply to all R-3 occupancies, the intent of the original code change is still accomplished, but in a different way. In this case, Exception 2 is covered, and can be deleted.

Public Comment 2:

Steve Thomas, CBO, Denver, CO, representing self; Wayne Jewell, CBO, CPCA, Green-Oak, MI, representing self; request Approval as Submitted by this Public Comment

Replace the proposal as follows:

1021.2 (IFC [B] 1021.2) Exits from stories. Two *exits*, or *exit access stairways* or *ramps* providing access to *exits*, from any story or occupied roof shall be provided where one of the following conditions exists:

1. The *occupant load* or number of *dwelling units* exceeds one of the values in Table 1021.2(1) or 1021.2(2).
2. The *exit access* travel distance exceeds that specified in Table 1021.2(1) or 1021.2(2) as determined in accordance with the provisions of Section 1016.1.
3. *Helistop* landing areas located on buildings or structures shall be provided with two *exits*, or *exit access stairways* or *ramps* providing access to *exits*.

   Exceptions:

   1. Rooms, areas and spaces complying with Section 1015.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit*.
   2. Group R-3 occupancy *buildings* shall be permitted to have one *exit*.
   3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit*.
   4. Air traffic control towers shall be provided with the minimum number of *exits* specified in Section 412.3.
   5. Individual *dwelling units* in compliance with Section 1021.2.3.
   6. Group R-3 congregate living facilities and R-4 ~~congregate~~ ~~residences~~ facilities shall be permitted to have one *exit*.
   7. *Exits* serving specific spaces or areas need not be accessed by the remainder of the story when all of the following are met:
      7.1. The number of *exits* from the entire story complies with Section 1021.2.4;
      7.2. The access to *exits* from each individual space in the story complies with Section 1015.1; and
      7.3. All spaces within each portion of a story shall have access to the minimum number of *approved* independent *exits* based on the *occupant load* of that portion of the story, but not less than two exits.

1009.3 (IFC [B] 1009.3) Exit access stairways. Floor openings between stories created by *exit access stairways* shall be enclosed.

Exceptions:

1. In other than Group I-2 and I-3 occupancies, *exit access stairways* that serve, or atmospherically communicate between, only two stories are not required to be enclosed.
2. *Exit access stairways* serving and contained within a single residential *dwelling unit* or *sleeping unit* in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.
3. Exit access stairways serving and contained within a Group R-3 congregate living facility or a Group R-4, facility are not required to be enclosed.

(No changes to remainder of section not shown. Renumber exceptions 3 through 10.)

1014.3 (IFC [B] 1014.3) Common path of egress travel. The *common path of egress travel* shall not exceed the *common path of egress travel* distances in Table 1014.3.

TABLE 1014.3 (IFC TABLE [B] 1014.3)
COMMON PATH OF EGRESS TRAVEL

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)		WITH SPRINKLER SYSTEM (feet)
	Occupant Load		
	≤30	> 30	
R-3, R-4 [e]	75	75	125 [b]

(No change to portions of table not shown)

For SI: 1 foot = 304.8 mm.

a. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
b. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where *automatic sprinkler systems* are permitted in accordance with Section 903.3.1.2.
c. For a room or space used for assembly purposes having *fixed seating*, see Section 1028.8.
d. The length of a *common path of egress travel* in a Group S-2 *open parking garage* shall not be more than 100 feet (30 480 mm).
e. The length of a *common path of egress travel* in a Group R-3 occupancy located in a mixed occupancy building or Group R-3 or R-4 within a congregate living facility.
f. For the distance limitations in Group I-2, see Section 407.4.

Commenter's Reason: As stated in the proponents reason, Section 1021.2, Exception 6 was added as part of E5-09/10. The intent of this proposal is to have a complete package for the exit stairway requirements for congregate living facilities in Groups R-3 and R-4, as an alternative to deleting the allowance for one exit staairway in Section 1021.1, Exception 6.

Exception 2 to Section 1021.2 is for the building of Group R-3, which would typically be a one- or two-family dwelling unit. Exception 6 is for Group R-3 and R-4 occupancies includes congregate living facilities with 16 or fewer residents; by definition a *congregate living facility* can be a part of a building. A congregate living facility is defined as sleeping units with shared kitchen and bathing facilities, so these are not dwelling units. The number of occupants in these occupancies is very limited and the occupants are familiar with their surroundings. This provision allows the same standards of design as required for single family homes to be applied to these types of facilities, keeping the code in-line with the requirements of the Federal Fair Housing provisions.

While the original proposal chose to delete the allowance for a single stairway within these small congregate residences, this proposal's addition to Sections 1009.3 and 1014.3 attempts to coordinate the requirements for open stairways and travel distance to address these types of facilities.

E132-12

Final Action: AS AM AMPC____ D

E135-12
1021.2.1 (IFC [B] 1021.2.1)

Proposed Change as Submitted

Proponent: Steve Pfeiffer representing City of Seattle, Department of Planning & Development (steve.pfeiffer@seattle.gov)

Revise as follows:

1021.2.1 (IFC [B] 1021.2.1) Mixed occupancies. Where one exit, or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2(1) or Table 1021.2(2) for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.

In each story of a mixed occupancy building, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants for each occupancy does not exceed one.

In each story containing both Group R-2 dwelling units and other occupancies, the maximum number of dwelling units and occupants served by a single exit shall be such that the sum of the ratios of the actual number of dwelling units divided by 4, plus the calculated number of occupants of the rest of the story, divided by the allowable number of occupants for each occupancy, does not exceed one.

Reason: This change allows use of the "unity" formula when a story contains both dwelling units and some other occupancy. For example, a second story would be permitted to be served by a single exit if it contained one dwelling unit and an office with an occupant of 21 or fewer (1/4 + 21/29 =0.974 ≤1). Or, a second story could contain three dwellings and an office with an occupant load of 7 or fewer, yet still be served by a single exit (3/4 + 7/29 =0.991 ≤1). The first paragraph of this section requires each occupancy to comply with the travel distance requirements in the table.

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

1021.2.1-E-Pfeiffer.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason The proposed formula is difficult to understand. In E127, the last sentence in Section 1021.2.1 addresses this issue.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Lupton, City of Seattle representing Dept. of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1021.2.1 (IFC [B] 1021.2.1) Mixed occupancies. Where one exit, or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided each individual occupancy complies with the applicable requirements of Table 1021.2(1) or Table 1021.2(2) for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1.

In each story of a mixed occupancy building, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants for each occupancy does not exceed one. <u>Where dwelling units are located on a story with other occupancies, the actual number of dwelling units divided by 4 plus the ratio from the other occupancy does not exceed one.</u>

~~In each story containing both Group R-2 dwelling units and other occupancies, the maximum number of dwelling units and occupants served by a single exit shall be such that the sum of the ratios of the actual number of dwelling units divided by 4, plus the calculated number of occupants of the rest of the story, divided by the allowable number of occupants for each occupancy, does not exceed one.~~

Commenter's Reason: If E127 does not pass then this code change is still necessary to address what to do when dwelling units are mixed with another occupancy and applying the unity formula. The original proposal has been modified to incorporate more understandable language proposed in E127, addressing the committee's concern. If E127 passes at the Final Action Hearing then the proposal will be withdrawn.

E135-12

Final Action: AS AM AMPC____ D

E137-12
1022.1(IFC [B] 1022.1)

Proposed Change as Submitted

Proponent: Paul Armstrong, P.E., CBO, City of El Monte representing the ICC Orange Empire Chapter Code Committee (paul@jaspacific.com)

Revise as follows:

1022.1 (IFC [B] 1022.1) General. Interior exit stairways and interior exit ramps serving as an exit component in a means of egress system shall comply with the requirements of this section. Interior exit stairways and ramps shall <u>be enclosed and</u> lead directly to the exterior of the building or shall be extended to the exterior of the building with an extended exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An interior exit stairway or ramp shall not be used for any purpose other than as a means of egress.

Reason: Editorial revision. The proposed revision is added for clarification to the requirement for protection of interior exit stairways or ramps as found in Chapter 2, Definitions.

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

1022.1-E-Armstrong.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed enclosure language is already addressed in Section 1009.2.2.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Chair, Code Technologies Committee, requests Approval as Submitted.

Commenter's Reason: This public comment is intended to correct an inadvertent error of omission with Item E7-12 that was approved as modified during the 2012 ICC code development hearings in Dallas, TX. E7-12 was intended to clarify and refine the provisions of Item E5-09/10 that was approved for inclusion in the 2012 IBC. E7-12 relocated the technical requirements for exit access stairways from Section 1009.3 to a new Section 1018. It also removed the provisions of Section 1009.2 applicable to interior exit stairways; however, failed to relocate them in Section 1022. It was not the intent of E-7 to remove the enclosure requirements for exit stairs from the code. The intent was to relocate the exit stair enclosure requirements to section 1022.

This oversight was discovered during the discussion of Item E137-12 at the Dallas code development hearings. Passage of E137-12 will fix this error and maintain the clear requirement that exit stairs shall be enclosed. The following language is currently contained in Section 1009.2 of the 2012 IBC.

1009.2 Interior exit stairways. Interior exit stairways shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1.

1009.2.1 Where required. Interior exit stairways shall be included, as necessary; to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance.

1009.2.2 Enclosure. All interior exit stairways shall be enclosed in accordance with the provisions of Section 1022.

These inadvertently deleted provisions have been placed in proper technical context in Section 1022. Approval of this public comment will restore necessary charging language for the enclosure of interior exit stairways and ramps in the 2015 Edition of the IBC.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Unenclosed exit stairways". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/UnenclosedExitStairs.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E137-12

Final Action: AS AM AMPC____ D

E141-12
1022.3.1 (IFC [B] 1022.3.1)

<u>Proposed Change as Submitted</u>

Proponent: Dennis Richardson, PE; Building Official, City of Salinas, representing Tri-Chapter (Peninsula, East Bay and Monterey Bay Chapters of ICC) (dennisrichardsonpe@yahoo.com)

Revise as follows:

1022.3.1 (IFC [B] 1022.3.1) Extension. Where *interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*, the *interior exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 711, or both. The *fire-resistance rating* shall be at least equal to that required for the *interior exit stairway* and *ramp*. A *fire door* assembly complying with Section 716.5 shall be installed in the *fire barrier* to provide a *means of egress* from the *interior exit stairwa*y and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door* assembly are prohibited. Penetrations of the *fire barrier* are prohibited.

~~Exception~~ <u>Exceptions</u>:

<u>1.</u> Penetrations of the *fire barrier* in accordance with Section 1022.5 shall be permitted.
<u>2.</u> <u>Separation between an interior exit stairway or ramp and the exit passageway shall not be required if there are no openings or penetrations in the exit passageway.</u>

Reason: It is practice to utilize exit passageways and ramps as required to extend or connect the exit enclosure protection horizontally at building offsets and other obstructions until the stairway can then again proceed downward ultimately terminating at a discharge or being extended to the discharge. The purpose in having a door at this interface in the existing requirement is to prevent smoke from a possible open door or other penetration in the passageway from traveling up the exit enclosure. This is prevented if there are no openings or penetrations in the exit passageway. The exit passageway is constructed strictly as an extension of the enclosure at a horizontal offset. Egress can proceed faster if there are not intermediate doors contained at the enclosure transitions.

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

1022.3.1-E-Richardson.doc

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: This proposed language is too restrictive for the exit passageway. It is not possible to build an exit passageway with no openings (i.e., lights, ventilation, sprinklers). Where interior exit stairways are connected by a passageway, a door should be provided for compartmentation of the exit path.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dennis Richardson, PE, CBO, City of Salinas, representing Tri-Chapter (Peninsula, East Bay and Monterey Chapters, ICC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1022.3.1 Extension. Where *interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*, the *interior exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 711, or both. The *fire-resistance rating* shall be at least equal to that required for the *interior exit stairway* and *ramp*. A *fire door* assembly complying with Section 716.5 shall be installed in the *fire barrier* to provide a *means of egress* from the *interior exit stairwa*y and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door* assembly are prohibited. Penetrations of the *fire barrier* are prohibited.

Exceptions:

1. Penetrations of the *fire barrier* in accordance with Section 1022.5 shall be permitted.
2. Separation between an interior exit stairway or ramp and the exit passageway extension shall not be required if there are no openings ~~or penetrations~~ in the exit passageway extension.

Commenter's Reason: The original proposed code change mistakenly included penetrations (along with openings) in exception 2 as prohibited from the exit passageway extension if no doors are provided. Members of the Egress Committee correctly pointed out that only openings would need to be prohibited in the passageway extension to obtain this exception and the original proposed exception was overly restrictive. This public comment has been revised accordingly.

E141-12

Final Action: AS AM AMPC____ D

E144-12

1022.10(New); [IFC [B] 1022.10 (New)]

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Add new text as follows:

1022.10 (IFC [B] 1022.10) Elevator Lobby identification signs. At landings in interior exit stairways where two or more doors lead to the floor level, the door leading to the elevator lobby shall be identified by signage located on the door or directly adjacent to the door stating "Elevator Lobby." Signage shall be in accordance with Section 1022.9.1 Items 4, 5 and 6.

(Renumber subsequent sections)

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

This proposal is one of several proposals submitted by the CTC Elevator lobby SG. The ICC Executive Board directed the Code Technology Committee (CTC) to study the issue of elevator lobby separations in November 2010 due to the number of code change proposals submitted addressing this issue over a number of code change cycles. The Code Technology Committee formed a study group on the elevator lobby separation issue in December 2010. Note that this subject had been previously addressed by CABO/BCMC in 1986 with a similar conclusion. The code change proposals submitted are the result of the CTC's study of the issue. Note that the scope of the activity was as follows:

Scope

- Review the need for elevator lobbies**,** with emphasis on building use, building and hoistway height, active and passive fire protection features associated with the aforementioned.
- Review the differences and specific needs when dealing with elevator lobbies of traditional-use elevators, fire service elevators, and occupant evacuation elevators.
- Review related code provisions, such as egress from and through elevator lobbies.
- Review the appropriate use of alternatives including pressurization of hoistways, additional doors, roll-down style barriers, and gasketing systems.
- Review with members of elevator industry to scope the requirements of applicable elevator reference standards as it deals with elevator lobby design, use and construction.
- Review design and construction requirements for elevator lobbies, including but not limited to dimensions, location and separation.
- Review applicable code change history, technical studies and loss statistics as part of this review.

Based upon the extensive nature of this area of study**,** 5 Task Groups were formed during the process to provide in-depth review and to manage the number of issues. These task groups developed a number of proposals that were coordinated throughout the process.

More information on this CTC area of study can be found at the following link.
http://www.iccsafe.org/cs/CTC/Pages/ElevatorLobbies.aspx

The focus is on necessary signage for entrance into elevator lobbies from interior exit stairway landings. This issue is more specific to Fire service access elevators and the potential for multiple required doors. The code currently requires direct access from the lobby to a stairway and additionally the same stairway must have a door that opens directly to the floor based upon standpipe access issues (i.e. limiting the number of doors that need to be open to lay hose during a fire). Fire fighters and occupants need to readily determine which door leads to the enclosed elevator lobby therefore signage is necessary to assist in wayfinding. The enclosed elevator lobby could be for fire service access elevators (FSAE) or occupant evacuation elevators. Since the signage need can apply to either type of enclosed elevator lobby and is related to interior exit stairways the requirements are proposed in Section 1022.

See discussion on CTC elevator lobby proposal coordination in code change FS##-12

Cost impact:

1022.10-E-BALDASSARRA-CTC.docx

<u>Public Hearing Results</u>

Committee Action: **Approved as Submitted**

Committee Reason: This signage is necessary for fire fighters when there is a fire service access elevator lobby. However, there could be some situations where there are two doors to the same level which do not have a fire service access elevator lobbies. There are also provisions that were approved by the General committee that would allow access to the fire service access elevator via a rated corridor. Additional revisions may be needed for further coordination.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

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

Public Comment 1:

Lee J Kranz, City of Bellevue Washington, representing WABO TCD, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1022.10 (IFC [B] 1022.10) Elevator Lobby identification signs. At landings in interior exit stairways where two or more doors lead to the floor level, ~~the~~ <u>any</u> door ~~leading~~ <u>with *direct access*</u> to ~~the~~ <u>an enclosed fire service access or occupant evacuation</u> elevator lobby shall be identified by signage located on the door or directly adjacent to the door stating “Elevator Lobby.” Signage shall be in accordance with Section 1022.9.1 Items 4, 5 and 6.

Commenter’s Reason: As stated in the original proposal’s reason statement, these signs are needed to provide direction for firefighters and building occupants where more than one door is provided for access to a floor from an interior exit stairway.

Although the Means of Egress Committee approved this proposal as submitted, they pointed out the text as proposed applies broadly to all elevator lobbies, as opposed to only those associated with fire service access or occupant evacuation elevators. In addition, the General Committee approved item G175-12, which provides exceptions to the requirement that fire service access and occupant evacuation elevator lobbies have direct access to an interior exit stairway.

This public comment coordinates this item with G175-12 and responds to the Means of Egress Committee comments by limiting the requirement for providing signage to those doors that open directly into enclosed fire service access or occupant evacuation elevator lobbies. The term “direct access” is defined via G175-12 as a “path of travel from a space to an immediately adjacent space through an opening in the common wall between the two spaces.”

For reference, the relevant approved-as-submitted text of G175-12 follows:

G175-12 (Approved as Submitted)

Revise as follows:

3007.7.1 <u>Interior exit stairway</u> access. The fire service access elevator lobby shall have direct access <u>from the enclosed elevator lobby</u> to an enclosure for an *interior exit stairway*.

<u>**Exception**: Access to an interior exit stairway shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.5.3.</u>

3008.7.1 <u>Interior exit stairway</u> access. The occupant evacuation elevator lobby shall have direct access <u>from the enclosed elevator lobby</u> to an *interior exit stairway* or *ramp*.
<u>**Exception**: Access to an interior exit stairway shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.5.3.</u>

Add new definition as follows:

<u>**DIRECT ACCESS.** A path of travel from a space to an immediately adjacent space through an opening in the common wall between the two spaces.</u>

Public Comment 2:

Jonathan Siu, representing City of Seattle Dept of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1022.10 (IFC [B] 1022.10) Elevator Lobby identification signs. At landings in interior exit stairways where two or more doors lead to the floor level, ~~the~~ any door ~~leading~~ with *direct access* to ~~the~~ an enclosed elevator lobby shall be identified by signage located on the door or directly adjacent to the door stating "Elevator Lobby." Signage shall be in accordance with Section 1022.9.1 Items 4, 5 and 6.

Commenter's Reason: As stated in the original proposal's reason statement, these signs are needed to provide direction for firefighters and building occupants where more than one door is provided for access to a floor from an interior exit stairway.

In approving this proposal as submitted, the Means of Egress Committee pointed out the text as proposed applies broadly to all elevator lobbies, as opposed to only those associated with fire service access or occupant evacuation elevators. Our response is if the signs are being provided to prevent confusion, both for firefighters and building occupants who are in the stairs, then it is immaterial as to what kind of lobby the door opens into—any "extra" doors are likely to cause confusion, and therefore, they should be provided with signs.

The change in the text to require the signage only for doors providing "direct access" to an enclosed lobby is to coordinate this proposal with Item G175-12, which was approved as submitted by the General Committee. G175-12 provides exceptions to the requirement that fire service access and occupant evacuation elevator lobbies have direct access to an interior exit stairway. The result of this public comment is if the door does not provide direct access to an enclosed lobby, it is not required to have signage.

For reference, the relevant approved-as-submitted text of G175-12 follows:

G175-12 (Approved as Submitted)

Revise as follows:

3007.7.1 Interior exit stairway access. The fire service access elevator lobby shall have direct access from the enclosed elevator lobby to an enclosure for an *interior exit stairway*.

Exception: Access to an interior exit stairway shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.5.3.

3008.7.1 Interior exit stairway access. The occupant evacuation elevator lobby shall have direct access from the enclosed elevator lobby to an *interior exit stairway* or *ramp*.
Exception: Access to an interior exit stairway shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.5.3.

Add new definition as follows:

DIRECT ACCESS. A path of travel from a space to an immediately adjacent space through an opening in the common wall between the two spaces.

E144-12
Final Action: AS AM AMPC____ D

E154-12
1026.6 (IFC [B] 1026.6)

Proposed Change as Submitted

Proponent: Dennis Richardson, PE; Building Official, City of Salinas, representing Tri-Chapter (Peninsula, East Bay and Monterey Bay Chapters of ICC) (dennisrichardsonpe@yahoo.com)

Revise as follows:

1026.6 (IFC [B] 1026.6) Exterior stairway and ramp protection. *Exterior exit stairways* and *ramps* shall be separated from the interior of the building as required in Section 1022.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical projection of the planes of the guard of an exterior stairway or ramp including landings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the exterior wall shall be rated in accordance with Section 1022.7.

Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are no more than two stories above grade plane where a level of exit discharge serving such occupancies is the first story above grade plane.
2. Separation from the interior of the building is not required where the exterior stairway or ramp is served by an exterior ramp or balcony that connects two remote exterior stairways or other approved exits, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be a minimum of 50 percent of the height of the enclosing wall, with the top of the openings no less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the interior of the building is not required for an exterior stairway or ramp located in a building or structure that is permitted to have unenclosed exit access stairways in accordance with Section 1009.3.
4. Separation from the interior of the building is not required for exterior stairways or ramps connected to open-ended corridors, provided that Items 4.1 through 4.5 are met:
   - 4.1 The building, including corridors, stairways or ramps, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
   - 4.2 The open-ended corridors comply with Section 1018.
   - 4.3 The open-ended corridors are connected on each end to an exterior exit ramp or stairway complying with Section 1026.
   - 4.4 The exterior walls and openings adjacent to the exterior exit stairway or ramp comply with Section 1022.7.
   - 4.5 At any location in an open-ended corridor where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior stairway or ramps shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

Reason: Current practice as explained in the past two IBC Code and Commentary editions is to require this protection consistent with the requirement in Section 1022.7 for protection of interior stairways and ramp exterior walls. Section 1022.7 is not referenced in 1026.6 or in 1022.2. The proposed language is similar to 1022.7 except that instead of measuring the angle between the building exterior walls and the unprotected walls at the exterior of the stairway or ramp, the proposed language measures between the building exterior walls and a vertical projection for the planes of the guard of the exterior stairway and ramp including landings. If the current practice as outlined in the IBC Code and Commentary is not correct then this code change should be disapproved and the Code and Commentary should be updated.

Cost Impact: This code change will not increase the cost of construction from current practice.

1026.6-E-Richardson.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The idea of protecting the exterior stairway in a corner is valid, however, the proposed verbiage is confusing.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dennis Richardson, PE, CBO, City of Salinas, representing Tri-Chapter (Peninsula, East Bay and Monterey Chapters, ICC), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1026.6 Exterior stairway and ramp protection. *Exterior exit stairways* and *ramps* shall be separated from the interior of the building as required in Section 1022.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical <u>plane</u> <u>projecting from the edge</u> ~~projection of the planes of the guard~~ of an exterior stairway or ramp <u>and</u> ~~including~~ landings <u>is</u> ~~are~~ exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the exterior wall shall be rated in accordance with Section 1022.7.

Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are no more than two stories above grade plane where a level of exit discharge serving such occupancies is the first story above grade plane.
2. Separation from the interior of the building is not required where the exterior stairway or ramp is served by an exterior ramp or balcony that connects two remote exterior stairways or other approved exits, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be a minimum of 50 percent of the height of the enclosing wall, with the top of the openings no less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the interior of the building is not required for an exterior stairway or ramp located in a building or structure that is permitted to have unenclosed exit access stairways in accordance with Section 1009.3.
4. Separation from the interior of the building is not required for exterior stairways or ramps connected to open-ended corridors, provided that Items 4.1 through 4.5 are met:
   - 4.1 The building, including corridors, stairways or ramps, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
   - 4.2 The open-ended corridors comply with Section 1018.
   - 4.3 The open-ended corridors are connected on each end to an exterior exit ramp or stairway complying with Section 1026.
   - 4.4 The exterior walls and openings adjacent to the exterior exit stairway or ramp comply with Section 1022.7.
   - 4.5 At any location in an open-ended corridor where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior stairway or ramps shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

Commenter's Reason: Current practice as explained in the past two IBC Code and Commentary editions is to require this protection consistent with the requirement in Section 1022.7 for protection of interior stairways and ramp exterior walls. Section 1022.7 is not referenced in 1026.6 or in 1022.2. The proposed language is similar to 1022.7 except that instead of measuring the angle between the building exterior walls and the unprotected walls at the exterior of the stairway or ramp, the proposed language measures between the building exterior walls and a vertical projection of the edge of an exterior stairway or ramp including landings. According to the egress committee, this concept is valid. The simplified language in this public comment conveys the interpretation found in the 2012 Code and Commentary.

E154-12

Final Action: AS AM AMPC____ D

E155-12
1027.1 (IFC [B] 1027.1)

<u>Proposed Change as Submitted</u>

Proponent: Robert J Davidson, Davidson Code Concepts LLC, representing SaftiFirst a Division of O'Keeffes, Inc. (rjd@davidsoncodeconcepts.com)

Revise as follows:

1027.1 (IFC [B] 1027.1) General. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide direct access to grade. The exit discharge shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and capacity of the required exits.

1. A maximum of 50 percent of the number and capacity of interior exit stairways and ramps is permitted to egress through areas on the level of exit discharge provided all of the following are met:
   1.1. Such enclosures egress to a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the enclosure.
   1.3. The egress path from the interior exit stairway and ramp on the level of exit discharge is protected throughout by an approved automatic sprinkler system. All portions of the level of exit discharge with access to the egress path shall either be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of interior exit stairways or ramps.
2. A maximum of 50 percent of the number and capacity of the interior exit stairways and ramps is permitted to egress through a vestibule provided all of the following are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating for the enclosure.
   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the level of exit discharge by construction providing <u>45 minutes of fire-resistance rated</u> protection ~~at least~~ ~~the equivalent of approved wired glass in steel frames~~.
   2.4. The area is used only for means of egress and exits directly to the outside.
3. *Horizontal exits* complying with Section 1025 shall not be required to discharge directly to the exterior of the building.

Reason: The purpose of this proposal is to eliminate a left over reference to "wired glass" for purposes of fire protection. The last few cycles references to wired glass have been replaced with references to fire-rated glazing or other generic terms to eliminate a reference to a specific product.

The reference here is replaced with a requirement of 45 minutes of fire resistance because that is the level of fire-resistance rating historically associated with wired glass in steel frames and the code section is looking for that equivalent.

From NFPA 257-2007, "Standard on Fire Test for Window and Glass Block Assemblies":

> ***B.2.3*** *The current requirements for fire test duration are open, whereas previous editions limited the duration to 45 minutes. With the advent of new glazing materials that provide various levels of fire protection, the current requirements have responded to the needs of the industry and the fire protection community by establishing various fire protection ratings that are both longer and shorter than the previous 45-minute specification. <u>The 45-minute limit was based on the ability of standard wired glass to perform satisfactorily in accordance with earlier editions of NFPA 257.</u>*

Cost Impact: This code change will not increase construction costs.

1027.1-E-Davidson.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed change for a 45 minutes fire resistance rating is an increase without technical justification. Wired glass is typically considered equivalent to a 45 minutes fire protection rating.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Robert J Davidson, Davidson Code Concepts, LLC, representing SaftiFirst a Division of O'Keefes, Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1027.1 (IFC [B] 1027.1) General. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide direct access to grade. The exit discharge shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and capacity of the required exits.

1. A maximum of 50 percent of the number and capacity of interior exit stairways and ramps is permitted to egress through areas on the level of exit discharge provided all of the following are met:
   1.1. Such enclosures egress to a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the enclosure.
   1.3. The egress path from the interior exit stairway and ramp on the level of exit discharge is protected throughout by an approved automatic sprinkler system. All portions of the level of exit discharge with access to the egress path shall either be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of interior exit stairways or ramps.
2. A maximum of 50 percent of the number and capacity of the interior exit stairways and ramps is permitted to egress through a vestibule provided all of the following are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating for the enclosure.
   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the level of exit discharge by ~~construction providing 45 minutes of fire-resistance rated protection~~ <u>a fire partition constructed in accordance with Section 708.</u>

   <u>**Exception:** The maximum transmitted temperature rise is not required.</u>

   2.4. The area is used only for means of egress and exits directly to the outside.
3. *Horizontal exits* complying with Section 1025 shall not be required to discharge directly to the exterior of the building.

Commenter's Reason: The committee's reason for denial is confusing in that the statement indicates the suggested reference to a 45 minutes fire resistance rating is an increase without justification, then they state that the wired glass equivalent that currently exists is considered equivalent to a 45 minutes of protection.

I believe they were referring to the fact that the referenced wired glass equivalent does not have a maximum transmitted temperature rise rating. The suggested modification refers to a fire partition for the method of construction. Though the fire partition requires a one hour rating in accordance with Section 708, the impact is negligible based upon common construction methods and the use of code recognized terms and methods will provide for clarity in design and construction.

To address the committee's concern an exception to the maximum transmitted temperature rise has been added.

E155-12
Final Action: AS AM AMPC____ D

E160-12

1028.9.5, 1028.10.2.1, Table 1028.10.2.1, 1028.10.2.2; (IFC [B] 1028.9.5, 1028.10.2.1, Table 1028.10.2.1, 1028.10.2.2)

Proposed Change as Submitted

Proponent: Dan Casella, Chair, ICC 300 Development Committee, Standard for Bleachers, Folding and Telescopic Seating and Grandstands

Revise as follows:

1028.9.5 (IFC [B] 1028.9.5) Assembly aisle termination. Each end of an *aisle* shall terminate at cross *aisle*, foyer, doorway, vomitory or concourse having access to an *exit*.

Exceptions:

1. Dead-end *aisles* shall not be greater than 20 feet (6096 mm) in length.
2. Dead-end *aisles* longer than 16 rows ~~20 feet (6096 mm)~~ are permitted where seats beyond the 16th row ~~20-foot (6096 mm)~~ dead-end *aisle* are no more than 24 seats from another *aisle*, measured along a row of seats having a minimum clear width of 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row where seats have backrests or beyond ten where seats are without backrests in the row.
3. For *smoke-protected assembly seating*, the dead end *aisle* length of vertical *aisles* shall not exceed a distance of 21 rows.
4. For *smoke-protected assembly seatin*g, a longer dead-end *aisle* is permitted where seats beyond the 21-row dead-end *aisle* are not more than 40 seats from another *aisle*, measured along a row of seats having an *aisle* accessway with a minimum clear width of 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat above seven in the row where seats have backrests or beyond ten where seats are without backrests in the row.

1028.10.2.1 (IFC [B] 1028.10.2.1) Dual access. For rows of seating served by *aisles* or doorways at both ends, there shall not be more than 100 seats per row. The minimum clear width of 12 inches (305 mm) between rows shall be increased by 0.3 inch (7.6 mm) for every additional seat beyond 14 seats where seats have backrests or beyond 21 where seats are without backrests. ~~, but~~ The minimum clear width is not required to exceed 22 inches (559 mm).

Exception: For s*moke-protected assembly seating*, the row length limits for a 12-inch-wide (305 mm) *aisle accesswa*y, beyond which the *aisle accessway* minimum clear width shall be increased, are in Table 1028.10.2.1.

TABLE 1028.10.2.1 (IFC [B] TABLE 1028.10.2.1)
SMOKE-PROTECTED ASSEMBLY AISLE ACCESSWAYS

TOTAL NUMBER OF SEATS IN THE SMOKE PROTECTED ASSEMBLY OCCUPANCY	**MAXIMUM NUMBER OF SEATS PER ROW PERMITTED TO HAVE A MINIMUM 12-INCH CLEAR WIDTH AISLE ACCESSWAY**			
	Aisle or doorway at both ends of row		**Aisle or doorway at one end of row only**	
	Seats with backrests	Seats without backrests	Seats with backrests	Seats without backrests
Less than 4,000	14	21	7	10
4,000	15	22	7	10
7,000	16	23	8	11
10,000	17	24	8	11

TOTAL NUMBER OF SEATS IN THE SMOKE PROTECTED ASSEMBLY OCCUPANCY	MAXIMUM NUMBER OF SEATS PER ROW PERMITTED TO HAVE A MINIMUM 12-INCH CLEAR WIDTH AISLE ACCESSWAY			
	Aisle or doorway at both ends of row		Aisle or doorway at one end of row only	
	Seats with backrests	Seats without backrests	Seats with backrests	Seats without backrests
13,000	18	25	9	12
16,000	19	26	9	12
19,000	20	27	10	13
22,000 and greater	21	28	11	14

For SI: 1 inch = 25.4 mm.

1028.10.2.2 (IFC [B] 1028.10.2.2) Single access. For rows of seating served by an *aisle* or doorway at only one end of the row, the minimum clear width of 12 inches (305 mm) between rows shall be increased by 0.6 inch (15.2 mm) for every additional seat beyond seven seats where seats have backrests or beyond ten where seats are without backrests. ~~, but~~ the minimum clear width is not required to exceed 22 inches (559 mm).

> **Exception:** For *smoke-protected assembly seating*, the row length limits for a 12-inch-wide (305 mm) *aisle accessway*, beyond which the *aisle accessway* minimum clear width shall be increased, are in Table 1028.10.2.1.

Reason: The intent of this proposal is for coordination with ICC 300 Section 407.3, 407.4 and 407.5.

This proposal is an extension of the recognition of the fact that bench seating without backrests allows easier and quicker lateral movement along a bleacher type row as compared with rows of seating which are provided with backrests. In seating with backrests, occupants typically must remain facing forward or approximately perpendicular to the aisle access and side step toward the aisle. The wider the aisle access, the more the occupants are allowed to turn and walk toward the aisle. When backrests are not present it is possible to turn and face parallel to the aisle access regardless of aisle access width. This in turn allows a walking style motion instead of side stepping.

Seating without backrests also allows easier vertical movements between rows without climbing over seatbacks or using aisles. Although this is not a consideration during normal egress, the benefits to crowd management, security, and emergency medical personnel are obvious.

Current IBC aisle access requirements are based on seating with backrests. For the minimum 12" aisle access, 6 seats are allowed between any seat and an aisle. From there that number of seats is increased with increases in aisle access width and smoke protection. This proposal increases the basic number of seats between any seat and an aisle for the minimum 12" aisle access from 6 to 9(single access) or 10(dual access). The increase factors for width and smoke protection remain unchanged.

Once the increased number is exceeded in a dual access or single access row, the calculation for the increased access aisle width would start at this point. Example of dual access:

Seats with backs – 30 seats; 30 – 14 = 16; 16 x 0.3" + 12" = 16.8" minimum access aisle width
Seats without backs – 30 seats; 30 – 21 = 7; 7 x 0.3" + 12" = 14.1" minimum access aisle width

This proposal also re-introduces the long standing and time tested dead end aisle limit of 16 rows for non-smoke protected seating. The 16 row limit is reasonable considering the attentiveness of people and typically shorter periods of occupancy involved with assembly. It also matches well with the 21 row limit already afforded to smoke protected seating.

The purpose of the ICC 300 standard is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, and safety to life and property relative to the construction, alteration, repair, operation, and maintenance of new and existing temporary and permanent bench bleachers, folding and telescopic seating, and grandstands. Information can be downloaded from the following website: http://www.iccsafe.org/cs/standards/IS-BLE/Pages/default.aspx. Since its inception in March 2000, the committee has produced 3 editions, the latest edition being 2012. All meeting are open to the public.

Cost Impact: None

1028.9.5-E-CASELLA-ICC 300.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There was no technical justification provided for quicker vertical movement claimed in the reason or an increase in the dead end length.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Dan Casella, Chair, ICC 300 – Development Committee, Standard for Bleachers, Folding and Telescopic Seating and Grandstands; Gene Boecker, AIA, Code Consultants, Inc (CCI); requests Approval as Submitted.

Commenter's Reason (Casella): The proposal should be approved as submitted as part of the harmonization efforts between the assembly seating arrangements in IBC and the ICC 300 standard.

Quicker vertical movement applies only where seats are without backrests as indicated in the second paragraph of the reason statement.

Per IBC 1018.4, dead-end corridors may be extended from 20 feet to 50 feet under exceptions 1 and 2. 50 feet is approximately equivalent to a maximum of 16 rows of seating. Per IBC 903, sprinklers will typically be required for the A-1 and A-4 nonsmoke-protected applications where assembly aisles are provided. Again, the attentiveness of the people and the shorter period of occupancy allow for an increased dead-end length. In addition, ceilings must be higher to accommodate site lines in assembly seating. This results in larger room volumes for smoke accumulation and affords greater egress time to walk the increased length.

When the IBC was assembled from the BOCA, SBC and UBC codes, all three recognized the proposed 16 row dead-end limit for nonsmoker-protected assembly seating. We believe it was merely an oversight that this was not included in the IBC.

References:

- 1999 BOCA Section 1013.6.1 Exception 1
- 1997 SBC Section 1019.11.6.1 Exception 5
- 1997 UBC Section 1004.3.2.4 Exception 2

The purpose of the ICC 300 standard is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, and safety to life and property relative to the construction, alteration, repair, operation, and maintenance of new and existing temporary and permanent bench bleachers, folding and telescopic seating, and grandstands. Information can be downloaded from the following website: http://www.iccsafe.org/cs/standards/IS-BLE/Pages/default.aspx. Since its inception in March 2000, the committee has produced 3 editions, the latest edition being 2012. All meeting are open to the public.

Commenter's Reason (Boecker): The proposal should be approved.

The proposal seeks to harmonize the IBC with the ICC 300 standard. The ICC 300 committee had extensive discussions on this issue and agreed that the revision was in keeping with the needs for assembly seating of this type. If this is not approved, there will be a gap between what is allowed in the ICC 300 Standard and what is allowed in the IBC. In a facility such as a high school with fixed seating on one side and a telescoping seating on the other, two different sets of rules would be in place if this is not approved.

The history of use demonstrates that this is an appropriate method of seating where no seat backs are provided

The purpose of the ICC 300 standard is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, and safety to life and property relative to the construction, alteration, repair, operation, and maintenance of new and existing temporary and permanent bench bleachers, folding and telescopic seating, and grandstands. Information can be downloaded from the following website: http://www.iccsafe.org/cs/standards/IS-BLE/Pages/default.aspx. Since its inception in March 2000, the committee has produced 3 editions, the latest edition being 2012. All meeting are open to the public.

E160-12

Final Action: AS AM AMPC____ D

E169-12
1103.2.2

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Delete without substitution:

~~**1103.2.2 Existing buildings.** Existing buildings shall comply with Section 3411.~~

Reason: This exception is being deleted because it is not needed. Application of the building code for existing buildings begins in chapter 34. The scope of accessibility requirements for existing buildings is specified in chapter 34, specifically in section 3411. IBC chapter 11 is not the scoping chapter for existing building accessibility, therefore this exception in chapter 11 is simply redundant and not needed. It is technically an invalid exception because it is a scoping exception for a chapter that does not scope accessibility for existing buildings. Other chapters of the IBC do not have a similar exception because the general scope of the IBC is for new construction with Chapter 34 applicable to scope the IBC or IEBC for existing construction. The general scope of application of the IBC and IEBC to existing buildings is established in IBC Chapter 34; the IEBC as referenced by IBC section 3401.6 as an alternative to IBC chapter 34.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None

1103.2.2-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: While the committee agreed with the proponents reason that existing buildings are covered in Chapter 34, the pointer to the existing building requirements in Chapter 34 for accessibility requirements is needed for the more casual user. Coordination with the IEBC may also be necessary depending on other code changes in regards to Chapter 34.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee, requests Approval as Submitted.

Commenter’s Reason: Code change G201 removed the existing building requirements from the IBC, therefore this reference is no longer valid. Accessibility requirements for existing buildings can be found in the IEBC.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “Areas of Study”. The Area of Study for this code change and public comment is called “IBC Coordination with the new ADAAG”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E169-12

Final Action: AS AM AMPC____ D

E174-12
1103.2.12

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Delete without substitution:

~~**1103.2.12 Day care facilities.** Where a day care facility is part of a *dwelling unit*, only the portion of the structure utilized for the day care facility is required to be accessible.~~

Reason: This exception is invalid within the context of the IBC. A day care facility cannot be part of a dwelling unit because they are two distinct occupancies. If a day care facility and a dwelling unit are in the same building then the building is a mixed occupancy building and the accessibility provisions for each occupancy are applicable, and no exception is required or appropriate. The dwelling unit portion would be a Group R-2 or R-3; the day care facility would be Group I-4, I-2 or E. Accessibility requirements would be scoped to each occupancy group accordingly.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None

1103.2.12-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There is value in having this pointer remain since this can be a business in an IRC building.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee, requests Approval as Submitted.

Commenter's Reason: Day care facilities should not be singled out as a specific exception for several reasons. Day care conducted in *dwelling units* is most often found in IRC dwellings rather than IBC dwellings. Also, in efforts to coordinate with the ADAAG by providing a laundry list of exceptions in IBC Section 1103, it is not necessary to specify day care facilities. The ADAAG regulates business use of the home in a wide variety of possible uses, not just day care. Providing this specific exception can be misleading and unnecessary by narrowing the focus of regulated businesses in *dwelling units* to day care facilities. Where constructed new, any day care occupancy connected to any other occupancy would be considered a mixed use building and should be addressed as such. Therefore, this is literally already covered by Chapter 11.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "IBC Coordination with the new ADAAG". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the

CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E174-12

Final Action: AS AM AMPC____ D

E176-12
1103.2.16 (New)

Proposed Change as Submitted

Proponent: David R. Scott, AIA, representing Target Corporation (David.Scott@Target.com)

Add new text as follows:

1103.2.16 Display areas. Display areas that do not exceed 300 square feet (30 m^2) in area and are not open to the public are not required to be accessible.

Reason: Access to these display areas are not intended by the general public. We feel Section 1103.2.8 Limited access spaces, do not clearly identify that display areas would fall under this section. We have established a size of 300 sq. ft. to give a limit to a size of a display area as well as to tie into the size established in Section 1103.2.3.

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

1103.2.16 (New)-E-Scott.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The phrase "display areas" is too broad for uniform enforcement. The term "display window" might be better language for this exception. If this includes any type of employee work area, approach, enter and exit would be required.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David Scott, AIA, representing Target Corporation, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1103.2.16 Display window areas. Display window areas that do not exceed 300 square feet (27.9 sq. meters) in floor area and are less than 7 feet in any plan dimension, and to which the general public is excluded, need not be made accessible.

Commenter's Reason: Committee comment indicated that "Display areas" could be too general or broad. We have revised this to "Display Window Areas" to help define the scope or area being addressed. Committee also indicated if this includes any type of employee work area, approach, enter and exit would be required. Per section 1208.1, a space is not considered a room or habitable space unless it is at least 7 ft. in any plan dimension. Additionally, section 1103.2.3 for work areas limit accessible requirement to 300 sq. ft. Therefore, a display window area that is less than 7 ft. in any plan dimension would not be considered a room or habitable space. The new language being proposed is to add clarity. If an area is considered too small to be considered a room or habitable space, it would also not be required to be accessible.

This proposed change will help tie section 1103.2.3 together with section 1208 and add clarity and consistency in the language.

E176-12

Final Action: AS AM AMPC____ D

E183-12
1106.1, 1106.2

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1106.1 Required. Where parking is provided, accessible parking spaces shall be provided in compliance with Table 1106.1, ~~except~~ <u>and</u> as required by Sections 1106.2 through 1106.4. Where more than one parking facility is provided on a site, the number of parking spaces required to be accessible shall be calculated separately for each parking facility.

1106.2 Groups <u>I-1, R-1, R-2 and R-4</u> ~~R-2 and R-3~~. <u>In addition to the parking required by Table 1106.1, in Groups I-1, R-1, R-2 and R-4, where parking is provided for Accessible and Type A units, at least one accessible parking space shall be provided for each unit.</u> ~~At least 2 percent, but not less than one, of each type of parking space provided for occupancies in Groups R-2 and R-3, which are required to have Accessible, Type A or Type B dwelling or sleeping units, shall be accessible.~~ Where parking is provided within or beneath a building, accessible parking spaces shall also be provided within or beneath the building.

1106.3 Hospital outpatient facilities. At least 10 percent, but not less than one, of care recipient and visitor parking spaces provided to serve hospital outpatient facilities shall be accessible.

1106.4 Rehabilitation facilities and outpatient physical therapy facilities. At least 20 percent, but not less than one, of the portion of care recipient and visitor parking spaces serving rehabilitation facilities specializing in treating conditions that affect mobility and outpatient physical therapy facilities shall be accessible.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

When parking is provided for residents, this proposal would require an accessible space for each Accessible and Type A unit, as well as accessible parking for the remainder of the units. This should meet both ADA and FHA. Literally, current IBC is asking for 2% of the parking provided for the three types of accessible units. 2010 ADA requires 2% of parking for all units that are not Accessible or Type A only when there is more than one parking space per unit. Table 1106.1 already gets you more than 2%. (2010 *ADA 208.3.2)*

Since Accessible units also required in Group I-1 assisted living, and these facilities may provide parking for residents, this Group has been added to the list. If the assisted living facility does not provide parking spaces for residents, the parking lots would just meet the general parking lot requirements.

Section 1106.3 and 1106.4 are relevant to only portions of the parking facilities for hospitals and rehabilitation facilities. Areas such as employee parking should use Table 1106.1 for the number of accessible spaces.

Cost Impact: None

1106.1#2-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent requested disapproval so that they can work with the National Association of Home Builders to address parking for Type B units and single family and townhouse complexes with no accessible units. There was also a question if the percentage asked for was consistent with the Fair Housing Act requirements.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1106.1 Required. Where parking is provided, accessible parking spaces shall be provided in compliance with Table 1106.1, <u>except</u> ~~and~~ as required by Sections 1106.2 through 1106.4. Where more than one parking facility is provided on a site, the number of parking spaces required to be accessible shall be calculated separately for each parking facility.

1106.2 Groups I-1, R-1, R-2<u>, R-3</u> and R-4. <u>Accessible parking spaces shall be provided in Groups I-1, R-1, R-2, R-3 and R-4 occupancies in accordance with items 1 through 4 as applicable.</u>

<u>1.</u> <u>In Groups R-2, R-3, and R4 occupancies which are required to have Accessible, Type A or Type B dwelling or sleeping units, at least 2 percent, but not less than one, of each type of parking space provided shall be accessible.</u>
<u>2.</u> <u>In Groups I-1 and R-1 occupancies accessible parking shall be provided in accordance with Table 1106.1.</u>
<u>3.</u> ~~In addition~~ <u>Where at least one parking space is provided for each dwelling unit or sleeping unit,</u> ~~to the parking required by Table 1106.1, in Groups I-1, R-1, R-2 and R-4, where parking is provided for Accessible and Type A units,~~ at least one accessible parking space shall be provided for each <u>Accessible and Type A unit</u>.
<u>4.</u> Where parking is provided within or beneath a building, accessible parking spaces shall also be provided within or beneath the building.

Commenter's Reason: The intent of this public comment is to clarify and coordinate parking requirements for what may be considered residential occupancies under Fair Housing and ADA. The additional language in the base paragraph is to editorial to clarify requirements.

Item 1 - The proposed comment reintroduces the basic requirement that for Group R-2 and R-3 (and R-4 per Section 310.6) when parking is made available at least 2%, but no less than one, space must meet the accessible requirements. See also E218-12 for signage requirements. These spaces are not required to be signed as accessible providing the space is provided.
Item 2 – This is added as coordination with item 3. If this section will include where Accessible units are required, then accessible parking for R-1 and I-1 must be clear.
Item 3 - This comment also address the change in the ADA which requires a one-to-one ratio when parking is provided for each dwelling unit, an accessible parking space is required for each dwelling unit that is an Accessible or Type A dwelling Unit.
Item 4 – This is existing text.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "IBC Coordination with the new ADAAG". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E183-12
Final Action: AS AM AMPC____ D

E186-12
1107.5.1.1, 1107.6.4.1

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1107.5.1 Group I-1. *Accessible units* and *Type B units* shall be provided in Group I-1 occupancies in accordance with Sections 1107.5.1.1 and 1107.5.1.2.

1107.5.1.1 Accessible units. In Group I-1, other than assisted living facilities, at least 4 percent, but not less than one, of the *dwelling units* and *sleeping unit*s shall be *Accessible units*. In Group I-1 assisted living facilities, at least 10 percent, but not less than one, of the *dwelling units* and *sleeping unit*s shall be *Accessible units.*

1107.5.1.2 Type B units. In structures with four or more *dwelling units* or *sleeping unit*s *intended to be occupied as a residence*, every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*.
Exception: The number of *Type B units* is permitted to be reduced in accordance with Section 1107.7.

1107.6.4 Group R-4. *Accessible units* and *Type B units* shall be provided in Group R-4 occupancies in accordance with Sections 1107.6.4.1 and 1107.6.4.2.

1107.6.4.1 Accessible units. In Group R-4, other than assisted living facilities, at least one of the *dwelling* or *sleeping unit*s shall be an *Accessible unit*. In Group R-4 assisted living facilities, at least two of the *dwelling* or *sleeping unit*s shall be an *Accessible unit*.

1107.6.4.2 Type B units. In structures with four or more *dwelling units* or *sleeping unit*s *intended to be occupied as a residence*, every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*.

Exception: The number of *Type B units* is permitted to be reduced in accordance with Section 1107.7.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

The intent of this code change is to establish a minimum number of Accessible units required in Assisted Living Facilities for Group I-1 and R-4. The 10% Accessible units is based on anticipated need in these types of facilities.

The curre nt ADA requirements address residential facilities and long term care facilities, typically hospitals and nursing homes. The text does not directly address what the International Codes refer to as Assisted Living or Group I-1 facilities. The current text requires the following: 100% Accessible units in Group I-2 rehabilitation facilities; 50% Accessible units in Group I-2 nursing homes; 4% Accessible units in all Group I-1 and 2% Type A units in Group R-2 apartment buildings. The 2009 IBC had 10% Accessible units for residential board and care facilities, but the deletion of that term in the 2012 IBC resulted in the loss of that requirement. This addition will establish a minimum level for Group I-1 assisted living facilities while leaving other Group I-1 facilities to remain at 4%. Facilities can always choose to exceed this limit depending on the needs of their clientele and the desire of the facility to have optimum flexibility. Since these facilities are custodial care, and not nursing care, 10% Accessible units should meet demand.

The committee feels that if the building code addresses the minimum accessibility needs for these types of facilities, then the federal government may not feel that they need to establish additional accessibility requirements.

Cost Impact: Increase

1107.5.1-E-BALDASSARRA

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: This proposal fills a gap between apartment living and nursing homes. The 10% is based on the anticipated need in assisted living facilities. This provision was lost when the definition for residential care facilities was removed during the last cycle.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1107.5.1.1 Accessible units. In Group I-1, ~~other than assisted living facilities~~ Condition 1, at least 4 percent, but not less than one, of the *dwelling units* and *sleeping unit*s shall be *Accessible units*. In Group I-1 ~~assisted living facilities~~ Condition 2, at least 10 percent, but not less than one, of the *dwelling units* and *sleeping unit*s shall be *Accessible units.*

1107.6.4.1 Accessible units. In Group R-4, ~~other than assisted living facilities~~ Condition 1,at least one of the *dwelling* or *sleeping unit*s shall be an *Accessible unit*. In Group R-4 ~~assisted living facilities~~ Condition 2, at least two of the *dwelling* or *sleeping unit*s shall be an *Accessible unit*.

Commenter's Reason: Code change E186 is a technical change which proposes to increase the required number of Accessible sleeping unit for assisted living arrangements where the anticipated need is greater than the current 4%. For Group I-1, Condition 2, this proposal will be consistent with anticipated need within these types of facilities. This proposal was approved by the committee in Dallas. The purpose of this public comment is limited to the editorial coordination of terminology with the approval of Code change G31-12.

At the Code Development Hearing, the IBC - General committee approved as submitted G31-12 which created two occupancy conditions for Group I-1, similar to what is currently in the IBC for Group I-3 and was approved for Group I-2 in G257. The end result is that where warranted, the code would call out Group I-1 into Condition 1, where residents can evacuate without assistance, and Group I-1, Condition 2, where residents may need limited assistance in evacuation. As indicated in the reason statement for G31, the benefit of the condition concept, when compared to creating new use groups, (i.e. Group I-5 or I-6) is that a majority of code requirements would still apply to all Group I-1 occupancies.

Following the successful action on G31, the Care Study Group for the Code Technologies Committee (CTC) did a a review of code changes submitted in the 2012 Cycle which are unique to Group I-1 to determine whether or not the condition designation was necessary in order to distinguish between the two Group I-1 conditions. Code change E186 is one such application where the Group I-1, Condition 1 and Group I-1, Condition 2 designation is warranted, and therefore this public comment is being submitted by the CTC.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "Care Facilities". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/CTC/Pages/CareFacilities.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

Staff analysis: Code changes G31 was Approved as Submitted and G257 was Approved as Modified at the Code Development Hearings. A public comment has not been submitted for either proposal. Accordingly it has been placed on the consent agenda.

E186-12
Final Action: AS AM AMPC____ D

E191-12
1107.6.2.1.1, 1107.6.2.2, 1107.6.3, 1107.6.4, 1107.6.4.1, 1107.6.4.2

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1107.6.2 Group R-2. Accessible units, Type A units and Type B units shall be provided in Group R-2 occupancies in accordance with Sections 1107.6.2.1 and 1107.6.2.2.

1107.6.2.1 Apartment houses, monasteries and convents. Type A units and Type B units shall be provided in apartment houses, monasteries and convents in accordance with Sections 1107.6.2.1.1 and 1107.6.2.1.2.

1107.6.2.1.1 Type A units. In Group R-2 occupancies containing more than 20 dwelling units or sleeping units, at least 2 percent but not less than one of the units shall be a Type A unit. All Group R-2 units on a site shall be considered to determine the total number of units and the required number of Type A units. Type A units shall be dispersed among the various classes of units. <u>Bedrooms within monasteries and convents shall be counted as sleeping units for the purpose of determining the number of units.</u>

Exceptions:

1. The number of Type A units is permitted to be reduced in accordance with Section 1107.7.
2. Existing structures on a site shall not contribute to the total number of units on a site.

1107.6.2.1.2 Type B units. Where there are four or more dwelling units or sleeping units intended to be occupied as a residence in a single structure, every dwelling unit and sleeping unit intended to be occupied as a residence shall be a Type B unit.

Exception: The number of Type B units is permitted to be reduced in accordance with Section 1107.7.

1107.6.2.2 Group R-2 other than apartment houses, monasteries and convents. In Group R-2 occupancies, other than apartment houses, monasteries and convents, Accessible units and Type B units shall be provided in accordance with Sections 1107.6.2.2.1 and 1107.6.2.2.2. <u>Bedrooms within congregate living facilities shall be counted as sleeping units for the purpose of determining the number of units.</u>

1107.6.2.2.1 Accessible units. Accessible dwelling units and sleeping units shall be provided in accordance with Table 1107.6.1.1.

1107.6.2.2.2 Type B units. Where there are four or more dwelling units or sleeping units intended to be occupied as a residence in a single structure, every dwelling unit and every sleeping unit intended to be occupied as a residence shall be a Type B unit.

Exception: The number of Type B units is permitted to be reduced in accordance with Section 1107.7.

1107.6.3 Group R-3. In Group R-3 occupancies where there are four or more dwelling units or sleeping units intended to be occupied as a residence in a single structure, every dwelling unit and sleeping unit intended to be occupied as a residence shall be a Type B unit. <u>Bedrooms within congregate living facilities shall be counted as sleeping units for the purpose of determining the number of units.</u>

Exception: The number of Type B units is permitted to be reduced in accordance with Section 1107.7.

1107.6.4 Group R-4. Accessible units and Type B units shall be provided in Group R-4 occupancies in accordance with Sections 1107.6.4.1 and 1107.6.4.2. Bedrooms within congregate living facilities shall be counted as sleeping units for the purpose of determining the number of units.

1107.6.4.1 Accessible units. At least one of the ~~dwelling or~~ sleeping units shall be an Accessible unit.

1107.6.4.2 Type B units. In structures with four or more ~~dwelling units or~~ sleeping units intended to be occupied as a residence, every ~~dwelling unit and~~ sleeping unit intended to be occupied as a residence shall be a Type B unit.

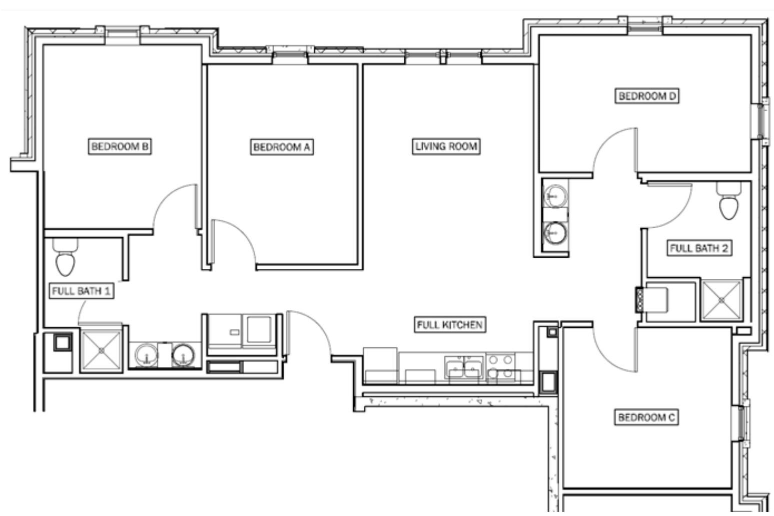
Exception: The number of Type B units is permitted to be reduced in accordance with Section 1107.7.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

The intent is to try and address the new style of dormitory facilities that operate like dorms, but look like apartments. There has also been the interpretation that fraternities and sororities are a single dwelling unit for purposes of accessibility. The statement about congregate residences should help address how to count units for these types of facilities. This should be extended to the 16 or fewer congregate residences permitted in Group R-3 and R-4.

Group R-4 facilities are group homes and therefore are always congregate residences; therefore they will not include dwelling units.

Below is an example of student on-campus housing at Indiana University. While it looks like an apartment, it is handled administratively by the university exactly the same as typical dorm room assignments.



Cost Impact: None

1107.6.2-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent asked for disapproval in order to allow them to work on coordination between the 2010 ADA Standard for Accessible Design and the Fair Housing Act for the new style of dormitories that look more like apartments than the old style dorm layouts.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1107.6.2.1.1 Type A units. In Group R-2 occupancies containing more than 20 dwelling units or sleeping units, at least 2 percent but not less than one of the units shall be a Type A unit. All Group R-2 units on a site shall be considered to determine the total number of units and the required number of Type A units. Type A units shall be dispersed among the various classes of units. Bedrooms within monasteries and convents shall be counted as sleeping units for the purpose of determining the number of units. Where the sleeping units are grouped into suites, only one sleeping unit in each suite shall be permitted to count towards the number of required Type A units.

Exceptions:

1. The number of Type A units is permitted to be reduced in accordance with Section 1107.7.
2. Existing structures on a site shall not contribute to the total number of units on a site.

1107.6.2.1.2 Type B units. Where there are four or more dwelling units or sleeping units intended to be occupied as a residence in a single structure, every dwelling unit and sleeping unit intended to be occupied as a residence shall be a Type B unit.

Exception: The number of Type B units is permitted to be reduced in accordance with Section 1107.7.

1107.6.2.2 Group R-2 other than apartment houses, monasteries and convents. In Group R-2 occupancies, other than apartment houses, monasteries and convents, Accessible units and Type B units shall be provided in accordance with Sections 1107.6.2.2.1 and 1107.6.2.2.2. Bedrooms within congregate living facilities shall be counted as sleeping units for the purpose of determining the number of units. Where the sleeping units are grouped into suites, only one sleeping unit in each suite shall be permitted to count towards the number of required Accessible units.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: The new style of dorm setups are looking like dwelling units but still operate as dormitories. In large facilities, the Accessible rooms should not be all grouped into one suite, so that the students have options. In congregate living arrangements in Group R-3 and R-4, with the maximum size at 16 occupants, this is not an issue, therefore further modification of these sections is not needed. This proposal is consistent with the intent in the DOJ Regulations for housing for education in the adoption of the 2010 ADA Standards for Accessible Design.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "IBC Coordination with the new ADAAG". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E191-12

Final Action: AS AM AMPC____ D

E192-12
1107.7.2

Proposed Change as Submitted

Proponent: Cheryl Kent, U.S. Department of Housing and Urban Development (cheryl.d.kent@hud.gov)

Revise as follows:

1107.7.2 Multistory units. A multistory dwelling or sleeping unit which is not provided with elevator service is not required to be a Type B unit. Where a multistory unit is provided with external elevator service to only one floor, the floor provided with elevator service shall be the primary entry to the unit, shall comply with the requirements for a Type B unit and a kitchen and toilet facility shall be provided on that floor.

Reason: At the time that HUD's Fair Housing Accessibility Guidelines were drafted, HUD included provisions for multistory units when such units may be located in a building with a public elevator, requiring that the story that is served by the building elevator be the primary entry to the unit, that this story comply with the accessibility requirements of the Fair Housing Act with respect to the rooms located on the entry/accessible floor, and that this floor include a complying bathroom or powder room. It was HUD's expectation that the main living areas, including the kitchen, living and dining rooms would be on this story/floor, but that this story may not always include an accessible bathroom or powder room, so the Guidelines specifically stated that it would. Since that time, there have been new building types introduced into the housing market, including a few situations where multistory units, located in a building with a public elevator, did not have the kitchen located on the story with the primary entry; or there were multiple floors, rather than the typical, 2-story unit with kitchen, living and dining on the main entry level and bedrooms and bathrooms above. As the Fair Housing Act requires usable kitchens and bathrooms, it has been our position that the kitchen also needs to be on the primary entry level of such multistory units. This code change proposal is intended to incorporate this requirement.

Cost Impact: There should be no significant cost impact because the typical building situation in which a multistory unit may be located in a building with public elevator service most often already does include the primary living areas and the kitchen on the primary entry level. In those few situations where this may not be the case, this changed code language will make it clear, from the outset, before design and construction, that the story of the unit that is served by the building elevator will be the primary entry to the unit, will have rooms on this level that comply with the accessibility requirements, including an accessible kitchen and bathroom or powder room; thus assuring that costs, if any, will be minimal.

1107.7.2-E-Kent.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed language could be read to require bathrooms and kitchens within a sleeping unit. Adding the words "where provided within the unit" would address the concern.

Assembly Action: **None**

Individual Consideration Agenda

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

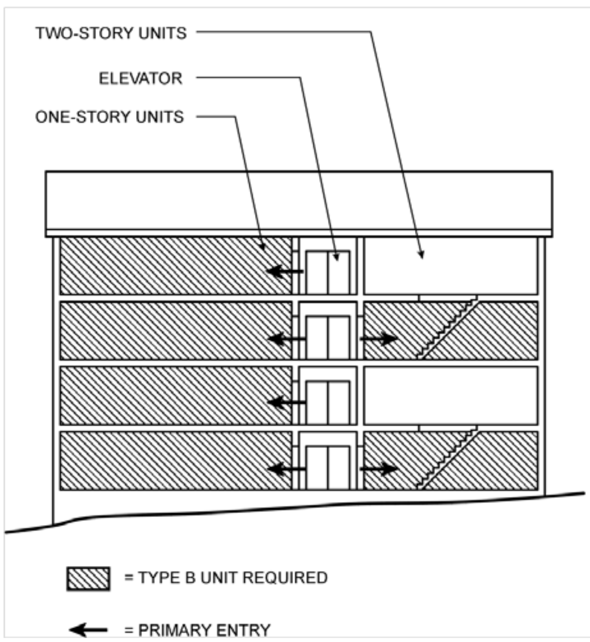
Public Comment 1:

Cheryl Kent, representing U.S. Department of Housing and Urban Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1107.7.2 Multistory units. A multistory dwelling or sleeping unit which is not provided with elevator service is not required to be a Type B unit. Where a multistory unit is provided with external elevator service to only one floor, the floor provided with elevator service shall be the primary entry to the unit, shall comply with the requirements for a Type B unit and, where provided within the unit, a living area, a kitchen and a toilet facility shall be provided on that floor.

Commenter's Reason: The Committee indicated that the language as originally written was unclear as to whether HUD wanted the kitchen to be accessible (even if located on the upper story of the multistory unit, or whether HUD wanted to ensure that the kitchen was located on the accessible level. The Committee also expressed concern that some types of dwelling units may not have a kitchen within the unit. The changes above are intended to address the Committee's concerns and also further clarify HUD's interpretation of the language in HUD's Fair Housing Accessibility Guidelines, which this provision in the code is intended to reflect. As HUD explained in its reason statement for this proposed change, at the time that HUD's Fair Housing Accessibility Guidelines (the Guidelines) were drafted, HUD included provisions for multistory units when such units may be located in a building with a public elevator, requiring that the story that is served by the building elevator be the primary entry to the unit, that this story comply with the accessibility requirements of the Fair Housing Act with respect to the rooms located on the entry/accessible floor, and that this floor include a complying bathroom or powder room. It was HUD's expectation that the primary entry level of the dwelling unit would include those living areas typically found on the lower story of a multistory unit and would include the kitchen and the living area, but may not include a powder room or bathroom. For this reason, the Guidelines specified a powder room or bathroom would be included on the primary entry level. (See attached graphic). It has since come to HUD's attention that some multistory dwelling units are being built with only the primary entry to the unit and a bathroom or powder room on the story served by the building elevator, with no other rooms or spaces on this level that would comply with the requirements for a Type B unit. This is not what HUD intended and it is not how HUD interprets the language in the Guidelines. HUD is proposing the above modification to address the concerns of the Committee and to also make clear that the primary entry level must include the living area, as well as the kitchen and a toilet facility, with the understanding that this is when these facilities are provided within the dwelling unit. Once again, HUD wishes to emphasize that this proposed change applies only to multistory dwelling units or sleeping units that are located in a building with a public elevator, and not multistory units located in buildings without a public elevator (e.g. townhouses). While most multistory dwelling units that are located in a building with a public elevator will be likely to have a living area, a kitchen and a toilet facility within the unit, the language as modified makes it clear that when those facilities are, in fact, provided within the unit, they must be on the accessible/primary entry level. We believe the language as modified addresses the Committee's concerns.



Public Comment 2:

Gene Boecker, AIA, Code Consultants, Inc. (CCI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1107.7.2 Multistory units. A multistory dwelling or sleeping unit which is not provided with elevator service is not required to be a Type B unit. Where a multistory unit is provided with external elevator service to only one floor, the floor provided with elevator service shall be the primary entry to the unit, shall comply with the requirements for a Type B unit and, <u>where provided within the unit</u>, a kitchen and toilet facility shall be provided on that floor.

Commenter's Reason: The committee felt that the language as originally written could be misinterpreted and offered this suggestion to resolve the concern. This makes it clear that the intent is to locate the kitchen on the accessible level in multi-story units; but, only where there is a kitchen in the unit. The logical also applies to the toilet room.

Although it is unlikely that these elements would not be located within the unit, this addresses the concern and removes the objections to its approval.

E192-12

Final Action: AS AM AMPC____ D

E200-12
1109.2.3

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

1109.2.3 Lavatories. Where lavatories are provided, at least 5 percent, but not less than one, shall be accessible. <u>Where an accessible lavatory is located within the accessible water closet compartment that lavatory shall not be the only accessible lavatory in the multi-compartment toilet room.</u> Where the total lavatories provided in a toilet room or bathing facility is six or more, at least one lavatory with enhanced reach ranges shall be provided.

Reason: Accessible lavatories must be available to all users of the toilet room any time the room is open. If the only accessible lavatory is within the accessible stall, others in the bathroom would not have access to that lavatory within the stall when the stall was in use. To prevent this, an additional accessible lavatory within the room should still be available for all users. It is not the intent of this section to prohibit someone from providing an accessible lavatory within an accessible stall, only that it not be the only one. This would be coordinated with ADA 213.3.4.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None

1109.2.3-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal will prevent someone from placing the only accessible lavatory within the accessible stall. This is consistent with the 2010 ADA Standard for Accessible Design.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gene Boecker, AIA, Code Consultants, Inc (CCI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1109.2.3 Lavatories. Where lavatories are provided, at least 5 percent, but not less than one, shall be accessible. Where an accessible lavatory is located within the accessible water closet compartment ~~that~~ <u>at least one additional accessible</u> lavatory shall ~~not~~ be <u>provided</u> ~~the only accessible lavatory~~ in the multi-compartment toilet room <u>outside the water closet compartment</u>. Where the total lavatories provided in a toilet room or bathing facility is six or more, at least one lavatory with enhanced reach ranges shall be provided.

Commenter's Reason: The proposed language does not change the intent of the section. It rephrases the text into a requirement instead of something to avoid. As originally written, it is conceivable that a second accessible lavatory in a second accessible water closet compartment would meet the requirement. That is not the original intent and not in keeping with the intent to harmonize the text with the ADA. The proposed language is specific in the manner in which the second lavatory must be provided and consistent with Section 213.3.4 of the 2010 ADA Standards for Accessible Design.

E200-12

Final Action: AS AM AMPC____ D

E203-12
1109.10(New), E105.4

Proposed Change as Submitted

Proponent: Cheryl Kent, U.S. Department of Housing and Urban Development (cheryl.d.kent@hud.gov)

Add a new section:

<u>**1109.10 Mail receptacles.** Where provided, mail receptacles shall be accessible in accordance with Sections 1109.10.1 or 1109.10.2.</u>

<u>**1109.10.1 Dwelling units and sleeping units.** Where mail receptacles are provided for Accessible, Type A or Type B dwelling and sleeping units, accessible mail receptacles shall be provided in accordance with 1109.10.1.1 or 1109.10.1.2.</u>

<u>**1109.10.1.1 Centralized mail receptacles.** Where each individual mail compartment of a centralized mail receptacle is assigned to a specific dwelling unit or sleeping unit, the individual mail compartments shall comply with 1109.10.1.1.1 or 1109.10.1.1.2.</u>

<u>**1109.10.1.1.1 Buildings without an elevator.** In a structure without an elevator, all individual mail compartments assigned to Accessible Units, Type A Units and Type B Units in each location shall be accessible.</u>

<u>**1109.10.1.1.2 Buildings with an elevator.** In a structure with an elevator, fifty percent of all individual mail compartments in each location shall be accessible. Individual mail compartments assigned to Accessible and Type A units shall be included in the accessible mailboxes. In addition to the individual mail compartments assigned to dwelling or sleeping units, an additional number of individual mail compartments that is equal to ten percent of the total number of dwelling units and sleeping units, but not less than one, at each location shall be accessible.</u>

<u>**1109.10.1.1.3 Parcel lockers.** All parcel lockers of centralized mail receptacles shall be accessible.</u>

<u>**1109.10.1.2 Individual house-mounted and curbside mail receptacles.** Where an individual house-mounted or curbside mail receptacle serves a dwelling unit or sleeping unit that is required to be an Accessible unit, Type A unit or Type B unit, the mail receptacle shall be accessible.</u>

<u>**1109.10.2 Other occupancies**. Where mail receptacles are provided in occupancies not falling within the purview of Section 1109.10.1, at least 5 percent, but not less than one, of each type in each location, shall be accessible.</u>

(Renumber subsequent sections)

Delete without substitution:

~~**E105.4 Mailboxes.** Where mailboxes are provided in an interior location, at least 5 percent, but not less than one, of each type shall comply with ICC A117.1. In residential and institutional facilities, where mailboxes are provided for each dwelling unit or sleeping unit, mailboxes complying with ICC A117.1 shall be provided for each unit required to be an Accessible unit.~~

Reason: This proposed change is intended to specifically address accessibility requirements for mailboxes that are provided for buildings that are covered by the Fair Housing Act's (FHAct) accessible design and construction requirements and HUD's Fair Housing Accessibility Guidelines (HUD's Guidelines). Under the IBC, dwelling units and sleeping units that are covered by the FHAct and HUD's Guidelines are known as Type B Dwelling Units, so the focus of the proposal is on Type B Units; at the same time however, this proposal also will easily include Accessible Units and Type A units.

As background, it came to HUD's attention that Section E105.4 is being interpreted as applying to mailboxes serving Type B dwelling units. This was not HUD's understanding of the IBC, rather, we understood that Section 1107.3 covered mailboxes as well as all other types of public and common use facilities serving Type B dwelling units, and that absent specific scoping requirements to scope less than 100% of individual mailboxes, that all mailboxes were required to be accessible consistent with HUD's position in its Guidelines, which also does not scope less than 100% of mailboxes serving covered dwelling units. The above language will resolve this misunderstanding by striking the language in Appendix E and adding the new language outlined above.

HUD is also aware that HUD's position on mailboxes provided at FHAct covered buildings and current U.S. Postal Service regulations are not in harmony. HUD and U.S.P.S. held a number of discussions and meetings but are not in agreement on a resolution. Nevertheless, HUD recognizes that a 100% scoping requirement for mailboxes in hi-rise elevator buildings, coupled with situations where wall space may be limited, poses challenges for designers and builders in meeting the FHAct requirements as well as those in the IBC and ICC A117.1 for accessible reach ranges. Therefore, we recognize in this proposal that up to 50% of Type A or B units in a building with one or more elevators may not be served by an accessible mailbox. For this reason, this proposal relies on the provision of an additional number of unassigned mailboxes within the accessible reach range to be available, at the time of first occupancy, to serve persons with disabilities who may reside in these units and who may need an accessible mailbox.

Through this code change proposal, we are proposing a resolution that supports our on-going desire to promote consistency between the accessibility requirements in the FHAct and the IBC. In addition, HUD believes this proposal will resolve the conflict in a manner that is consistent with HUD's efforts to move toward more widely accepted accessible reach ranges that are in the more recent editions of the ICC A117.1 standard, as well as in recent government standards for the ADA. In this regard, although HUD's Guidelines use the 1986 edition of ICC A117.1, our proposal is in keeping with several of the more recent editions of IBC and ICC A117.1 that HUD has recognized as safe harbors for compliance under the FHAct, and which use the 48-inch maximum reach range for the high reach. Consequently, we are not recommending changes to the ICC A117.1 as part of this proposal, nor do we intend to do so.

We would like to ensure that architects and builders involved in designing and constructing buildings that are covered by the Fair Housing Act provide for accessibility of mailboxes consistent with HUD's regulations and Guidelines. Developers who deviate from these standards by providing mailboxes at higher reach ranges have been subject to enforcement proceedings brought by HUD as well as litigation brought by the Department of Justice. The Department of Justice has entered into a number of consent decrees which have required the developer to change the height of mailboxes serving covered multifamily dwellings. We believe this change is needed to ensure that the IBC is consistent with the Fair Housing Act and HUD's regulations and Guidelines, and to avoid unnecessary litigation with respect to mailboxes serving Type B dwelling units.

Cost Impact: There should be no significant cost impact since the IBC currently contains text at Section 1107.3 that would apply to mailboxes, like any other public and common use area, and again, absent scoping requirements, should have already been requiring 100% accessibility of mailboxes serving Type B dwelling units. However, by adding this new text to address mailboxes specifically, rather than just generally in Section 1107.3, the IBC will be assuring consistency with the Fair Housing Act, HUD's regulations and the Guidelines.

1109.16-E-Kent.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal provides guidance for mailboxes, which are already shared and common spaces for housing covered by Section 1107.3. This proposal will address concerns and issued brought up by representatives from Housing and Urban Development and the U.S. Postal Service during the last cycle's hearings. 50% of the mailboxes within the range will allow for a reasonable number of mailboxes within a facility to be accessible. Asking for 100% can be too restrictive in for large complexes or dormitory facilities. The extra 5% would allow for mailboxes to be pre-assigned or not, depending on what the facility wishes.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Thomas Meyers, Colorado Code Consulting, LLC., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1109.10.1.1.2 Buildings with an elevator. In a structure with an elevator, fifty percent of all individual mail compartments in each location shall be accessible. Individual mail compartments assigned to Accessible and Type A units shall be included in the accessible mailboxes**.** ~~In addition to the individual mail compartments assigned to dwelling or sleeping units, an additional number~~

~~of individual mail compartments that is equal to ten percent of the total number of dwelling units and sleeping units, but not less than one, at each location shall be accessible.~~

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: This proposal was approved on the merits of providing needed guidance on the number of mailboxes that are deemed accessible. The 50% requirement seems quite conservative. One rarely finds users confined to needing the accessible 15-48" wheelchair derived reach ranges in most circumstances, including senior or low income residential projects. The occasional need for an accessible (within reach range) mailbox will be fairly rare and certainly be accommodated within the 50% provided.

The added 10% in addition to the 50% is extremely restrictive If the intent is to always have one available "just in case" a reasonable accommodation is requested, only one spare compartment is really necessary. Considering normal vacancy rates, it is very likely that among the 50% accessible, at least one box may be instantly available. If not, mailboxes can be easily switched among tenants to accommodate the need.

It should also be noted that the construction of such a large quantity of unused boxes is wasteful and unprecedented in the code. As a minimum standard document, the building code should not require capital investment and ongoing maintenance expenses to possibly accommodate a very unlikely eventuality.

Public Comment 2:

Steven Orlowski, representing National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: The original proposal submitted by HUD far exceeds the requirements by establishing a fifty percent requirement on buildings serviced by an elevator for all mailboxes to be within the acceptable reach ranges and adds requirements for parcel lockers which are not mentioned anywhere in the Fair Housing or ADA. The fifty percent requirement in the proposal will create conflicts between the IBC and the United States Postal Services standard 4B, which regulates both the height and width of wall-mounted centralized mail receptacles. Where there are a large number of mail receptacles servicing a multistory residential dwellings, there may not be enough wall space to accommodate fifty percent of the receptacles to be mounted between the 15" minimum and 48" maximum reach ranges. These requirements conflict with the minimum and maximum heights for centralized mailboxes under the USPS Standard 4b and NAHB urges the FAH assembly to disapprove this proposal.

E203-12
Final Action: AS AM AMPC____ D

E206-12
1109.13.1

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Delete without substitution:

~~**1109.13.1 Operable window.** Where operable windows are provided in rooms that are required to be accessible in accordance with Sections 1107.5.1.1, 1107.5.2.1, 1107.5.3.1, 1107.5.4, 1107.6.1.1, 1107.6.2.1.1, 1107.6.2.2.1 and 1107.6.4.1, at least one window in each room shall be accessible and each required operable window shall be accessible.~~

Reason: This list is a reference for Accessible units and Type A units. Windows within dwelling units and sleeping units are addressed in ICC A117.1, therefore they are not needed here. The ADA/ABA 229.1 has some requirements for operable windows, but has a series of exceptions, including one for residential uses.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None

1109.13.1-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent asked for disapproval in order to address scoping issues/differences between transient and non-transient lodging found in the 2010 ADA Standard for Accessible Design.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee, requests Approval as Submitted.

Commenter's Reason: The MOE committee disapproved this change because the CTC representative asked for some additional time to investigate some possible conflicts with ADA. The concern was over operable windows in Accessible units in transient lodging. Since there are window requirement in Accessible Units (ICC A117.1 1002.13) it would be appropriate to address the technical requirements at that location. Therefore, in our opinion there is no scoping conflict with ADA by removing this section from the IBC. A change proposal has been submitted to the ICC A117.1 to deal with the technical criteria for windows within Accessible or Type A dwelling units.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "IBC Coordination with the new ADAAG". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the

CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E206-12

Final Action: AS AM AMPC____ D

E215-12
1109.15.4, 1110 (New)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

SECTION 1110
RECREATIONAL FACILITIES

1110.4 ~~1109.15.4~~ Recreational ~~and sports~~ facilities ~~exceptions.~~ Recreational ~~and sports~~ facilities shall be ~~required to be~~ accessible ~~shall be exempt from this chapter to~~ and shall be on an accessible route to the extent specified in this section.

1110.4.13 Play Areas. Play areas containing play components designed and constructed for children shall be accessible and be located on an accessible route.

Reason: This proposal is part of a coordination effort with the 2010 ADA Standard for Accessible Design and the new technical provisions for recreational facilities found in 2009 ICC A117.1 Chapter 11. This overall proposal for recreational facilities has been divided into parts so that the membership can look at each type of recreational facilities on its own merit. The overall intent is to provide access to recreational facilities so that persons with mobility impairments can participate to the best of their ability. The requirements are not intended to change any essential aspects of that recreational activity.

This proposal contains scoping provisions for play areas. Currently, Section 402.6.3 addresses “structures intended as children’s playgrounds” and Section 105.2 exempts “swings and other playground equipment accessory to detached one- and two-family dwellings” from permits. To the extent that children’s play facilities are covered by the IBC, they should be accessible to children with disabilities. These scoping requirements are reasonable and are the result of recommendations from a regulatory negotiation committee the Access Board established for this purpose that included ASTM Public Playground, Soft Contained Play, and Playground Surfacing Systems Committees manufacturers of play equipment, landscape architects, government associations, elementary school associations, and organizations representing people with disabilities. Since the Access Board’s guidelines were published in late 2000, manufacturers offer play equipment complying with these scoping and technical criteria. The 2009 edition of the ICC A117.1, Section 1108, contains technical criteria for play areas consistent with the 2010 ADA Standard.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as “areas of study”. Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None – This will be required by the 2010 ADA Standard for Accessible Design.

1110#4-E-BALDASSARRA-CTC.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this change due to concerns over how technically playground equipment could be made accessible and that it may be very difficult to achieve. While some residential facilities may not have to comply with ADA requirements for access into or onto playground equipment, there were questions on if an accessible route would be required to the playground as a common use space for residents.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee; Gene Boecker, AIA, Code Consultants, Inc (CCI); requests Approval as Submitted.

Commenter's Reason (Baldassarra): The MOE committee disapproved this change because of testimony from NAHB and the National Apartment Association that pools and playgrounds connected with residential facilities are not required to comply with the 2010 ADA Standard for Accessible Design; therefore, asking them to comply with ICC A117.1 for playgrounds would be exceeding ADA requirements.

The MOE committee also stated that they were not sure how someone could make a playground accessible. These provisions are already in the 20009 ICC A117.1, Section 1108. These requirements were developed originally by the Access Board and included many representatives from the playground equipment industry.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "IBC Coordination with the new ADAAG". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

The requirements for playgrounds are basically are as follows.

Play components are elements designed to offer opportunities to play, socialize or learn. They can be stand alone or part of a composite play structure. Swings, spring riders, water tables, playhouses, slides and climbers are just a few examples of play components. Ground-level play components are accessed from the ground, such as swings, spring riders or panels. Elevated play components are part of a composite structure accessed from a platform or deck, such as slides or climbers. All accessible play components must be integrated so there is not a separate "accessible" area.

At least one of each type of play component available at ground level must be on an accessible route. Additional ground-level play components may be required depending on the number of elevated play components provided. This two-part evaluation is designed to provide a variety of experiences for individuals who choose to remain with their mobility device and not transfer to elevated components. If ramps provided access to at least 50 percent of the elevated play components, which also include three different types, then additional ground level play components are not required. At least 50 percent of elevated play components must be accessed by ramps or transfer systems. Where elevated play areas have more than 20 components, at least 25 percent of the elevated play components must be accessed by a ramp. Where elevated play areas have 20 or fewer components, all the routes can be transfer systems (ICC A117.1 1108.3.2)

The surfaces around the play areas must consider wheelchair access as well as child fall safety issues. The smaller size of children and how they move around the space is also considered in the requirements. Ground-accessible routes are required to be at least 60 inches wide (to allow wheelchairs to pass) and with a maximum slope of 1:16. There are exceptions to deal with access around elements and transitions at changes in materials.

Where ramps are used for access to elevated play components, the maximum rise per ramp run is 12 inches, and handrails are at a height of 20 inches to 28 inches. A transfer platform is a series of steps allowing access to the elevated play areas. The first platform is between 11 and 18 inches above the ground and unobstructed on the transfer side. A series of platforms can then be used to move up into the structure, each with a maximum rise of 8 inches. The size of each platform/step is a minimum of 24 wide and at least 14 inches deep. Some type of support for stability must be provided, but options are left open (ICC A117.1 1108.4).

Play tables, including water or sand tables, should provide knee clearances of 24 inches high and with the table top or edge (i.e., at sand or water tables) not more than 31 inches high (ICC A117.1 1108.4.3.3).

Depending on the age of the children the play component is designed for, a better design would provide a lower reach range than required. Based on research from the U.S. Access Board, the recommended heights are 20 to 36 inches for 3- to 4-year-olds, 18 to 40 inches for 5- to 8-year-olds and 16 to 44 inches for 9- to 12-year- olds.

Soft, contained- play equipment allow individuals to enter a fully enclosed play environment that uses pliable materials such as plastic, soft padding and fabric. When three or fewer entry points are provided, at least one must be on an accessible route. When four or more entry points are provided, at least two must be on an accessible route (ICC A117.1 1108.4.1.2)

Following are examples of accessible playground elements.

Commenter's Reason (Boecker): The committee discussed whether play features could be made accessible. They are and they have been for some time now. The specific means to do so is identified in the 2009 ICC/ANSI A117.1 and the 2010 ADA Standards for Accessible Design. By the time the 2015 IBC is adopted, this issue will have been settled much more clearly than it is now because the 2010 Standards will have been in effect for a half dozen years.

Regarding the question of scoping in residential areas, the ICC should make it clear that, as an organization, it supports accessibility and would vote to have accessibility for play areas associated with residential occupancies just as much as non-residential occupancies. If the organization intends to demonstrate its desire for leadership in accessibility, then the scoping should include all occupancies and not be limited to that within the ADA. There are other areas in the code were the IBC requires accessibility and the ADA does not (e.g. churches). Access to play areas and play components is appropriate for all occupancies.

E215-12

Final Action: AS AM AMPC____ D

E216-12
1109.15.4, 1109.15.4.5, 1110 (New)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

SECTION 1110
RECREATIONAL FACILITIES

1110.4 ~~1109.15.4~~ Recreational ~~and sports~~ facilities ~~exceptions.~~ Recreational ~~and sports~~ facilities shall be ~~required to be~~ accessible ~~shall be exempt from this chapter to~~ and shall be on an accessible route to the extent specified in this section.

1110.4.14 Swimming pools, wading pools, hot tubs and spas. Swimming pools, wading pools, hot tubs and spas shall be accessible and be on an accessible route.

Exceptions:

1. *Catch Pools or a designated section of a pool used as a terminus for a water slide flume* shall not be required to provide an *accessible* means of entry, provided that a portion of the *catch pool* edge is on an *accessible* route.
2. Where spas or hot tubs are provided in a cluster, at least 5 percent, but no less than one spa or hot tub in each cluster, shall be accessible and be on an accessible route.

1110.4.14.1 ~~1109.15.4.5~~ Raised diving boards and diving platforms. Raised diving boards and diving platforms are not required to be accessible or to be on an accessible route.

1110.4.14.2 Water Slides. Water slides are not be required to be accessible or to be on an accessible route.

Reason: This proposal is part of a coordination effort with the 2010 ADA Standard for Accessible Design and the new technical provisions for recreational facilities found in 2009 ICC A117.1 Chapter 11. This overall proposal for recreational facilities has been divided into parts so that the membership can look at each type of recreational facilities on its own merit. The overall intent is to provide access to recreational facilities so that persons with mobility impairments can participate to the best of their ability. The requirements are not intended to change any essential aspects of that recreational activity.

This proposal contains scoping provisions for swimming pools, wading pools, hot tubs and spas. This is especially important that use swimming pools for exercise or rehabilitation. The exceptions for Section 1110.4.14 are exceptions for pools used only be water slides, and a percentage of hot tubs. These exceptions, along with the exceptions for diving boards and water slides are logical, and consistent with ADA. The 2009 edition of the ICC A117.1, Section 1109, contains technical criteria for play areas consistent with the 2010 ADA Standard. Criteria for entry points include options for pool lifts, sloped entries, transfer walls, transfer systems and pool stairs.

The *International Swimming Pool and Spa Code*, Section 307.9, references the IBC for accessibility requirements for pools.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

Cost Impact: None – This will be required by the 2010 ADA Standard for Accessible Design.

1110#5-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The current text requires pools to be accessible. This proposal basically adds exceptions for water slides and catchment pools. This also coordinates with 2010 ADA Standard for Accessible Design and ICC A117.1.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Carl Baldassarra, Code Technologies Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1110.4.14 Swimming pools, wading pools, hot tubs and spas. Swimming pools, wading pools, hot tubs and spas shall be accessible and be on an accessible route.

Exceptions:

1. *Catch Pools or a designated section of a pool used as a terminus for a water slide flume* shall not be required to provide an *accessible* means of entry, provided that a portion of the *catch pool* edge is on an *accessible* route.
2. Where spas or hot tubs are provided in a cluster, at least 5 percent, but no less than one spa or hot tub in each cluster, shall be accessible and be on an accessible route.
3. Swimming pools, wading pools, spas and hot tubs that are required to be accessible by Section 1110.2.2 and 1110.2.3 are not required to provide accessible means of entry into the water.

(Portions of proposal not shown remain unchanged.)

Commenter's Reason: Code change E208 initiates the new recreation scoping section in Chapter 11. Section 1110.2 clarifies what recreational facilities associated with residential units are required to be fully accessible. Where units do not contain Accessible units, but do contain type B units, the Fair Housing Act only requires an accessible route to the pool, not access into the water. Lifts are very expensive to install and maintain. This proposal is asking for a step back for these limited residential facilities. Note that in both current and proposed language (E208) residential complexes that do not have Type B units (i.e., townhouse complex or group of single family homes) would not be required to provide even an accessible route to the pool.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "IBC Coordination with the new ADAAG". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

Public Comment 2:

Kelly Buckland, The National Council on Independent Living; Martha E. Ford, The Arc of the United States; Dominic Marinelli, United Spinal Association; and Patrick L. Wojahn, National Disability Rights Network; requests Approval as Submitted.

Commenter's Reason (Buckland): National Council on Independent Living **(**NCIL) is the longest-running national, cross-disability, grassroots organization run by and for people with disabilities. Founded in 1982, NCIL represents thousands of organizations and individuals including: Centers for Independent Living (CILs), Statewide Independent Living Councils (SILCs), individuals with disabilities, and other organizations that advocate for the human and civil rights of people with disabilities throughout the United States. There are currently over 700 physical locations across America actively providing Independent Living services to people with disabilities. NCIL envisions a world in which people with disabilities are valued equally and participate fully.

Commenter's Reason (Ford): The Arc of the United States (The Arc) is the largest national community-based organization advocating for and serving people with intellectual and developmental disabilities and their families. We have more than 140,000 members and more than 700 state and local chapters nationwide. The Arc strongly supports inclusion and access of people with disabilities in all aspects of community life.

Commenter's Reason (Marinelli): United Spinal Association's mission is to improve the quality of life of all people living with spinal cord injuries and disorders (SCI/D). We were founded in 1946 by a determined group of paralyzed WWII veterans in New York City who advocated for greater civil rights and independence for themselves and their fellow veterans. Since then, our core belief has remained unchanged. Despite living with SCI/D, a full, productive, and rewarding life is within the reach of anyone with the strength to believe it and the courage to make it happen. Today, United Spinal is the largest non-profit organization dedicated to helping people living with SCI/D. We are committed to providing active-lifestyle information, peer support and advocacy that empower individuals to achieve their highest potential in all facets of life.

Commenter's Reason (Wojahn): National Disability Rights Network (NDRN) is the nonprofit membership organization for the federally mandated Protection and Advocacy (P&A) Systems and Client Assistance Programs (CAP). Collectively, the P&A/CAP network is the largest provider of legally based advocacy services to people with disabilities in the United States.

Combined Commenter's Reason (Buckland, Ford, Marinelli, Wojahn):

E216-12 as presented and approved "As Submitted" in Dallas specifically requires pools to be accessible – with exceptions for water slides and catchment pools – harmonizing with the 2010 ADA Standards.

We object to the Exception proposed by the CTC that exempts pools, wading pools, spas and hot tubs serving R-2, R-3 and R-4 occupancies that contain Type A and Type B dwelling units from compliance A117.1 Section 1109 (accessible means of entry into the pool/spa).

As a point of clarification, our comments support the MOE Committee's approval of E216 at the ICC public hearing in Dallas last spring. At the CTC meeting held in Chicago in June, the CTC voted to provide a revised proposal for E216 that provides an exception that exempts swimming pools, wading pools and spas serving Type A and Type B units from having to provide an accessible means of entry into the water. We do not support this revision proposed by the CTC.

E216 as approved by the MOE committee in Dallas did not include the exception for swimming pools, wading pools and spas serving Type A and Type B units from having to provide an accessible means of entry into the water. We firmly believe that the inclusion of this Exception proposed by the CTC for pools and spas serving Type A and Type B units not only provides less access for people with disabilities, but it also creates a window of opportunity for the scoping in the IBC to potentially "dip below" the minimum ADA requirements for access into pools and spas serving Type A units. As the building code does not scope residential facilities in the same manner as the ADA, there will be instances where a Type A unit scoped by the IBC will be the same unit required by the ADA to meet accessibility requirements. Subsequently, providing an exception for pools and spas that serve Type A units has the potential of allowing a facility owner to comply with the "code" and at the same time violate the ADA. ICC and its committees have worked diligently for a number of years to avoid creating this exact problem. By accepting E216 as proposed at the CTC meeting in Chicago with the Exception for pools and spas that serve Type A units, this harmonization dilemma will be realized by building owners that have both ADA and IBC/A117.1 obligations.

Our collective membership overwhelmingly supports the new scoping and technical requirements found in the 2010 ADA Standards, the ICC International Building Code and A117.1 that provide access to a number of recreational elements, including swimming pools and spas. With these new requirements in place, people with disabilities will now be able to participate in sports and recreational activities, as opposed to being accommodated merely as spectators at these types of facilities. The addition of the technical criteria to Chapter 11 of A117.1 and the 2010 ADA Standards creates opportunities for our membership, and all people with disabilities, to more fully participate in sports and recreational activities and we applaud ICC's inclusion of these technical requirements in the standard.

Having said this, our comments today recognize that the Exception proposed to be added to E216 at the CTC meeting in Chicago jeopardize the IBC/ADA coordination efforts in those instances where Type A Units may also fall under the purview of the ADA, and we also urge the membership to ensure that pools and spas that are provided in multi-family developments containing Type A and Type B units remain accessible for people with disabilities – as the current editions of IBC/ANSI A117.1 require.

Our concerns with this Exception are summarized below:

1. Given that our membership finds that swimming pools and spas are very therapeutic for those living with SCI, we feel that swimming pools and spas provided as an amenity in multi-family residential occupancies should be accessible to people with disabilities paying rent that includes use of such amenities – just as that opportunity is afforded to renters/owners without disabilities. The National Center on Accessibility (NCA) has researched swimming statistics and found that approximately 52% of people with disabilities and 55.5% of people without disabilities reported swimming outdoors in the previous year . The same report from the NCA found that people with disabilities under the age of 25 and over the age of 75 participated in swimming activities at higher rates than people without disabilities. (1)

According to the Center for Disease Control (CDC) (2) and based on US Census Bureau 2010 statistical abstract of the United States Recreation and leisure activities: participation in selected sports activities 2008 (3) swimming is the second most popular sports activity in the United States and a good way to get regular aerobic physical activity. Just two and a half hours per week of aerobic physical activity, such as swimming, bicycling, or running can decrease the risk of chronic illnesses. This can also lead to improved health for people with diabetes and heart disease. Swimmers have about half the risk of death compared with inactive people. People report enjoying water-based exercise more than exercising on land and they can also exercise longer in water than on land without increased effort or joint or muscle pain.

2. Additionally, we know that several stakeholders have indicated that providing an Exception for swimming pools and spas to not have to provide an accessible route into the water if they serve Type B units is "in line" with Fair Housing Act requirements. We do

not feel that because the Fair Housing Act does not require an accessible route into the pool, the building code should fall in step and decrease the level of accessibility currently scoped in the Code. While the FHA requires an accessible route to the "edge of a pool" that serves covered multi-family dwelling units, the Department (HUD) declined to require an accessible route into pools while developing the FHA Design and Construction requirements in part due to a lack of "generally accepted standards" for providing access into pools. (4) Now, however, over 20 years later – we have standards in place via both the 2010 ADA Standards for Accessible Design and the 2009 edition of ICC ANSI A117.1 that provide technical requirements for access into swimming pools, wading pools and spas. Note that the US Access Board released the guidelines for achieving access into swimming pools in 2004 with the release of the ADA/ABA Accessibility Guidelines, that were subsequently adopted as an enforceable standard for entities required to comply with the ADA as of March 15, 2012. Given the US DOJ's adoption of the 2010 ADA Standards for Accessible Design and the effective date of March 15, 2012 – all newly constructed swimming pools, wading pools and spas covered under the ADA must comply with the requirements for accessible means of entry into these areas. The US DOJ has extended the deadline for compliance with these new requirements for existing swimming pools, wading pools and spas until January 31, 2013. The lack of "generally accepted standards" of achieving access into swimming pools cited previously by HUD over twenty years ago has now been addressed with the issuance of the 2010 ADA Standards for Accessible Design and incorporation of technical requirements for achieving access into pools and spas within the ICC ANSI A117.1 standard.

We have additional concerns regarding access to swimming pools for FHA covered multi-family dwelling units. The FHA requirement for an accessible route to the "edge" of a swimming pool may not provide enough space to install a lift if requested by a tenant with a disability under FHA Reasonable Modification requirements. Given the standards in place now that outline the space needed for future installation of pool lifts in both the 2010 ADA Standards for Accessible Design and 1109 of ICC ANSI A117.1, FHA's requirement for an accessible route to the edge of a pool may not be adequate to support a tenant's right to request a modification (i.e. pool lift) if one is needed to allow them to independently use the pool.

3. From a "harmonization" perspective, we see faults with the inclusion of Exception 3 cited above that would exempt swimming pools, wading pools and spas serving Type A and Type B units from providing an accessible means of entry into the water because the window is then left open for building owners/managers to violate the 2010 ADA Standards for Accessible Design, therefore we agree with the MOE Committee's approval of both E208 & E216 at the ICC public hearing in Dallas last month "As Submitted". Incorporating the Exception proposed by the CTC will permit certain residential occupancies that provide swimming pools and spas in R-2, R-3 and R-4 settings that serve Type A units from having to provide accessible means of entry into pools – which conflicts with the ADA requirements for residential dwelling units designed and constructed or altered by public entities (ADA Title II Regulations) as well as certain ADA Title III entities (i.e. social service center establishments).

Thank you for the opportunity to present these comments on behalf of United Spinal Association, The National Council on Independent Living, The Arc of the United States and the National Disability Rights Network.

References:

1. The National Center on Accessibility study "People with Disabilities - National Survey of Recreation and the Environment" - http://www.ncaonline.org/rec-leisure/nsre.shtml
2. US Census Bureau 2010 statistical abstract of the United States Recreation and leisure activities: participation in selected sports activities 2008 [PDF - 2 pages]. Last verified on May 12, 2011) http://www.cdc.gov/healthywater/swimming/health_benefits_water_exercise.html
3. Preamble to HUD's FHA Design and Construction Requirements - Fair Housing APP B3 – Page 9487

E216-12

Final Action: AS AM AMPC____ D

E224-12
1022.9, 1110.3 (IFC [B] 1022.9)

Proposed Change as Submitted

Proponent: Sharon Toji, Access Communications, representing self (SharonToji@me.com)

Revise as follows:

1110.3 Other signs. Signage indicating special accessibility provisions shall be provided as shown.

1. Each assembly area required to comply with Section 1108.2.7 shall provide a sign notifying patrons of the availability of assistive listening systems complying with the ICC A117.1 requirements for visual characters and shall include the International Symbol of Access for Hearing Loss. The sign shall be located outside the entrances to the assembly area.
   Exception: Where ticket offices or windows are provided, signs are not required at each assembly area provided that signs are displayed at each ticket office or window informing patrons of the availability of assistive listening systems .
2. At each door to an *area of refuge*, an exterior area for assisted rescue, an egress *stairway*, *exit passageway* and *exit discharge*, signage shall be provided in accordance with Section 1011.4.
3. At *areas of refuge*, signage shall be provided in accordance with Section 1007.11.
4. At exterior areas for assisted rescue, signage shall be provided in accordance with Section 1007.11.
5. At two-way communication systems, signage shall be provided in accordance with Section 1007.8.2.
6. Within interior exit stairways and ramps, floor level signage shall be provided in accordance with Section 1022.9.

1022.9 (IFC [B] 1022.9) Stairway identification signs. A sign shall be provided at each floor landing in an *interior exit stairway* and *ramp* connecting more than three stories designating the floor level, the terminus of the top and bottom of the *interior exit stairway* and *ramp* and the identification of the *stair* or *ramp*. The signage shall also state the story of, and the direction to, the *exit discharge* and the availability of roof access from the *interior exit stairway* and *ramp* for the fire department. The sign shall be located 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions. In addition to the *stairway* identification sign, a floor level sign in visual characters, raised characters and braille complying with ICC A117.1 shall be located at each floor level landing adjacent to the door leading from the *interior exit stairway* and *ramp* into the *corridor* to identify the floor level. On the level of exit discharge, a five pointed tactile star shall be placed to the left of the level designator. The diameter of the star shall be equal to the height of the raised character level designator, and shall be translated into contracted braille as "Main."

Reason: Proposed revisions bring the items into compliance with 2010 ADA, and add clarity for requirements for visual signage.

The location for the assistive listening sign is made more precise because the sign is too often located randomly where space is available inside the assembly or conference area, where it is not likely to be noticed or seen. I believe that the intent is to locate it where it will be seen at the entry point.

The five pointed star should be added to the floor designator in stairways, because this sign is to provide information analogous to the elevator hoistway signs, for persons who are blind and visually impaired who are, for various reasons, using the stairway for vertical access, rather than the elevator. It signals that they have reached the exit level, just as the stair does on the elevator hoistways.

Cost Impact: none, or a possible slight reduction in cost at some Areas of Refuge.

1110.3-E-Toji.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Portions of this proposal are technical criteria that should be in ICC A117.1, not in the code. The language for the location of the assistive listening system signage is too broad to be uniformly enforced. Not all assembly spaces have one main door. The term 'outside' could be interpreted to be outside the room or outside the building.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gene Boecker, AIA, Code Consultants, Inc (CCI), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1110.3 Other signs. Signage indicating special accessibility provisions shall be provided as shown. 3

1. Each assembly area required to comply with Section 1108.2.7 shall provide a sign notifying patrons of the availability of assistive listening systems complying with the ICC A117.1 requirements for visual characters and shall include the International Symbol of Access for Hearing Loss. ~~The sign shall be located outside the entrances to the assembly area.~~

   Exception: Where ticket offices or windows are provided, signs are not required at each assembly area provided that signs are displayed at each ticket office or window informing patrons of the availability of assistive listening systems .

2. At each door to an *area of refuge*, an exterior area for assisted rescue, an egress *stairway*, *exit passageway* and *exit discharge*, signage shall be provided in accordance with Section 1011.4.
3. At *areas of refuge*, signage shall be provided in accordance with Section 1007.11.
4. At exterior areas for assisted rescue, signage shall be provided in accordance with Section 1007.11.
5. At two-way communication systems, signage shall be provided in accordance with Section 1007.8.2.
6. Within interior exit stairways and ramps, ~~floor level~~ signage shall be provided in accordance with Section 1022.9.

1022.9 (IFC [B] 1022.9) Stairway identification signs. A sign shall be provided at each floor landing in an *interior exit stairway* and *ramp* connecting more than three stories designating the floor level, the terminus of the top and bottom of the *interior exit stairway* and *ramp* and the identification of the *stair* or *ramp*. The signage shall also state the story of, and the direction to, the *exit discharge* and the availability of roof access from the *interior exit stairway* and *ramp* for the fire department. The sign shall be located 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions. In addition to the *stairway* identification sign, a floor level sign in visual characters, raised characters and braille complying with ICC A117.1 shall be located at each floor level landing adjacent to the door leading from the *interior exit stairway* and *ramp* into the *corridor* to identify the floor level. On the level of exit discharge, a five pointed tactile star shall be placed to the left of the floor level ~~designator~~ designation. The diameter of the star shall be ~~equal to the height of the raised character level designator~~ 2 inches, and shall be translated into contracted braille as "Main."

Commenter's Reason: The proponent was correct in that the change in 1110.3 is necessary to be in harmony with the 2010 ADA Standards for Accessible Design. The 2010 Standards require the symbol to be provided on the sign. The ICC/ANSI A117.1 does not require the sign. That requirement is in the IBC. Therefore, the proper place for the requirement relative to the International Symbol for Hearing Loss is in the IBC - not the A117.1. The 2010 Standards do not identify the location. It is agreed that the location stated as "outside": can be broadly interpreted and should therefore not be a part of this proposal.

The added language in item #6 is not necessary. The language in Section 1022.9 refers to the signage as stairway identification signage. Although the signage is required at each level, "floor level" would be an improper term when referring to the sign.

The text added to 1022.9 is a new requirement. Similar to the reasons noted above, the requirements for stairway identification signage are within the IBC and not the A117.1. Therefore, this is the proper place for such information if such information is to be included within the code. While the 2010 Standards do not require this signage, it is consistent with the marking for elevators which designate the level of discharge and consistent with the requirements in Section 1011.4 for tactile identification of the path of egress. The proposed added text would limit the size of the star to two. Some signs I have seen used number that were in excess of 10 inches. While that may be helpful in a darkened stairway to see, the intent with the tactile sign does not involve sight so the size should have a limitation for tactile use. The size of 2 inches is the same as that for the tactile star at elevator hoistways and is the maximum height for tactile characters according to Section 703.3.5 of the A117.1 Standard. The tactile star has been used as the designation for the level of discharge in elevators for some time now and is understood. It should be used elsewhere that discharge level designation is required.

E224-12
Final Action: AS AM AMPC____ D

E225-12
E106 (New)

Proposed Change as Submitted

Proponent: Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee

Revise as follows:

SECTION E106
RECREATIONAL FACILITIES

E106.1 Golf Facilities. Golf facilities shall comply with E106.1.1 through E106.1.4.

E106.1.1 Golf Courses. Golf courses shall comply with E106.1.1.1 through E106.1.1.3.

E106.1.1.1 Teeing Grounds. Where one teeing ground is provided for a hole, the teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where two teeing grounds are provided for a hole, the forward teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where three or more teeing grounds are provided for a hole, at least two teeing grounds, including the forward teeing ground, shall be designed and constructed so that a golf car can enter and exit each teeing ground.

E106.1.1.2 Putting Greens. Putting greens shall be designed and constructed so that a golf car can enter and exit the putting green.

E106.1.1.3 Weather Shelters. Where provided, weather shelters shall be designed and constructed so that a golf car can enter and exit the weather shelter and shall be accessible.

E106.1.2 Practice Putting Greens, Practice Teeing Grounds, and Teeing Stations at Driving Ranges. At least 5 percent, but no fewer than one, of practice putting greens, practice teeing grounds, and teeing stations at driving ranges shall be designed and constructed so that a golf car can enter and exit.

E106.1.3 Accessible route. At least one accessible route shall connect accessible elements and spaces within the boundary of the golf course. In addition, accessible routes serving golf car rental areas; bag drop areas; course weather shelters complying with Section E106.1.1.3; course toilet rooms; practice putting greens; practice teeing grounds; and teeing stations at driving ranges complying with Section E106.1.2 shall comply with the accessible route requirements for golf courses in ICC A117.1.

> **Exception:** Accessible golf car passages shall be permitted to be used for all or part of accessible routes required by this section.

E106.1.4 Teeing Grounds. When teeing grounds are being altered, teeing grounds shall comply with Section E106.1.1.1**.**

> **Exception:** In existing golf courses, the forward teeing ground shall not be required to be one of the teeing grounds on a hole designed and constructed so that a golf car can enter and exit the teeing ground where compliance is not feasible due to terrain.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April, 2005, the CTC has held twenty-two meetings – all open to the public.

This proposal is part of a coordination effort with the 2010 ADA Standard for Accessible Design and the new technical provisions for recreational facilities found in 2009 ICC A117.1 Chapter 11. This overall proposal for recreational facilities has been divided into parts so that the membership can look at each type of recreational facilities on its own merit. The overall intent is to provide access to recreational facilities so that persons with mobility impairments can participate to the best of their ability. The requirements are not intended to change any essential aspects of that recreational activity.

This proposal contains scoping provisions for constructed elements within golf facilities. Where an element within a golf course is subject to the building code, this will ensure that people with disabilities are not excluded from the recreational and business opportunities on the course. Please note that a passage sufficiently wide for a golf car substitutes for an accessible route. Today, golfers with disabilities use accessible golf cars, also known as single-rider carts, that are designed to have little impact on the greens and are operated with one-handed controls. Golfers sit in the swivel seats and position to hit the ball from a seated position. Technical criteria can be found in the 2009 edition of the ICC A117.1, Section 1106 and includes criteria for accessible routes, golf cart passage and weather shelters.

Cost Impact: None – This will be required by the 2010 ADA Standard for Accessible Design.

E106-E-BALDASSARRA-CTC.docx

Public Hearing Results

Committee Action: Disapproved

Committee Reason: While some committee members felt that placing golf courses in Appendix E is appropriate, others felt the built elements and accessible route should be in the codes, but not the golf course areas, such as the greens and tees, even in an appendix.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Carl Baldassarra, Code Technologies Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~SECTION E106~~
SECTION 1110
RECREATIONAL FACILITIES

1110.4 ~~1109.15.4~~ Recreational ~~and sports~~ facilities ~~exceptions.~~ Recreational ~~and sports~~ facilities shall be ~~required to be~~ accessible ~~shall be exempt from this chapter to~~ and shall be on an accessible route to the extent specified in this section.

1110.4.13 ~~E106.1~~ Golf Facilities. Golf facilities shall comply with ~~E106.1.1~~ ~~through~~ ~~E106.1.4~~ 1110.4.13.1 and 1110.4.13.2.

~~**E106.1.1 Golf Courses.** Golf courses shall comply with E106.1.1.1 through E106.1.1.3.~~

~~**E106.1.1.1 Teeing Grounds.** Where one teeing ground is provided for a hole, the teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where two teeing grounds are provided for a hole, the forward teeing ground shall be designed and constructed so that a golf car can enter and exit the teeing ground. Where three or more teeing grounds are provided for a hole, at least two teeing grounds, including the forward teeing ground, shall be designed and constructed so that a golf car can enter and exit each teeing ground.~~

~~**E106.1.1.2 Putting Greens.** Putting greens shall be designed and constructed so that a golf car can enter and exit the putting green.~~

1110.4.13.1 ~~E106.1.1.3~~ Weather Shelters. Where provided, weather shelters shall be designed and constructed so that a golf car ~~cart~~ can enter and exit the weather shelter and shall be accessible.

~~**E106.1.2 Practice Putting Greens, Practice Teeing Grounds, and Teeing Stations at Driving Ranges.** At least 5 percent, but no fewer than one, of practice putting greens, practice teeing grounds, and teeing stations at driving ranges shall be designed and constructed so that a golf car can enter and exit.~~

1110.4.13.2 ~~**E106.1.3**~~ **Accessible route.** ~~At least one accessible route shall connect accessible elements and spaces within the boundary of the golf course. In addition,~~ Accessible routes serving golf car rental areas; bag drop areas; course weather shelters complying with Section ~~E106.1.1.3~~ 1110.4.13.1; course toilet rooms; practice putting greens; practice teeing grounds; and teeing stations at driving ranges complying with Section 1110.4.13.2 ~~E106.1.2~~ shall comply with the accessible route requirements for golf courses in ICC A117.1.

> **Exception:** Accessible golf car passages shall be permitted to be used for all or part of accessible routes required by this section.

~~**E106.1.4 Teeing Grounds.** When teeing grounds are being altered, teeing grounds shall comply with Section E106.1.1.1.~~

> ~~**Exception:** In existing golf courses, the forward teeing ground shall not be required to be one of the teeing grounds on a hole designed and constructed so that a golf car can enter and exit the teeing ground where compliance is not feasible due to terrain.~~

Commenter's Reason: The MOE committee felt the elements of the course itself should not be in the code, but rather the requirements should be limited to the constructed elements of a golfing facility. The proposal as modified is limited to constructed elements.

The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "Areas of Study". The Area of Study for this code change and public comment is called "IBC Coordination with the new ADAAG". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website http://www.iccsafe.org/cs/CTC/Pages/IBCCoordination-ADAAG.aspx. Since its inception in April, 2005, the CTC has held twenty-four meetings – all open to the public. In addition to holding face-to-face meetings, the CTC established Study Groups where any interested party can participate in conference calls on specific subjects such as this area of study without having to attend the face-to-face meetings.

E225-12
Final Action: AS AM AMPC____ D

EB1-12
[B]301.1.4, [B]301.1.4.1, [B]Table 301.1.4.1, [B]301.1.4.2, [B]Table 301.1.4.2

Proposed Change as Submitted

Proponent: Jennifer Goupil, The Structural Engineering Institute of ASCE (jgoupil@asce.org)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] 301.1.4 Evaluation and design procedures. The seismic evaluation and design shall be based on the procedures specified in the *International Building Code*~~, ASCE 31~~ or ASCE 41. The procedures contained in Appendix A of this code shall be permitted to be used as specified in Section 301.1.4.2.

[B] 301.1.4.1 Compliance with IBC level seismic forces. Where compliance with the seismic design provisions of the *International Building Code* is required, the procedures shall be in accordance with one of the following:

1. One-hundred percent of the values in the *International Building Code*. Where the existing seismic force-resisting system is a type that can be designated as “Ordinary,” values of R, Ω_0 and C_d used for analysis in accordance with Chapter 16 of the *International Building Code* shall be those specified for structural systems classified as “Ordinary” in accordance with Table 12.2-1 of ASCE 7, unless it can be demonstrated that the structural system will provide performance equivalent to that of a “Detailed,” “Intermediate” or “Special” system.
2. Compliance with <u>the performance objectives in</u> ASCE 41 ~~using both the BSE-1 and BSE-2 earthquake hazard levels and the corresponding performance levels shown in Table 301.1.4.1~~ <u>Section 2.2.4 based on the assigned Risk Category for the building</u>.

~~[B] TABLE 301.1.4.1~~
~~PERFORMANCE CRITERIA FOR IBC—LEVEL SEISMIC FORCES OCCUPANCY~~

[B] 301.1.4.2 Compliance with reduced IBC level seismic forces. Where seismic evaluation and design is permitted to meet reduced *International Building Code* seismic force levels, the procedures used shall be in accordance with one of the following:

1. The *International Building Code* using 75 percent of the prescribed forces. Values of R, Ω_0 and C_d used for analysis shall be as specified in Section 301.1.4.1 of this code.
2. Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A as specified in Items 2.1 through 2.5 and subject to the limitations of the respective Appendix Chapters shall be deemed to comply with this section.
   - 2.1. The seismic evaluation and design of unreinforced masonry bearing wall buildings in Risk Category I or II are permitted to be based on the procedures specified in Appendix Chapter A1.
   - 2.2. Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in Risk Category I or II are permitted to be based on the procedures specified in Chapter A2.
   - 2.3. Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A3.
   - 2.4. Seismic evaluation and design of soft, weak, or open-front wall conditions in multiunit residential buildings of wood construction in Risk Category I or II are permitted to be

based on the procedures specified in Chapter A4. 2.5. Seismic evaluation and design of concrete buildings in all risk categories are permitted to be based on the procedures specified in Chapter A5.

~~3. Compliance with ASCE 31 based on the applicable performance level as shown in Table 301.1.4.2. It shall be permitted to use the BSE-1 earthquake hazard level as defined in ASCE 41 and subject to the limitations in Item 4 below.~~

~~4~~3. Compliance with the performance objectives in ASCE 41 ~~using the BSE-1 Earthquake Hazard Level and the performance level shown in Table 301.1.4.2. The design spectral response acceleration parameters S_{xs} and S_{x1} specified in ASCE 41 shall not be taken less than 75 percent of the respective design spectral response acceleration parameters S_{DS} and S_{D1} defined by the *International Building Code*~~ Section 2.2.1 based on the assigned Risk Category for the building.

~~[B] TABLE 301.1.4.2~~
~~PERFORMANCE CRITERIA FOR REDUCED IBC—LEVEL SEISMIC FORCES RISK CATEGORY~~

Reason: This proposal has two primary purposes:

1. Replace references to ASCE 31-03 and 41-06 with the updated standard ASCE 41-13, which combined 31 and 41 and contains numerous technical updates, representing the state of the practice for seismic evaluation and rehabilitation of existing buildings.
2. Remove IEBC Tables 301.1.4.1 and 301.1.4.2 and replace with a reference to the related sections of ASCE 41-13. The update standard contains performance objective criteria for both a new building standard equivalent level ("IBC-level seismic forces" in the IEBC), and a basic retrofit level ("reduced IBC-level seismic forces" in the IEBC).

Both of these purposes and a general summary of the changes associated with the new standard are presented below:

ASCE 41-13 Summary

ASCE 41-13 is the culmination of a multi-year, ANSI approved update process for the two seismic evaluation and rehabilitation standards promulgated by ASCE. There are several significant updates to the standards:

- ASCE 31-03 and 41-06 have been combined into one standard for improved consistency and usability. The primary features of the two standards have been maintained, including a three-tiered analysis approach; the use of simplified, experience-based approach for common building types; the use of advance analytical techniques for more complex or unusual buildings.
- Updated seismic hazard and performance objectives, including the addition of a "new building standard equivalent" performance and a change in the seismic hazard determination of the basic performance objective for existing buildings. The new building equivalent utilizes the same seismic hazards as ASCE 7-10. The existing building performance has removed the 0.75 factors on demands that has traditionally been used and instead uses reduced seismic hazards (see below for more detail). This approach is currently used for existing buildings in the 2007 California Building Code.
- Updated and revised checklists for the Tier 1 screening procedure that was in ASCE 31-03.
- Updated provisions for analysis, foundations, and the major materials chapters in ASCE 41-06 based on incorporation of research and practice since ASCE 41-06 was developed.

A public ballot version of the new standard will be available from ASCE in the spring of 2012 and it is expected that it a prepublication (white cover) version will be available prior to the ICC Final Action Hearings in October of 2012. Any person interested in obtaining a public comment copy of ASCE 41-13 may do so by contacting the proponent at jgoupil@asce.org.

Referencing ASCE 41-13 for Seismic Performance

It is our opinion that the table describing the ASCE 41 performance levels is best kept within the standard rather than defining force levels, performance objectives, and interpolation of acceptance criteria in the IEBC. This is consistent with how ASCE 7 works with the IBC. Namely, a building is assigned a Risk Category by the IBC, and then ASCE 7 defines the performance objective for that Risk Category. In ASCE 7 this is done via the seismic importance factor and other limitations contained in the standard. We propose the same method for the IEBC: Risk Category is assigned by the Code (in this case the IEBC), and associated seismic performance is specified by the referenced standard (ASCE 41-13).

Section 301.1.4.1 IBC Level Seismic Forces

This proposal removes the ASCE 41-06 performance levels from the IEBC and instead references a new section in ASCE 41-13 that contains criteria for "New Building Standards Equivalent Performance Objective." The objectives are similar to Table 301.1.4.1 in the 2012 IEBC and are intended to be generally consistent with the IBC and ASCE 7 as referenced in IEBC Section 301.1.4.1 Item 1.

Since ASCE 41-13 Section 2.2.4 addresses both structural and nonstructural items, the revised text references only the structural performance criteria consistent with Table 301.1.4.1 in the IEBC.

If kept within the IEBC, an updated version of Table 301.1.4.1 would be as follows:

TABLE 301.1.4.1
PERFORMANCE CRITERIA FOR IBC-LEVEL SEISMIC FORCES

RISK CATEGORY (BASED ON IBC TABLE 1604.5)	PERFORMANCE LEVEL FOR USE WITH ASCE 41 BSE-1N EARTHQUAKE HAZARD LEVEL	PERFORMANCE LEVEL FOR USE WITH ASCE 41 BSE-2N EARTHQUAKE HAZARD LEVEL
I	Life Safety ~~(LS)~~	Collapse Prevention ~~(CP)~~
II	Life Safety ~~(LS)~~	Collapse Prevention ~~(CP)~~
III	Damage Control ~~Note a~~	Limited Safety ~~Note a~~
IV	Immediate Occupancy ~~(IO)~~	Life Safety ~~(LS)~~

~~a. Acceptance criteria for Risk Category III shall be taken as 80 percent of the acceptance criteria specified for Risk Category II performance, but need not be less than the acceptance criteria specified for Risk Category IV performance levels.~~

Therefore, this part of the proposal effectively has two substantive revisions to the 2012 version of Table 301.1.4.1 based on the updates in ASCE 41-13:

1. BSE-1N and BSE-2N in ASCE 41-13 are similar to the BSE-1 and BSE-2 in ASCE 41-06 except that they are based on the MCE_R ground motions consistent with ASCE 7-10. In addition whereas the BSE-1 in ASCE 41-06 was taken as the lesser of 2/3MCE and earthquake exceedance probability of 10% in 50 years, the BSE-1N is defined as MCE_R without considering the earthquake exceedance probability of 10% in 50 years.
2. The interpolation for Risk Category III has been changed from 80% of Risk Category IV to halfway between Risk Category II and Risk Category IV based on the definitions of "Damage Control" and "Limited Safety" in ASCE 41-13. Based on review and modifications to the acceptance criteria during the development of ASCE 41-06, the halfway interpolation better reflects the intent of the ASCE 7-10 Importance Factors for Risk Category III. Note also that the halfway interpolation is consistent with how the IEBC treated Risk Category III prior to 2009.

Section 301.1.4.2 Reduced IBC Level Seismic Forces

This proposal removes the ASCE 41-06 performance levels from the IEBC and instead references the section in ASCE 41-13 that contains criteria for "Basic Performance Objective for Existing Buildings." The objectives are similar to Table 301.1.4.2 in the 2012 IEBC and are intended to be generally consistent with the traditional approach for reduced seismic forces (75% of new code).

Since ASCE 41-13 Section 2.2.1 addresses both structural and nonstructural items, the revised text references only the structural performance criteria consistent with Table 301.1.4.1 in the IEBC.

ASCE 41-13 contains a three-tiered approach with Tiers 1 and 2 taken from ASCE 31-03 and Tier 3 being the Systematic Method from ASCE 41-06. Therefore, effectively the methods in ASCE 41-13 as referenced in new Item 3 and the same as those referenced in 2012 IEBC Items 3 and 4.

If kept within the IEBC, an updated version of Table 301.1.4.1 would be as follows:

TABLE 301.1.4.2
PERFORMANCE CRITERIA FOR REDUCED IBC-LEVEL SEISMIC FORCES

RISK CATEGORY (BASED ON IBC TABLE 1604.5)	~~PERFORMANCE LEVEL FOR USE WITH ASCE 31~~	PERFORMANCE LEVEL FOR USE WITH ASCE 41 BSE-1 EARTHQUAKE HAZARD LEVEL
I	~~Life Safety (LS)~~	Life Safety ~~(LS)~~
II	~~Life Safety (LS)~~	Life Safety ~~(LS)~~
III	~~Note a~~	Damage Control Note a
IV	~~Immediate Occupancy (IO)~~	Immediate Occupancy ~~(IO)~~

a. For Risk Category III, the ASCE 41 Tier 1 Screening checklists shall be based on the Life Safety Performance Level, except that checklists statements using the Quick Check procedures of ASCE 41 Section 4.5.3 shall be to a demand to capacity ratio based on the average of the demand to applicable capacity ratio for Life Safety and Immediate Occupancy.

~~a. Acceptance criteria for Risk Category III shall be taken as 80 percent of the acceptance criteria specified for Risk Category II performance, but need not be less than the acceptance criteria specified for Risk Category IV performance levels.~~

~~b. For Risk Category III, the ASCE 31 screening phase checklists shall be based on the life safety performance level.~~

Therefore, this part of the proposal effectively has four substantive revisions:

1. The BSE-1E is a newly defined seismic hazard in ASCE 41-13 intended for the Basic Performance Objective for existing buildings. The hazard level is defined as an earthquake with a 20% exceedance probability in 50 years, which is generally consistent with a 10% in 50 year earthquake with the 0.75 factor that was built into the ASCE 31-03 methodology for seismic evaluation.
2. The interpolation for Risk Category III has been changed from 80% of Risk Category IV to halfway between Risk Category II and Risk Category IV based on the definitions of "Damage Control" in ASCE 41-13. Based on review and modifications to the acceptance criteria during the development of ASCE 41-06, the halfway interpolation better reflects the intent of the ASCE 7-10 Importance Factors for Risk Category III. Note also that the halfway interpolation is consistent with how the IEBC treated Risk Category III prior to 2009.
3. The performance objectives for the Tier 1 and Tier 2 procedures in ASCE 41-13 consists of a single check (one performance level and seismic hazard combination), consistent with ASCE 31-03 as referenced in the 2012 IEBC. Due to seismic hazard reduction (from 2/3 MCE to 20% in 50 year) combined with the elimination of the ASCE 31-03 0.75 factor, the effective performance objective for Tier 1 and Tier 2 is similar to what the 2012 IEBC Table 301.4.2 specifies for ASCE 31-03.

4. The performance objective for the Tier 3 procedure in ASCE 41-13 consists of a dual check (two performance level and seismic hazard combination), which differs from how the 2012 IEBC references ASCE 41-06. The inclusion of the second seismic hazard (BSE-2E defined as 5% in 50 year) is intended to offset the effect of the hazard reduction from the ASCE 41-06 BSE-1 (10% in 50 year) to the ASCE 41-13 BSE-1E (20% in 50 year). Therefore, the dual level check proposed is intended to be generally consistent with the single level check in 2012 IEBC Table 301.1.4.2.

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

Analysis: This code change proposal references ASCE standard 41, which is already referenced in this code. However, the proposed change to code text is written to correlate with a new edition of the standard ASCE 41-13, rather than the edition presently referenced in the code, which is the 06 edition. The 13 edition of this standard is not yet completed, published and available. The update to this standard will be considered by the Administrative Code Committee during the 2013 Code Development Cycle. Should this code change proposal be approved, but the update to the standard not be approved by the Administrative Code Committee, the code text will revert to the text as it appears in the 2012 Edition of the code. Additionally, if the standard update is approved but the document is not published and available by December 1, 2014, an errata will be issued to the code that will return the affected code text to the text as it appears in the 2012 edition of the code.

301.1.4-EB-GOUPIL.doc

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

[B] 301.1.4 Evaluation and design procedures. The seismic evaluation and design shall be based on the procedures specified in the *International Building Code* or ASCE 41. The procedures contained in Appendix A of this code shall be permitted to be used as specified in Section 301.1.4.2.

[B] 301.1.4.1 Compliance with IBC level seismic forces. Where compliance with the seismic design provisions of the *International Building Code* is required, the ~~procedures~~ criteria shall be in accordance with one of the following:

1. One-hundred percent of the values in the *International Building Code*. Where the existing seismic force-resisting system is a type that can be designated as “Ordinary,” values of R, $\Omega 0$ and C_d used for analysis in accordance with Chapter 16 of the *International Building Code* shall be those specified for structural systems classified as “Ordinary” in accordance with Table 12.2-1 of ASCE 7, unless it can be demonstrated that the structural system will provide performance equivalent to that of a “Detailed,” “Intermediate” or “Special” system.
2. ~~Compliance with the performance objectives in ASCE 41 Section 2.2.4 based on the assigned Risk Category for the building.~~ ASCE 41, using a Tier 3 procedure and the two-level performance objective in Table 301.1.4.1 for the applicable risk category.

[B] TABLE 301.1.4.1
PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH IBC-LEVEL SEISMIC FORCES

RISK CATEGORY (Based on IBC Table 1604.5)	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1N EARTHQUAKE HAZARD LEVEL	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-2N EARTHQUAKE HAZARD LEVEL
I	Life Safety (S-3)	Collapse Prevention (S-5)
II	Life Safety (S-3)	Collapse Prevention (S-5)
III	Damage Control (S-2)	Limited Safety (S-4)
IV	Immediate Occupancy (S-1)	Life safety (S-3)

[B] 301.1.4.2 Compliance with reduced IBC level seismic forces. Where seismic evaluation and design is permitted to meet reduced *International Building Code* seismic force levels, the ~~procedures~~ criteria used shall be in accordance with one of the following:

3. The *International Building Code* using 75 percent of the prescribed forces. Values of R, Ω_0 and C_d used for analysis shall be as specified in Section 301.1.4.1 of this code.
4. Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A as specified in Items 2.1 through 2.5 and subject to the limitations of the respective Appendix Chapters shall be deemed to comply with this section.
   - 4.1 The seismic evaluation and design of unreinforced masonry bearing wall buildings in Risk Category I or II are permitted to be based on the procedures specified in Appendix Chapter A1.
   - 4.2 Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in Risk Category I or II are permitted to be based on the procedures specified in Chapter A2.
   - 4.3. Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A3.
   - 4.4. Seismic evaluation and design of soft, weak, or open-front wall conditions in multiunit residential buildings of wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A4.
   - 4.5. Seismic evaluation and design of concrete buildings in all risk categories are permitted to be based on the procedures specified in Chapter A5.
5. ~~Compliance with the performance objectives in ASCE 41 Section 2.2.1 based on the assigned Risk Category for the building.~~ ASCE 41, using the performance objective in Table 301.1.4.2 for the applicable risk category.

[B] TABLE 301.1.4.2
PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH REDUCED IBC-LEVEL SEISMIC FORCES

RISK CATEGORY (Based on IBC Table 1604.5)	STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1E EARTHQUAKE HAZARD LEVEL
I	Life Safety (S-3)
II	Life Safety (S-3)
III	Damage Control (S-2). See Note a
IV	Immediate Occupancy (S-1)

a. Tier 1 evaluation at the Damage Control performance level shall use the Tier 1 Life Safety checklists and Tier 1 Quick Check provisions midway between those specified for Life Safety and Immediate Occupancy performance.

Committee Reason: This IEBC update is a necessary step in making this section compatible with the new edition of ASCE 41. The modification will make this section easier to use by keeping the performance objectives in the code,

Analysis: This code change proposal references ASCE standard 41, which is already referenced in this code. However, the proposed change to code text is written to correlate with a new edition of the standard ASCE 41-13, rather than the edition presently referenced in the code, which is the 2006 edition. The 2013 edition of this standard is not yet completed, published and available. The update to this standard will be considered by the Administrative Code Committee during the 2013 Code Development Cycle. If the standard update is approved but the document is not published and available by December 1, 2014, an errata will be issued to the code that will return the referenced edition of the standard to the edition referenced in the 2012 edition of the code.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

James Bela, Oregon Earthquake Awareness, representing self, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

[B] 301.1.4 Evaluation and design procedures. The seismic evaluation and design shall be based on the procedures specified in the *International Building Code* ~~or ASCE 41~~. The procedures contained in Appendix A of this code shall be permitted to be used as specified in Section 301.1.4.2.

[B] 301.1.4.1 Compliance with IBC level seismic forces. Where compliance with the seismic design provisions of the *International Building Code* is required, the criteria shall be in accordance with one of the following:

1. One-hundred percent of the values in the *International Building Code*. Where the existing seismic force-resisting system is a type that can be designated as “Ordinary,” values of R, $\Omega 0$ and C_d used for analysis in accordance with Chapter 16 of the *International Building Code* shall be those specified for structural systems classified as “Ordinary” in accordance with Table 12.2-1 of ASCE 7, unless it can be demonstrated that the structural system will provide performance equivalent to that of a “Detailed,” “Intermediate” or “Special” system.
2. ~~ASCE 41, using a Tier 3 procedure and the two-level performance objective in Table 301.1.4.1 for the applicable risk category.~~

~~[B] TABLE 301.1.4.1~~
~~PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH IBC-LEVEL SEISMIC FORCES~~

~~RISK CATEGORY (Based on IBC Table 1604.5)~~	~~STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1N EARTHQUAKE HAZARD LEVEL~~	~~STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-2N EARTHQUAKE HAZARD LEVEL~~
~~I~~	~~Life Safety (S-3)~~	~~Collapse Prevention (S-5)~~
~~II~~	~~Life Safety (S-3)~~	~~Collapse Prevention (S-5)~~
~~III~~	~~Damage Control (S-2)~~	~~Limited Safety (S-4)~~
~~IV~~	~~Immediate Occupancy (S-1)~~	~~Life safety (S-3)~~

[B] 301.1.4.2 Compliance with reduced IBC level seismic forces. Where seismic evaluation and design is permitted to meet reduced *International Building Code* seismic force levels, the criteria used shall be in accordance with one of the following:

1. The *International Building Code* using 75 percent of the prescribed forces. Values of R, Ω_0 and C_d used for analysis shall be as specified in Section 301.1.4.1 of this code.
2. Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A as specified in Items 2.1 through 2.5 and subject to the limitations of the respective Appendix Chapters shall be deemed to comply with this section.
   2.1. The seismic evaluation and design of unreinforced masonry bearing wall buildings in Risk Category I or II are permitted to be based on the procedures specified in Appendix Chapter A1.
   2.2. Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in Risk Category I or II are permitted to be based on the procedures specified in Chapter A2.
   2.3. Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A3.
   2.4. Seismic evaluation and design of soft, weak, or open-front wall conditions in multiunit residential buildings of wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A4.
   2.5. Seismic evaluation and design of concrete buildings in all risk categories are permitted to be based on the procedures specified in Chapter A5.
3. ~~ASCE 41, using the performance objective in Table 301.1.4.2 for the applicable risk category.~~

~~[B] TABLE 301.1.4.2~~
~~PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH REDUCED IBC-LEVEL SEISMIC FORCES~~

~~RISK CATEGORY (Based on IBC Table 1604.5)~~	~~STRUCTURAL PERFORMANCE LEVEL FOR USE WITH BSE-1E EARTHQUAKE HAZARD LEVEL~~
~~I~~	~~Life Safety (S-3)~~
~~II~~	~~Life Safety (S-3)~~
~~III~~	~~Damage Control (S-2). See Note a~~
~~IV~~	~~Immediate Occupancy (S-1)~~

~~a. Tier 1 evaluation at the Damage Control performance level shall use the Tier 1 Life Safety checklists and Tier 1 Quick Check provisions midway between those specified for Life Safety and Immediate Occupancy performance.~~

Commenter's Reason: The IEBC should not be dealing with seismic upgrade and seismic retrofit issues; rather, it should remain limited to fire-and-life-safety, exiting requirements, and strength issues related to gravity and lateral loading (due to wind). If engineers want to use ASCE 41, they should do it without the presumed endorsement of the ICC code development process. Since ASCE 41 is out-of-step with the ICC code development process, it should not be permissible to incorporate anticipated future changes to it into ICC code development processes. Since ASCE 41 incorporates the same flaws and miscalculations regarding seismic hazard assessment as ASCE 7-10 (specifically now even MCE_R); the results thereof will be even more problematical for existing buildings. Existing buildings need to be confronted by the realities of a real earthquake determined by Deterministic Seismic Hazard Assessment, or DSHA. With the "yo-yoing" of seismic design forces resulting from the non-stability of seismic hazard mapping, then further reducing force levels below now reduced current code levels makes no sense whatsoever – and the end results for public safety are really questionable. The so-called "Performance Levels" referred to in ASCE 41 are without physical meaning and without merit. Existing buildings need to be evaluated against a real earthquake criterion, which has a real magnitude, real frequency content, and a real duration of shaking.

EB1-12

Final Action: AS AM AMPC____ D

EB2-12
[B]301.1.4, [B]301.1.5 (New), Chapter 16 (New)

Proposed Change as Submitted

Proponent: Matthew Senecal, P.E., American Concrete Institute

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] 301.1.4 Seismic evaluation and design procedures. The seismic evaluation and design shall be based on the procedures specified in the *International Building Code*, ASCE 31 or ASCE 41. The procedures contained in Appendix A of this code shall be permitted to be used as specified in Section 301.1.4.2.

[B] 301.1.5 Concrete evaluation and design procedures. Non-seismic evaluation and design of structural concrete shall be in accordance with the requirements of ACI 562.

Add new standard to Chapter 16 as follows:

ACI

562-12 - Code Requirements for Evaluation, Repair, and Rehabilitation of Concrete Buildings

Reason: There are no general evaluation and design criteria for concrete structures in the IEBC. ASCE 31, ASCE 41, and Appendix A of this code provide direction for particular structural systems in high seismic areas. ACI 562 is a new referenced standard addressing non-seismic evaluation and design of concrete structures. ACI 562 is compatible with the principles of this code, ASCE 31, and ASCE 41.

Cost Impact: The code change proposal will set a minimum standard for the repair or rehabilitation of concrete structures; therefore, the cost of construction may increase or decrease depending on the standard of practice of the local jurisdiction.

Analysis: A review of the standard proposed for inclusion in the code ACI 562-12 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

301.1.4-EB-SENECAL.doc

Public Hearing Results

Note: For staff analysis of the content of ACI 562 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This proposal adds ACI 562 as an IEBC reference standard in order to provide guidance for the repair of concrete buildings.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

David Bonowitz, representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

301.1.4 Seismic evaluation and design procedures. The seismic evaluation and design shall be based on the procedures specified in the *International Building Code*, ASCE 31 or ASCE 41. The procedures contained in Appendix A of this code shall be permitted to be used as specified in Section 301.1.4.2.

~~**301.1.5 Concrete evaluation and design procedures.** Non-seismic evaluation and design of structural concrete shall be in accordance with the requirements of ACI 562.~~

301.1.5 Non-seismic evaluation and design procedures. Where seismic evaluation or design is not required, and where the cited evaluation or design requirements are not specific with respect to existing conditions, compliance with ACI 562 shall be deemed to comply with requirements for evaluation, repair, or rehabilitation of structural concrete.

Commenter's Reason: This comment would clarify the intent and scope of proposal EB2, which was approved as submitted.

As submitted, proposal EB2 would require the use of ACI 562, but ACI 562 is problematic for several reasons:

- ACI 562 is a new standard, never used. Its final text has not been available for review. According to ACI, changes have been made to the document since the ballot draft was made available to ICC, and the new text is only going to public comment through ACI on August 1, 2012.
- ACI 562 creates confusion by referring to itself as a code, not a standard.
- "Non-seismic" as used in proposal EB2 is not defined. Does it refer to the seismic design category, the cause of the damage, the system or component in question, the load combination in question, or something else?
- "Design of structural concrete" as used in proposal EB2 is unclear. Does it apply only to existing components being repaired or altered, or does it also apply to new components being added (which are supposed to be as per code for new construction)?
- ACI 562 sec 1.3.4 et al. cite ACI 318 instead of citing the building code. Thus, any code modifications to ACI 318 are lost.
- ACI 562 uses non-code terminology not defined: "distressed," "life safety hazard," etc.
- ACI 562 uses non-code terminology inadequately defined by the standard: "service life," etc.
- ACI 562 sec 1.3.5 greatly increases the scope of work for repairs by requiring a potentially costly and disruptive investigation anywhere in the building of elements "similar" to damaged elements.
- ACI 562 sec 1.3.5 and 1.3.5C confuses construction defects (which always require remedy) and damage (which might or might not require repair). It makes the engineer and code official on a repair project responsible for finding original construction defects and hidden non-compliance.
- ACI 562 has administrative requirements in section 1.4 through 1.7 that appear to supersede IBC Chapter 1 inappropriately.
- ACI 562 section 1.5.3 and 1.7 make the engineer and code official responsible for developing a maintenance plan as part of a structural evaluation or design.
- ACI 562 section 4.2 inappropriately restates (and thus introduces potential confusion, if not conflict) compliance provisions in IEBC 301.
- ACI 562 section 4.4 inappropriately restates (and thus introduces potential confusion, if not conflict) basic provisions of the IEBC regarding design criteria for different project types.
- ACI 562 section 7.5 inappropriately restates (and thus introduces potential confusion, if not conflict) provisions in IEBC 301, 401, 602, etc.

For these reasons, proposal EB2 must at the very least be modified to clarify the intent as follows:

- It should be voluntary, not mandatory. Hence the recommended "deemed to comply" language.
- It should apply only where the default evaluation and design requirements – those in IBC Chapter 16 and material chapters, as modified by the triggering provision in the IEBC – are unclear, incomplete, or not applicable to existing conditions because they were developed to apply primarily to new construction.
- The new section should parallel the existing organization, which is based on load types, not materials.

Public Comment 2:

Mark K. Gilligan, representing self, requests Disapproval.

Commenter's Reason: Including ACI 562 as a reference standard is not appropriate because the document is severely flawed on multiple levels.

A basic concern for building officials is that in many places the document does not provide objective criteria for the building official to determine whether the proposed design complies or not. For example Sections 7.3.2.1, 7.4.2 through 7.4.4. 7.8.2.1, 7.9.1.4, 8.3.1, 8.4, and 8.5.

In numerous locations it tries to dictate who does what and not what the building must comply with.

Section 10.3.1C changes the very nature of Construction Observation into a requirement for a full fledged inspection program.

Sections 4.3.4 & 5.1.2 requires the design professional to have a detailed involvement in contractors shoring. While sequence of construction and loading can have an impact on the forces in concrete members the reality is that in most common situations the ultimate capacity is not very sensitive to these conditions. The same issue exists in new construction where common practice is to have the contractor design shoring and formwork. It does not make sense to have this requirement for repairs when we do not require it for new construction.

Section 1.5.3 requires the development of a maintenance program when there is no corresponding requirement for new construction.

Section 6.6 makes reference to ACI 437 which ACI considers a guideline and not a standard. According to ACI policy ACI 437 should not be used as a reference standard.

Issues such as load testing and post installed anchors are already addressed in ACI 318.

This document is a clear indication of the problems that can occur when reference standards are submitted for inclusion before people have had an opportunity to review the document. Standards of questionable value get adopted without anybody reading them.

Public Comment 3:

Marko Schotanus, Rutherford & Chekene, representing SEAOC Existing Buildings Committee, requests Disapproval.

Commenter's Reason: Proposal EB2 requires the use of a new standard, ACI 562, that is still incomplete, has never been used, and has not even been thoroughly reviewed by either ICC committee members, code officials, or engineers. According to ACI, changes have been made to the document since the ballot draft was made available to ICC, and the new text is only going to public comment through ACI on August 1, 2012. Also, proposal EB2 affects only the IEBC, not the IBC, leading to a lack of coordination.

Proposal EB2 should therefore be Disapproved at least until the final content of ACI 562 is known and accepted by consensus.

In addition, review of the draft copy of ACI 562 made available by the proponent revealed the following concerns that further argue for Disapproval of EB2:

- ACI 562 creates confusion by referring to itself as a code, not a standard.
- Proposal EB2 affects "non-seismic" applications only, but ACI 562 is comprehensive and addresses seismic issues as well. Thus, when sent to ACI 562 by proposed IEBC 301.1.5, the user will not know which sections to use and which to ignore.
- "Non-seismic" as used in proposal EB2 is not defined. Does it refer to the seismic design category, the cause of the damage, the system or component in question, the load combination in question, or something else?
- "Design of structural concrete" as used in proposal EB2 is unclear. Does it apply only to existing components being repaired or altered, or does it also apply to new components being added (which are supposed to be as per code for new construction)?
- Overall application of ACI 562 is unclear. Proposal EB2 would have it apply to any project type covered by the IEBC – additions, alterations, repairs, change of occupancy, relocation – but the content of ACI 562 appears to be almost entirely about repair. For example, see ACI 562 sec 4.2
- ACI 562 sec 1.3.4 et al. cite ACI 318 instead of citing the building code. Thus, any code modifications to ACI 318 are lost.
- ACI 562 uses non-code terminology not defined: "distressed," "life safety hazard," etc.
- ACI 562 uses non-code terminology inadequately defined by the standard: "service life," etc.
- ACI 562 sec 1.3.5 greatly increases the scope of work for repairs by requiring a potentially costly and disruptive investigation anywhere in the building of elements "similar" to damaged elements.
- ACI 562 sec 1.3.5 and 1.3.5C confuses construction defects (which always require remedy) and damage (which might or might not require repair). It makes the engineer and code official on a repair project responsible for finding original construction defects and hidden non-compliance.
- ACI 562 has administrative requirements in section 1.4 through 1.7 that appear to supersede IBC Chapter 1 inappropriately.
- ACI 562 section 1.5.3 and 1.7 make the engineer and code official responsible for developing a maintenance plan as part of a structural evaluation or design.
- ACI 562 section 4.2 inappropriately restates (and thus introduces potential confusion, if not conflict) compliance provisions in IEBC 301.

- ACI 562 section 4.4 inappropriately restates (and thus introduces potential confusion, if not conflict) basic provisions of the IEBC regarding design criteria for different project types.
- ACI 562 section 7.5 inappropriately restates (and thus introduces potential confusion, if not conflict) provisions in IEBC 301, 401, 602, etc.

EB2-12

Final Action: AS AM AMPC____ D

EB3-12
[B]301.1.4.2, [B]A502.1

Proposed Change as Submitted

Proponent: David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] 301.1.4.2 Compliance with reduced IBC level seismic forces. Where seismic evaluation and design is permitted to meet reduced *International Building Code* seismic force levels, the procedures used shall be in accordance with one of the following:

1. The *International Building Code* using 75 percent of the prescribed forces. Values of R, Ω_0 and C_d used for analysis shall be as specified in Section 301.1.4.1 of this code.
2. Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A as specified in Items 2.1 through 2.5 and subject to the limitations of the respective Appendix A Chapters shall be deemed to comply with this section.
   2.1. The seismic evaluation and design of unreinforced masonry bearing wall buildings in Risk Category I or II are permitted to be based on the procedures specified in Appendix Chapter A1.
   2.2. Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in Risk Category I or II are permitted to be based on the procedures specified in Chapter A2.
   2.3. Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A3.
   2.4. Seismic evaluation and design of soft, weak, or open-front wall conditions in multiunit residential buildings of wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A4.
   2.5. Seismic evaluation and design of concrete buildings ~~in all risk categories are~~ assigned to risk category I, II or III is permitted to be based on the procedures specified in Chapter A5.
3. Compliance with ASCE 31 based on the applicable performance level as shown in Table 301.1.4.2. It shall be permitted to use the BSE-1 earthquake hazard level as defined in ASCE 41 and subject to the limitations in Item 4 below.
4. Compliance with ASCE 41 using the BSE-1 Earthquake Hazard Level and the performance level shown in Table 301.1.4.2. The design spectral response acceleration parameters S_{XS} and S_{X1} specified in ASCE 41 shall not be taken less than 75 percent of the respective design spectral response acceleration parameters S_{DS} and S_{D1} defined by the *International Building Code*.

Revise as follows:

[B] A502.1 Scope. The provisions of this chapter shall apply to all buildings having concrete floors or roofs supported by reinforced concrete walls or by concrete frames and columns. This chapter shall not apply to buildings with roof diaphragms that are defined as flexible diaphragms by the building code, and shall not apply to concrete frame buildings with masonry infilled walls. Buildings that were designed and constructed in accordance with the seismic provisions of the 1993 *BOCA National Building Code*, the 1994 *Standard Building Code*, the 1976 *Uniform Building Code*, the 2000 *International Building Code* or later editions of these codes shall be deemed to comply with these provisions, unless the seismicity of the region has increased since the design of the building.

> **Exception:** This chapter shall not apply to ~~concrete~~ buildings ~~where Seismic Design Category A is permitted~~ assigned to risk category IV.

Reason: This proposal clarifies the eligibility of buildings to use Appendix Chapter A5, with coordinated revisions to Chapter 3 and Chapter A5. Two changes are proposed:

- Chapter A5 is intended to improve a building's performance with respect to safety but not necessarily with respect to post-earthquake functionality or recovery. As such, it is not appropriate for buildings assigned to risk category IV. The proposal makes appropriate revisions to Chapter 3 and Chapter A5.
- The current Chapter A5 text says the chapter does not "apply" to SDC A; commentary explains that this is based on the low seismicity associated with SDC A. There is no technical reason why the chapter's provisions cannot be used for these buildings, however, so that confusing "limitation" is removed.

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

301.1.4.2-EB-BONOWITZ.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change clarifies the current intent of the IEBC by stating the risk categories that are permitted to utilize Appendix Chapter A5. Doing so fixes a hole in the code that could allow these retrofits in a Risk Category IV structure.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

James Bela, Oregon Earthquake Awareness, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[B] 301.1.4.2 Compliance with reduced IBC level seismic forces. Where seismic evaluation and design is permitted to meet reduced *International Building Code* seismic force levels, the procedures used shall be in accordance with one of the following:

1. The *International Building Code* using 75 percent of the prescribed forces. Values of *R*, Ω_0 and C_d used for analysis shall be as specified in Section 301.1.4.1 of this code.
2. Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A as specified in Items 2.1 through 2.5 and subject to the limitations of the respective Appendix A Chapters shall be deemed to comply with this section.
   2.1. The seismic evaluation and design of unreinforced masonry bearing wall buildings in Risk Category I or II are permitted to be based on the procedures specified in Appendix Chapter A1.
   2.2. Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in Risk Category I or II are permitted to be based on the procedures specified in Chapter A2.
   2.3. Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A3.
   2.4. Seismic evaluation and design of soft, weak, or open-front wall conditions in multiunit residential buildings of wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A4.
   2.5. Seismic evaluation and design of concrete buildings ~~assigned to risk category I, II or III is~~ is permitted to be based on the procedures specified in Chapter A5.
3. Compliance with ASCE 31 based on the applicable performance level as shown in Table 301.1.4.2. It shall be permitted to use the BSE-1 earthquake hazard level as defined in ASCE 41 and subject to the limitations in Item 4 below.
4. Compliance with ASCE 41 using the BSE-1 Earthquake Hazard Level and the performance level shown in Table 301.1.4.2. The design spectral response acceleration parameters S_{XS} and S_{X1} specified in ASCE 41 shall not be taken

less than 75 percent of the respective design spectral response acceleration parameters S_{DS} and S_{D1} defined by the *International Building Code*.

[B] A502.1 Scope. The provisions of this chapter shall apply to all buildings having concrete floors or roofs supported by reinforced concrete walls or by concrete frames and columns. This chapter shall not apply to buildings with roof diaphragms that are defined as flexible diaphragms by the building code, and shall not apply to concrete frame buildings with masonry infilled walls. Buildings that were designed and constructed in accordance with the seismic provisions of the 1993 *BOCA National Building Code*, the 1994 *Standard Building Code*, the 1976 *Uniform Building Code*, the 2000 *International Building Code* or later editions of these codes shall be deemed to comply with these provisions, unless the seismicity of the region has increased since the design of the building.
ICC

~~**Exception:** This chapter shall not apply to buildings assigned to risk category IV.~~

Commenter's Reason: The IEBC should not be dealing with seismic upgrade and seismic retrofit issues; rather, it should remain limited to fire-and-life-safety, exiting requirements, and strength issues related to gravity and lateral loading (due to wind). I fail to see the implied argument that "the similarities are different" between Risk Category III and Risk Category IV. Risk Category III structures, which include schools, have just as significant consequences for failure as does Risk Category IV. It is better to leave any differences, if they truly can be justified, to Chapter A5. Besides, the engineer and the regulator are left hanging wondering how one exactly is to evaluate and design concrete buildings unfortunate enough to be Risk Category IV. See additional reasons of Public Comment EB1-12.

Code language should most often be formatted as positive statements. Seismic Design Categories are not precisely defined due to systemic errors in the formulation of seismic hazard maps, which are proving "non-stable" over succeeding editions (see reasons and bibliography under **Public Comment S110-12 Public Comment AS – Figs. 1613.3.1 Deleting MCEsub R Maps.** Any free passes (or get-out-fixing-your-bad-building exceptions) are really best handled specifically and exclusively in the Appendix itself.

EB3-12

Final Action: AS AM AMPC____ D

EB6-12, Part I
[B] 807.5, [IBC] 3404.4

Proposed Change as Submitted

Proponent: David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

PART I - IEBC

Revise as follows:

[B] 807.5 Existing structural elements resisting lateral loads. ~~*Alterations* affecting the demands or capacities of existing elements of the lateral load-resisting system shall be evaluated using the wind provisions of the *International Building Code* and the reduced IBC-level seismic forces. Any existing lateral load-resisting structural elements whose demand-capacity ratio with the *alteration* considered is more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be brought into compliance with those wind and seismic provisions. In addition, the *alteration* shall not create a structural irregularity prohibited by ASCE 7 unless the entire structure complies with Section 301.1.4.2. For the purposes of this section, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacity shall account for the cumulative effects of *additions* and *alterations* since the original construction.~~ Except as permitted by Section 807.6, where the alteration increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the alteration decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall be shown to meet the wind and seismic provisions of the *International Building Code*. Reduced IBC-level seismic forces shall be permitted.

> **Exception:** Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is no more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces per IBC Sections 1609 and 1613. Reduced IBC-level seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of additions and alterations since original construction.

Reason: The proposal rewrites IEBC Section 807.5 using the clearer logic of IBC Section 3404.4. No change in scope or effect is intended. In applying the clearer wording, however, the scope of triggered work associated with the creation of a prohibited irregularity is slightly changed, from full compliance without exception to the usual compliance eligible for the 10 percent DCR exception. This is appropriate, and the resulting IEBC provision will be consistent with the corresponding IBC provision, except that the IEBC criteria will continue to allow the use of reduced seismic forces.

The proposal also modifies IBC Section 3404.4 for consistency by inserting the word "prohibited" in one place.

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

807.5-EB-BONOWITZ.doc

Public Hearing Results

PART I - IEBC
Committee Action: **Approved as Submitted**

Committee Reason: This proposal adopts the clearer language of the corresponding IBC section for the compliance triggers for alterations. The treatment of prohibited structural irregularities is more appropriate.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

James Bela, Oregon Earthquake Awareness, representing self, requests Disapproval.

Commenter's Reason: Using "prohibited" in the same sentence that leads with "permitted" is not necessary, and it is potentially confusing. Are there any such things as permitted irregularities.

EB6-12, Part I
Final Action: AS AM AMPC____ D

EB6-12, Part II
[B] 807.5, [IBC] 3404.4

Proposed Change as Submitted

Proponent: David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

THIS IS A TWO PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE AS TWO SEPARATE CODE CHANGES. SEE TENTATIVE HEARING ORDER FOR THIS COMMITTEE

PART II – IBC STRUCTURAL

Revise as follows:

3404.4 Existing structural elements carrying lateral load. Except as permitted by Section 3404.5, where the *alteration* increases design lateral loads in accordance with Section 1609 or 1613, or where the *alteration* results in a <u>prohibited</u> structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall be shown to meet the requirements of Sections 1609 and 1613.

> **Exception:** Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is no more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces per Sections 1609 and 1613. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

Reason: The proposal rewrites IEBC Section 807.5 using the clearer logic of IBC Section 3404.4. No change in scope or effect is intended. In applying the clearer wording, however, the scope of triggered work associated with the creation of a prohibited irregularity is slightly changed, from full compliance without exception to the usual compliance eligible for the 10 percent DCR exception. This is appropriate, and the resulting IEBC provision will be consistent with the corresponding IBC provision, except that the IEBC criteria will continue to allow the use of reduced seismic forces.

The proposal also modifies IBC Section 3404.4 for consistency by inserting the word “prohibited” in one place.

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

807.5-EB-BONOWITZ.doc

Public Hearing Results

PART II – IBC STRUCTURAL
Committee Action: **Approved as Submitted**

Committee Reason: Consistent with the action taken on Part I of this code change, a clarification is made to refer to “prohibited structural irregularities” which is considered more appropriate terminology.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

James Bela, Oregon Earthquake Awareness, representing self, requests Disapproval.

Commenter's Reason:. Using "prohibited" in the same sentence that leads with "permitted" is not necessary, and it is potentially confusing. Are there any such things as permitted irregularities?

EB6-12, Part II
Final Action: AS AM AMPC____ D

EB7-12
[B] 907.4.2

Proposed Change as Submitted

Proponent: David Bonowitz, Chair, Existing Buildings Subcommittee, Code Advisory Committee, National Council of Structural Engineers Associations (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] 907.4.2 Substantial structural alteration. Where more than 30 percent of the total floor and roof areas of the building or structure have been or are proposed to be involved in structural *alteration* within a five-year period, the evaluation and analysis shall demonstrate that the lateral load resisting system of the altered building or structure complies with the *International Building Code* for wind loading and with reduced IBC-level seismic forces. The areas to be counted toward the 30 percent shall be those areas tributary to the vertical load-carrying components, such as joists, beams, columns, walls and other structural components that have been or will be removed, added or altered, as well as areas such as mezzanines, penthouses, roof structures and in-filled courts and shafts.

Reason: This proposal clarifies the long-standing intent of the IEBC that alteration-triggered structural upgrade applies to the (designated or *de facto*) lateral system only, and not to the gravity system or to nonstructural components.

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

907.4.2-EB-BONOWITZ.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change is a good clarification of triggered upgrades in alterations under the IEBC, since the intent of this provision has been that the upgrade be required only for the lateral force system.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

James Bela, Oregon Earthquake Awareness representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[B] 907.4.2 Substantial structural alteration. Where more than 30 percent of the total floor and roof areas of the building or structure have been or are proposed to be involved in structural alteration ~~within a five-year period~~, the evaluation and analysis shall demonstrate that the ~~lateral load resisting system of the~~ altered building or structure complies with the International Building Code for wind loading and with reduced IBC-level seismic forces. The areas to be counted toward the 30 percent shall be those areas tributary to the vertical load-carrying components, such as joists, beams, columns, walls and other structural components that have been or will be removed, added or altered, as well as areas such as mezzanines, penthouses, roof structures and in-filled courts and shafts.

Commenter's Reason: Substantial alteration should result in a substantially safer building, since its life is being extended. This includes, in particular, non-structural safety issues. So-called "gravity only" columns must be able to participate in the deflections imposed by the lateral load resisting system of the altered building or structures. The existing language is unsafe.

EB7-12

Final Action: AS AM AMPC____ D

EB12-12
[B] 1103.3

Proposed Change as Submitted

Proponent: David Bonowitz, Chair, Existing Buildings Subcommittee, Code Advisory Committee, National Council of Structural Engineers Associations (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] 1103.3 Lateral force-resisting system. The lateral force-resisting system of *existing buildings* to which additions are made shall comply with Sections 1103.3.1, 1103.3.2 and 1103.3.3.

Exceptions:

1. Buildings of Group R occupancy with no more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. ~~In other *existing buildings* where the lateral-force story shear in any story is not increased by more than 10 percent cumulative~~.
2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is no more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of additions and alterations since original construction.

Reason: The proposal follows the precedent set in the 2006 IBC, making the exception to lateral system upgrade element-based, as opposed to story-based. The intent is that elements triggered for lateral upgrade by Section 1103.3.1 or 1103.3.2 should be exempt based on their individual demand-capacity ratios, not on the overall story shear. A focus on story shear can miss critical individual elements in vertical additions and can be difficult to define in the case of horizontal additions. The language of the proposed exception is taken from IBC Section 3403.4.

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

1103.3-EB-BONOWITZ.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The revision to the second exception to Section 1103.3 coordinates the lateral force system treatment in the IEBC with similar provisions for additions under Chapter 34 of the IBC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

David Bonowitz, representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[B] 1103.3 Lateral force-resisting system.
The lateral force-resisting system of *existing buildings* to which additions are made shall comply with Sections 1103.3.1, 1103.3.2 and 1103.3.3.

Exceptions:

1. Buildings of Group R occupancy with no more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.
2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is no more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of additions and alterations since original construction. <u>For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations involving IBC level seismic forces in accordance with Section 301.1.4.1.</u>

Commenter's Reason: As the proponents of EB12-12, we believe the proposal is fine as submitted, and the ICC Structural Committee agreed. However, if there is concern about how to calculate the demand-capacity ratios as required by the revised Exception 2, a sentence can be added to clarify that the full IBC level seismic forces apply, just as they would throughout Section 1103.3 if the exception were not invoked. Either of the two methods allowed by Section 301.1.4.1 is suitable for making the calculations required by the exception.

Public Comment 2:

Jonathan Siu, City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

[B] 1103.3 Lateral force-resisting system. The lateral force-resisting system of *existing buildings* to which additions are made shall comply with Sections 1103.3.1, 1103.3.2 and 1103.3.3.

Exceptions:

1. Buildings of Group R occupancy with no more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *International Building Code* or the provisions of the *International Residential Code*.

2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is no more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of additions and alterations since original construction. <u>For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Section 301.1.4.1, item 1.</u>

Commenter's Reason: The original proposal added text to the IEBC taken from Chapter 34 of the IBC. However, additional guidance from the corresponding section in IBC Chapter 34 was not carried over into the IEBC in the original proposal. Without this text, it is unclear what loads are required to be used to determine the demand—can they be the reduced loads ordinarily allowed for existing buildings in this code, or are they required to be based on the loads for new construction? By referencing Item 1 in Section 304.1.4.1, this public comment clarifies it is the new construction loading that is required to be used, and maintains alignment between the IEBC and the IBC.

EB12-12
Final Action: AS AM AMPC____ D

EB14-12
[B]1302.6

Proposed Change as Submitted

Proponent: John Ingargiola and Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (john.ingargiola@dhs.gov, gregory.p.wilson@dhs.gov) and Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B]1302.6 Flood hazard areas. If relocated or moved into a flood hazard area, structures shall comply with Section 1612 of the *International Building Code* or Section R322 of the *International Residential Code*, as applicable.

Reason: Section 1302.2 already specifies that the foundation system of relocated buildings shall comply with the IBC or IRC, as applicable. As currently written, Section 1302.6 does not allow use of the flood resistant requirements of the IRC. This proposal clarifies that the provisions of the International Residential Code may be used, if applicable to the occupancy.

Cost Impact: The cost for some residential foundations may be lower because the prescriptive provisions of the IRC can be used, rather than requiring a registered design professional for all foundation system for relocated homes.

1302.6-EB-INGARGIOLA-WILSON-QUINN.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal allows the use of IRC Section R322 for relocated structures where applicable. A public comment is suggested for any additional Section references that may be needed.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

John Ingargiola and Gregory Wilson; Rebecca C. Quinn, RCQuinn Consulting, Inc., representing Dept Homeland Security, Federal Emergency Management Agency, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[B] 402.2 [Additions] Flood hazard areas. For buildings and structures in flood hazard areas established in Section 1612.3 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable, any addition that constitutes substantial improvement of the existing structure, as defined in Section 202, shall comply with the flood design requirements for new construction and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in *flood hazard areas* established in Section 1612.3 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable, any *additions* that do not constitute *substantial improvement* of the existing structure, as defined in Section 202, are not required to comply with the flood design requirements for new construction.

[B] 403.2 Flood hazard areas. For buildings and structures in flood hazard areas established in Section 1612.3 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable, any *alteration* that constitutes *substantial Improvement* of the existing structure, as defined in Section 202, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in *flood hazard areas* established in Section 1612.3 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable, any *alterations* that do not constitute *substantial improvement* of the existing structure, as defined in Section 202, are not required to comply with the flood design requirements for new construction.

[B] 404.5 Flood hazard areas. For buildings and structures in flood hazard areas established in Section 1612.3 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable, any *repair* that constitutes *substantial improvement* of the existing structure, as defined in Section 202, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in *flood hazard areas* established in Section 1612.3 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable, any repairs that do not constitute *substantial improvement* or repair of *substantial damage* of the existing structure, as defined in Section 202, are not required to comply with the flood design requirements for new construction.

[B] 408.2 Flood hazard areas. Within flood hazard areas established in accordance with Section 1612.3 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable, where the work proposed constitutes substantial improvement as defined in Section 1612.2 of the *International Building Code*, the building shall be brought into conformance with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.

Exception: *Historic buildings* need not be brought into compliance that are:

1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places;
2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or
3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

[B] 601.3 Flood hazard areas. In flood hazard areas, repairs that constitute *substantial improvement* shall require that the building comply with Chapter 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.

[B] 606.2.4 Flood hazard areas. In flood hazard areas, buildings that have sustained *substantial damage* shall be brought into compliance with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.

[B] 701.3 Flood hazard areas. In flood hazard areas, alterations that constitute *substantial improvement* shall require that the building comply with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.

[B] 1103.5 Flood Hazard Areas. Additions and foundations in flood hazard areas shall comply with the following requirements:

1. For horizontal additions that are structurally interconnected to the existing building:
   - 1.1 If the addition and all other proposed work, when combined, constitute substantial improvement, the existing building and the addition shall comply with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.
   - 1.2 If the addition constitutes substantial improvement, the existing building and the addition shall comply with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.
2. For horizontal additions that are not structurally interconnected to the existing building:
   - 2.1 The addition shall comply with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.
   - 2.2 If the addition and all other proposed work, when combined, constitute substantial improvement, the existing building and the addition shall comply with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.
3. For vertical additions and all other proposed work, when combined, that constitute substantial improvement, the existing building shall comply with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.
4. For a new, replacement, raised, or extended foundation, if the foundation work and all other proposed work, when combined, constitute substantial improvement, the existing building shall comply with Section 1612 of the *International*

Building Code, or Section R322 of the *International Residential Code*, as applicable.

[B] 1201.4 Flood hazard areas. In flood hazard areas, if all proposed work, including repairs, work required because of a change of occupancy, and alterations, constitutes substantial improvement, then the existing building shall comply with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.

> **Exception:** If an *historic building* will continue to be an *historic building* after the proposed work is completed, then the proposed work is not considered a *substantial improvement*. For the purposes of this exception, an *historic building* is:
>
> 1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places;
> 2. Determined by the Secretary of the U.S. Department of Interior to contribute to the historical significance of a registered historic district or a district preliminarily determined to qualify as a historic district; or
> 3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

[B] 1302.6 Flood hazard areas. If relocated or moved into a flood hazard area, structures shall comply with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable.

[B] 1401.3.3 Compliance with flood hazard provisions. In flood hazard areas, buildings that are evaluated in accordance with this section shall comply with Section 1612 of the *International Building Code*, or Section R322 of the *International Residential Code*, as applicable, if the work covered by this section constitutes substantial improvement.

Commenter's Reason: EB14-12 was Approved as Submitted, with a committee comment suggesting submission of a public comment for any additional section references that may be needed to carry the concept throughout the IEBC.

This modification carries the proposed language in EB14 to other flood provisions of the IEBC. The justification for making the change that was Approved as Submitted to Section 1302.6 extends to those other flood provisions. If a state or community adopts the IEBC and applies it to all buildings, including dwellings within the scope of the IRC, it is appropriate that when existing dwellings are required to be brought into compliance because of substantial improvement that compliance be determined by the IRC. For dwellings within the scope of the IRC there is one significant difference between compliance with Sec. 1612 and compliance with R322 – Sec. 1612 by reference to ASCE 24 requires an additional foot of elevation. Thus existing dwellings would be required to meet a different standard than new dwellings. This proposal would require compliance with the IRC, thus avoiding unequal treatment.

EB14-12

Final Action: AS AM AMPC____ D

EB23-12
[B] A301.3

Proposed Change as Submitted

Proponent: David Bonowitz, Chair, Existing Buildings Subcommittee, Code Advisory Committee, National Council of Structural Engineers Associations (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] A301.3 Alternative design procedures. The details and prescriptive provisions herein are not intended to be the only acceptable strengthening methods permitted. Alternative details and methods may be used where designed by a registered design professional ~~and~~ or approved by the *code official*. Approval of alternatives shall be based on a demonstration that the method or material used is at least equivalent in terms of strength, deflection and capacity to that provided by the prescriptive methods and materials.

Where analysis by a registered design professional is required, such analysis shall be in accordance with all requirements of the building code, except that the seismic forces may be taken as 75 percent of those specified in the building code.

Reason: This proposal provides flexibility to local jurisdictions to use alternative prescriptive solutions without the need for engineered solutions. This is consistent with the intent of the chapter and represents a practice already successfully in place in Berkeley and other California jurisdictions. Since the final sentence of the section already requires a demonstration of equivalence, code official approval is sufficient and there should be no need for both special approval *and* engineered design.

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

A301.3-EB-BONOWITZ.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: If accepted this change would have changed the scope of the Building Official's review of alternative designs. It would allow a single person, rather than two, to approve alternative designs. There is agreement with the intent of providing flexibility to local jurisdictions, but the wording needs more thought.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David Bonowitz, representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

A301.3 Alternative design procedures. The details and prescriptive provisions herein are not intended to be the only acceptable strengthening methods permitted. Alternative details and methods may be used where ~~designed by a registered design professional~~

~~and~~ approved by the code official. Approval of alternatives shall be based on a demonstration that the method or material used is at least equivalent in terms of strength, deflection and capacity to that provided by the prescriptive methods and materials.

Where analysis by a registered design professional is required, such analysis shall be in accordance with all requirements of the building code, except that the seismic forces may be taken as 75 percent of those specified in the building code.

Commenter's Reason: Section A301.3 already allows alternative means of compliance and gives guidance for how to assess them. The purpose of proposal EB23 is to allow local jurisdictions to implement that guidance without necessarily requiring an engineered design. This is necessary and appropriate for prescriptive retrofit of conventional houses. It provides flexibility to local jurisdictions represents a practice already successfully in place in Berkeley and other California jurisdictions.

The ICC Structural committee agreed with the intent. However, they correctly pointed out the wording originally proposed might have removed the authority of the code official to approve the alternative design. This comment therefore resolves that problem. By eliminating the clause as shown, approval of the code official is maintained, while the requirement for an engineered custom design is properly relaxed.

EB23-12

Final Action: AS AM AMPC____ D

EB26-12
[B] A304.2.6, Chapter A6 (New)

Proposed Change as Submitted

Proponent: David Bonowitz, Chair, Existing Buildings Subcommittee, Code Advisory Committee, National Council of Structural Engineers Associations (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] A304.2.6 New sill plates. Where new sill plates are used in conjunction with new foundations, they shall be minimum 2x nominal thickness and shall be preservative-treated wood or naturally durable wood permitted by the building code for similar applications, and shall be marked or branded by an approved agency. ~~Nails~~ Fasteners in contact with preservative-treated wood shall be hot-dip galvanized or other material permitted by the building code for similar applications. Fasteners, whether cast-in-place or post-installed, that anchor a preservative-treated sill plate to the foundation shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum. Metal framing anchors in contact with preservative treated wood shall be galvanized in accordance with ASTM A 653 with a G 185 coating.

Add new standard to Chapter A6 as follows:

ASTM

B695-04 Standard Specification for Coating of Zinc Mechanically Deposited on Iron and Steel

Reason: This proposal makes two improvements related to metal hardware in contact with treated wood:

- In the second sentence, it replaces "nails" with "fasteners" to clarify that the provision is general.
- It inserts a sentence addressing allowable compliance for anchor bolts. The compliance details match those in 2012 IBC Section 2304.9.5.3.

Since ASTM B 695 is not yet used in the IEBC, the proposal adds it to Chapter A6. However, B 695 is already used in the IBC, so a copy is not provided with the proposal.

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

EB26-12

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

A304.2.6-EB-BONOWITZ.doc

Public Hearing Results

Note: For staff analysis of the content of ASTM B 695 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The committee agrees that adding the referenced standard is necessary in order to bring the IEBC provision for fasteners in contact with treated wood in line with the IBC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jonathan Siu, City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[B] A304.2.6 New sill plates. Where new sill plates are used in conjunction with new foundations, they shall be minimum 2x nominal thickness and shall be preservative-treated wood or naturally durable wood permitted by the building code for similar applications, and shall be marked or branded by an approved agency. Fasteners in contact with preservative-treated wood shall be hot-dip galvanized or other material permitted by the building code for similar applications. ~~Fasteners~~ Anchors, ~~whether cast-in-place or post-installed~~, that ~~anchor~~ attach a preservative-treated sill plate to the foundation shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum. Metal framing anchors in contact with preservative treated wood shall be galvanized in accordance with ASTM A 653 with a G 185 coating.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The original proposal brought language into the IEBC taken from IBC Section 2304.9.5.1, allowing a different method and standard for protecting fasteners anchoring preservative treated sill plates to concrete foundations. However, the IBC requires nails to be hot-dipped galvanized, since Section 2304.9.5.1 specifically excludes nails and other fasteners from being allowed to use ASTM B 695. By referring to "fasteners" in the added text, this proposal may have introduced some confusion as to whether the nails used to attach metal framing anchors are required to be hot-dipped galvanized, or whether mechanically deposited zinc coating would be permitted.

We believe the intent of the proposal was to allow only anchor bolts and similar attachment hardware such as post-installed expansion or adhesive bolts to have mechanically deposited zinc coating in accordance with ASTM B 695. This public comment, by using the generic term "anchors," does not change the allowance for anchors bolts, expansion bolts, or epoxied bolts, but clarifies that nails are excluded from that allowance.

Deletion of "whether cast in place or post-installed" is proposed to eliminate unnecessary text. Anchors into concrete foundations must be installed by one method or the other, so stating both methods is not necessary.

EB26-12

Final Action: AS AM AMPC____ D

EB36-12
[B]C101.1, [B]C101.2, [B]C101.3 (New)

Proposed Change as Submitted

Proponent: David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

~~**[B]C101.1 Intent and purpose.** The provisions of this chapter provide prescriptive methods for selected structural retrofitting of existing buildings to increase their resistance to wind loads. Except as provided herein, other structural provisions of the *International Building Code* or the *International Residential Code* shall apply, as required.~~

~~**[B]C101.2 Scope.** The following prescriptive methods are intended for applications where the gable end wall framing is provided by a metal-plate-connected gable end frame or a conventionally framed gable end. The retrofits are appropriate for wall studs or webs spaced 24 inches (610 mm) on center maximum and oriented with the wide face either parallel or perpendicular to the surface of the gable end. Gable ends to be strengthened shall be permitted to be retrofitted using methods prescribed by this chapter.~~

[B]C101.1 Purpose. This chapter provides prescriptive methods for partial structural retrofit of an existing building to increase its resistance to out-of-plane wind loads. It is intended for voluntary use and for reference by mitigation programs. The provisions of this chapter do not necessarily satisfy requirements for new construction. Unless specifically cited, the provisions of this chapter do not necessarily satisfy requirements for structural improvements triggered by addition, alteration, repair, change of occupancy, building relocation or other circumstances.

[B]C101.2 Eligible buildings and gable end walls. The provisions of this chapter are applicable only to buildings that meet the following eligibility requirements:

1. The building is not more than three stories tall, from adjacent grade to the bottom plate of each gable end wall being retrofitted with this chapter.
2. The building is classified as Occupancy Group R3 (1-2 family dwellings)
3. The structure includes one or more wood-framed gable end walls, either conventionally framed or metal-plate-connected.

In addition, the provisions of this chapter are applicable only to gable end walls that meet the following eligibility requirements:

4. Each gable end wall has or shall be provided with studs or vertical webs spaced 24 inches (610 mm) on center maximum.
5. Each gable end wall has a maximum height of 16 ft.

[B]C101.3 Compliance. Eligible gable end walls in eligible buildings may be retrofitted with this chapter. Eligible buildings with one or more ineligible gable end walls may be retrofitted with this chapter, provided all ineligible gable end walls are retrofitted with alternative criteria approved by the building official as equivalent. All other modifications required for conformance with this chapter shall be designed and constructed in accordance with the *International Building Code* or *International Residential Code* provisions for new construction except as specifically provided for by this chapter.

Reason: This proposal reorganizes, clarifies, and supplements the Chapter's provisions regarding intent, scope, eligibility, and compliance.

Proposed section C101.1 restates the first sentence of current section C101.1 and adds two clarifying sentences that confirm the relationship of this chapter to the rest of the IEBC and to other I-codes (similar to the current text of Section C201.1). Chapter C1 was added to the 2012 IEBC as a good idea suitable for voluntary use but not benchmarked in terms of performance. Because other IEBC provisions at times call for structural evaluation or retrofit to resist wind loads, it is important to be clear that Chapter C1 does not necessarily satisfy those requirements.

Proposed section C101.2 lays out the eligibility requirements in a more direct and specific way:

- Item 1: The proposed three-story limit is new, but it reflects our understanding (based on review of the supporting calculations and Chapter history) of the intent of Chapter C1 to apply to typical 1-2 unit dwellings of conventional wood framing. Given the limits of the Chapter's supporting studies and past applications, it would be wrong to encourage this retrofit scheme for taller or more complex structures that happen to have wood framed gable end walls.
- Item 2: The proposed occupancy eligibility rule is new, but it again reflects our understanding of the intent of Chapter 1 to apply to typical 1-2 unit dwellings. Given the limits of the Chapter's supporting studies, past applications, and lack of benchmarking by risk category, it would be wrong to encourage this retrofit scheme for multi-unit complexes or for assisted living, commercial, educational, or other occupancies simply because the building looks like a house. (For ease of use by homeowners and residential contractors, we have proposed this eligibility limit in terns of occupancy. Alternatively, because the governing load is extreme wind, eligibility could be written in terms of risk category with reference to IBC Table 1604.5.)
- Item 3: This is a simple provision that merely confirms the presence of the structural elements of interest.
- Item 4: The 24 inch spacing requirement matches the current provision in C101.2. The proposed rule adds an allowance that a non-conforming structure may be made to conform through the retrofit.
- Item 5: The 16 ft height limit comes from current Table C104.2. It is useful to have such eligibility rules in one place near the top of the chapter.

Proposed section C101.3 implements the eligibility rules of proposed section C101.2 and explicitly addresses the case of buildings where some gable end walls are eligible and others are not. The final sentence restates the provision from current section C101.1, but in an appropriate place. The text is borrowed from IEBC A403.1, which has the same intent.

In summary, the proposal is measured and fair, and it respects the intention of the Chapter and its proponents. We have limited the proposal to basic issues, leaving aside remaining questions regarding, for example, maximum spans, suitable roof sheathing, suitable ceiling construction, and suitable exterior wall sheathing or siding.

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

C101.1-EB-BONOWITZ

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee supports the proponent's stated intent of clarifying the intent and scope of IEBC Appendix C1, but believes a public comment should be considered to address the issues raised in testimony. The wording should clarify the requirements for eligibility. It is not appropriate to require at all gable end walls. Where C101.3 brings up "equivalent" there's a question on what criteria would be used. Also the scope should clarify that the IRC is allowed.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

David Bonowitz, representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[B]C101.1 Purpose. This chapter provides prescriptive methods for partial structural retrofit of an existing building to increase its resistance to out-of-plane wind loads. It is intended for voluntary use and for reference by mitigation programs. The provisions of this chapter do not necessarily satisfy requirements for new construction. Unless specifically cited, the provisions of this chapter do not necessarily satisfy requirements for structural improvements triggered by addition, alteration, repair, change of occupancy, building relocation or other circumstances.

[B]C101.2 Eligible buildings and gable end walls. The provisions of this chapter are applicable only to buildings that meet the following eligibility requirements:

1. The building is not more than three stories tall, from adjacent grade to the bottom plate of each gable end wall being retrofitted with this chapter.
2. The building is classified as Occupancy Group R3 ~~(1-2 family dwellings)~~ or is within the scope of the *International Residential Code.*
3. The structure includes one or more wood-framed gable end walls, either conventionally framed or metal-plate-connected.

In addition, the provisions of this chapter are applicable only to gable end walls that meet the following eligibility requirements:

4. Each gable end wall shall be provided with studs or vertical webs spaced 24 inches (610 mm) on center maximum.
5. Each gable end wall has a maximum height of 16 ft.

[B]C101.3 Compliance. Eligible gable end walls in eligible buildings may be retrofitted with this chapter. ~~Eligible buildings with one or more ineligible gable end walls may be retrofitted with this chapter, provided all ineligible gable end walls are retrofitted with alternative criteria approved by the building official as equivalent.~~ All other modifications required for conformance with this chapter shall be designed and constructed in accordance with the *International Building Code* or *International Residential Code* provisions for new construction except as specifically provided for by this chapter.

Commenter's Reason: As noted in the ROH, the ICC Structural committee supported the overall intent of proposal EB36 but had concerns about one proposed sentence. This comment therefore simply removes the sentence in question from proposed section C101.3, thereby resolving the committee's objection and achieving the main benefit intended by the proposal. The sentence in question would have read, "Eligible buildings with one or more ineligible gable end walls may be retrofitted with this chapter, provided all ineligible gable end walls are retrofitted with alternative criteria approved by the building official as equivalent."

In addition, item 2 in proposed section C101.2 is modified relative to the original proposal so as to match the similar modification approved for EB37-12. This resolves the final point raised by the committee in the ROH.

Public Comment 2:

Gary J. Ehrlich, P.E, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

B]C101.1 Purpose. This chapter provides prescriptive methods for partial structural retrofit of an existing building to increase its resistance to out-of-plane wind loads. It is intended for voluntary use and for reference by mitigation programs. ~~The provisions of this chapter do not necessarily satisfy requirements for new construction.~~ Unless specifically cited, the provisions of this chapter do not necessarily satisfy requirements for structural improvements triggered by addition, alteration, repair, change of occupancy, building relocation or other circumstances.

[B]C101.2 Eligible buildings and gable end walls. The provisions of this chapter are applicable only to buildings that meet the following eligibility requirements:

1. The building is not more than three stories tall, from adjacent grade to the bottom plate of each gable end wall being retrofitted with this chapter.
2. The building is classified as Occupancy Group R-2 or R-3 ~~(1-2 family dwellings)~~, or is within the scope of the *International Residential Code.*
3. The structure includes one or more wood-framed gable end walls, either conventionally framed or metal-plate-connected.

In addition, the provisions of this chapter are applicable only to gable end walls that meet the following eligibility requirements:

4. Each gable end wall has or shall be provided with studs or vertical webs spaced 24 inches (610 mm) on center maximum.
5. Each gable end wall has a maximum height of 16 ft.

[B]C101.3 Compliance. Eligible gable end walls in eligible buildings shall be permitted to be ~~may be~~ retrofitted with this chapter. ~~Eligible buildings with one or more ineligible gable end walls may be retrofitted with this chapter, provided all ineligible gable end walls are retrofitted with alternative criteria approved by the building official as equivalent.~~ All other modifications required for conformance with this chapter shall be designed and constructed in accordance with the *International Building Code* or *International Residential Code* provisions for new construction except as specifically provided for by this chapter.

Commenter's Reason: The purpose of this public comment is to revise the proposed scope, eligibility criteria, and compliance criteria for using the Appendix C1 gable end retrofits

While these retrofits were originally designed for use with one- and two-family dwellings, there is no reason they cannot be made applicable to any low-rise multifamily residential building. The loads and engineering design are the same. By allowing these affordable gable end retrofits to be made in low-rise condominimum and apartment buildings as well as houses, damage from wind events can be minimized and the possibility that the residents of these multifamily buildings will not be displaced. Also, a direct reference to the International Residential Code is provided. The scope of the IRC is not defined by occupancy group.

Unnecessary language regarding new construction is removed from the proposed new Section C101.1. Chapter 1 of the IEBC and the remaining language of this proposal for Sections C101.1 and C101.3 make it clear that these provisions apply only to retrofit work done within existing buildings and using the Appendix C provisions. Further, the statement gives the user the impression that these provisions do not comply with standard engineering practice. This is not true. The provisions as codified here were developed by IBHS engineers working with an NAHB member in Florida with the intent of developing retrofit methods solidly rooted in engineering principles but easy to implement by building owners. There was an earlier version of these provisions based on calculations by another engineer, but they were deemed not feasible to construct. The revised, easier-to-construct approach which was approved last cycle reflects calculations done by IBHS engineers and complies with standard engineering practices in high-wind regions.

Finally, the requirement that all gable ends be retrofitted is deleted. The original intent of these provisions was to allow a homeowner or building owner to make an incremental improvement to their structure. Realizing that homeowners and building owners have limited funds, and that gable end framing may be concealed by interior finishes or inaccessible due to mechanical equipment in the attic space, the provisions allow an owner to retrofit only the gable end or ends the owner chooses because of opportunity and funding. This may be a gable end where extensive deterioration has occurred, where exterior siding and sheathing is being replaced making access to the framing easy, or may be the gable end with the worst exposure to severe winds. It was not the intent to force the owner to upgrade every gable end in the building regardless of their condition or whether or not the particular gable end framing in question is accessible. Instead, the intent was to encourage strengthening the building at every opportunity as the owner's interests or budget permitted. In contrast, the originally proposed language in EB36 is so demanding in many instances that it will discourage strengthening of buildings by making the option either retrofitting all gable ends or no gable ends at all. Gable end retrofitting is an option that should be encouraged not made prohibitive because of cost. It is presumed that any strengthening is beneficial.

It is noted the IBC and IRC contain no additional explicit requirements for new construction for connecting gable end walls to the remainder of the structure. Conversely, the gable end retrofit provisions in the IEBC provide an explicit set of requirements fully grounded in engineering principles. Applying these provisions will result in a retrofitted gable end that is substantially stronger and better connected than would be provided in new construction.

EB36-12

Final Action: AS AM AMPC____ D

EB37-12
[B]C201.1, [B]C201.2

<u>Proposed Change as Submitted</u>

Proponent: David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

~~**[B]C201.1 Intent and purpose.** The provisions of this chapter provide prescriptive methods for selected structural retrofitting of existing buildings. Compliance with these provisions will not always meet the requirements for new construction in the *International Building Code* or the *International Residential Code*. The provisions of this chapter are intended to provide methods for strengthening existing buildings to increase resistance to wind loads.~~

~~**[B]C201.2 Scope.** The provisions of this chapter are a prescriptive alternative for one- and two-family dwellings located where the wind speed according to Section 1609 of the *International Building Code* exceeds 100 mph (44.7 m/s) to achieve compliance with Section 706.3 of the *International Existing Building Code.*~~

<u>**[B]C201.1 Purpose.** This chapter provides prescriptive methods for partial structural retrofit of an existing building to increase its resistance to wind loads. It is intended for voluntary use and for reference by mitigation programs. The provisions of this chapter do not necessarily satisfy requirements for new construction. Unless specifically cited, the provisions of this chapter do not necessarily satisfy requirements for structural improvements triggered by addition, alteration, repair, change of occupancy, building relocation or other circumstances.</u>

<u>**[B]C201.2 Eligible conditions.** The provisions of this chapter are applicable only to buildings that meet the following eligibility requirements:</u>

<u>1. Buildings assigned to risk category I or II per *International Building Code* Table 1604.5.</u>

Reason: This proposal clarifies and corrects the Chapter's provisions regarding intent, scope, and eligibility.

Proposed section C201.1 restates current section C201.1 and adds a clarifying sentence that confirms the relationship of this chapter to the rest of the IEBC and to other I-codes. Chapter C2 was added to the 2012 IEBC as a good idea suitable for voluntary use but not benchmarked in terms of performance. Because other IEBC provisions at times call for structural evaluation or retrofit to resist wind loads, it is important to be clear that Chapter C2 does not necessarily satisfy those requirements. In particular, the statement in current section C201.2 regarding compliance with Section 706.3 is for that reason proposed for deletion.

Proposed section C201.2 expands the current reference to "one- and two-family dwellings." Since nothing in Chapter C2 presumes a building use or a construction type specific to R3 occupancy, the Chapter actually has broader applicability than is currently stated. The appropriate limit is to risk category I and II buildings, as proposed. Also, there is no need to state a minimum wind speed in the provision; if the criteria are good for wind speeds over 100 mph, they are also good for lower demands.

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

C201.1-EB-BONOWITZ

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

[B]C201.1 Purpose. This chapter provides prescriptive methods for partial structural retrofit of an existing building to increase its resistance to wind loads. It is intended for voluntary use <u>where the ultimate design wind speed, V_{ult}, determined in accordance with Figure 1609A of the *International Building Code* exceeds 130 mph (58 m/s)</u> and for reference by mitigation programs. The provisions of this chapter do not necessarily satisfy requirements for new construction. Unless specifically cited, the provisions of this chapter do not necessarily satisfy requirements for structural improvements triggered by addition, alteration, repair, change of occupancy, building relocation or other circumstances.

[B]C201.2 Eligible conditions. The provisions of this chapter are applicable only to buildings that meet the following eligibility requirements:

1. Buildings assigned to Risk Category I or II in accordance with *International Building Code* Table 1604.5<u>; or buildings within the scope of the *International Residential Code*</u>.

Committee Reason: This proposal helps to clarify that Appendix Chapter C2; is optional; does not apply to an entire building; and does not necessarily achieve full compliance. The modification reinstates the threshold regarding high wind speeds and also clarifies that the applicability of the chapter includes buildings within the scope of the IRC.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gary J. Ehrlich, P.E, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

[B]C201.1 Purpose. This chapter provides prescriptive methods for partial structural retrofit of an existing building to increase its resistance to wind loads. It is intended for voluntary use where the ultimate design wind speed, V_{ult}, determined in accordance with Figure 1609A of the *International Building Code* exceeds 130 mph (58 m/s) and for reference by mitigation programs. ~~The provisions of this chapter do not necessarily satisfy requirements for new construction.~~ Unless specifically cited, the provisions of this chapter do not necessarily satisfy requirements for structural improvements triggered by addition, alteration, repair, change of occupancy, building relocation or other circumstances.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The purpose of this public comment is to remove unnecessary language from the proposed revisions to Appendix C2. Chapter 1 of the IEBC and the remaining language of this proposal for Section C201.1 make it clear that these provisions apply only to retrofit work done within existing buildings.

Further, the statement gives the user the impression that these provisions do not comply with standard engineering practice. This is not true. The provisions as codified here were developed by IBHS engineers working with an NAHB member in Florida with the intent of developing retrofit methods solidly rooted in engineering principles but easy to implement by building owners. There was an earlier version of these provisions based on calculations by another engineer, but they were deemed overly conservative and not feasible to construct. The revised, easier-to-construct approach which was approved last cycle reflects calculations done by IBHS engineers and complies with standard engineering practices in high-wind regions.

EB37-12

Final Action: AS AM AMPC____ D

EB38-12
[B] C201.2, [B] Table C202.1.2

Proposed Change as Submitted

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] C201.2 Scope. The provisions of this chapter are a prescriptive alternative for one- and two-family dwellings located where the ultimate design wind speed V_{ult}, determined in accordance with Figure 1609A ~~according to Section 1609~~ of the *International Building Code* exceeds 130 mph (58 m/s) ~~100 mph (44.7 m/s)~~ to achieve compliance with Section 706.3 of the *International Existing Building Code*.

[B] TABLE C202.1.2
SUPPLEMENTAL FASTENERS AT PANEL EDGES AND INTERMEDIATE FRAMING

EXISTING FASTENERS	EXISTING FASTENER SPACING (EDGE OR INTERMEDIATE SUPPORTS)	MAXIMUM SUPPLEMENTAL FASTENER SPACING FOR ~~WIND SPEEDS GREATER THAN 100 MPH~~ 130 MPH < V_{ULT} ≤ 140 MPH	MAXIMUM SUPPLEMENTAL FASTENER SPACING FOR INTERIOR ZONE[c] LOCATIONS FOR ~~WIND SPEEDS EXCEEDING~~ V_{ULT} > 140 MPH ~~110 MPH~~ AND EDGE ZONES NOT COVERED BY THE COLUMN TO THE RIGHT	EDGE ZONE[d] FOR ~~WIND SPEED GREATER THAN~~ V_{ULT} > 160 MPH ~~120 MPH~~ AND EXPOSURE C, OR ~~WIND SPEED GREATER THAN~~ V_{ULT} > 180 MPH ~~140 MPH~~ AND EXPOSURE B

(Portions of table not shown remain unchanged)

Reason: The purpose of this proposal is to correlate basic wind speed triggers in the IEBC with the IBC. The 2012 IBC adopted new ultimate-strength basis wind speed maps from ASCE 7-10. A conversion factor from the ultimate wind speed selected from the new maps (V_{ult}) down to the old allowable-stress level wind speed (V_{asd}) was introduced into the IBC to accommodate triggers for special requirements in high-wind regions, tables limiting the use of ballasted roofs at certain heights and wind speeds, and tables for proper selection of shingles and other roofing materials for wind resistance. Unfortunately, this conversion was not introduced into the IEBC, with the result that provisions which were supposed to apply only in high-wind regions now appear to apply across the entire United States. This proposal not only corrects this oversight, it fully updates the IEBC provisions to match the 2012 IBC and ASCE 7-10.

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

C201.2-EB-EHRLICH

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

[B] C201.2 Scope. The provisions of this chapter are a prescriptive alternative for one- and two-family dwellings located where the ~~ultimate design~~ wind speed ~~V_{ult}, determined in accordance with Figure 1609A~~ according to Section 1609 of the *International Building Code* exceeds ~~130 mph (58 m/s)~~ 100 mph (44.7 m/s) to achieve compliance with Section 706.3 of the *International Existing Building Code*.

[B] TABLE C202.1.2
SUPPLEMENTAL FASTENERS AT PANEL EDGES AND INTERMEDIATE FRAMING

EXISTING FASTENERS	EXISTING FASTENER SPACING (EDGE OR INTERMEDIATE SUPPORTS)	MAXIMUM SUPPLEMENTAL FASTENER SPACING FOR 130 MPH < V_{ULT} ≤ 140 MPH	MAXIMUM SUPPLEMENTAL FASTENER SPACING FOR INTERIOR ZONE[c] LOCATIONS FOR V_{ULT} > 140 MPH AND EDGE ZONES NOT COVERED BY THE COLUMN TO THE RIGHT	EDGE ZONE[d] FOR V_{ULT} > 160 MPH AND EXPOSURE C, OR V_{ULT} > 180 MPH AND EXPOSURE B

(Portions of table not shown remain unchanged)

Committee Reason: This code change updates the wind speed triggers in IEBC Appendix Chapter 2 in order to correlate with the IBC. The modification accepts the wind speed updates to Table C202.1.2, but undoes the changes proposed in Section C201.2, because the changes made to this section by EB37-12 are preferred.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Gary J. Ehrlich, P.E, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

TABLE C104.2
STUD LENGTH LIMITATIONS BASED ON EXPOSURE AND DESIGN WIND SPEED

EXPOSURE CATEGORY	MAXIMUM 3-SEC GUST BASIC WIND SPEED[a]	MAXIMUM HEIGHT OF GABLE END RETROFIT STUD[b]			
C	~~110~~140	8'-0"	11'-3"	14'-9"	16'-0"
C	~~120~~150	7'-6"	10'-6"	13'-6"	16'-0"
C	~~130~~165	7'-0"	10'-0"	12'-3"	16'-0"
C	~~140~~180	7'-0"	10'-0"	12'-3"	16'-0"
C	~~150~~190	6'-6"	8"-9"	11'-0"	16'-0"
B	~~110~~140	8'-0"	12'-3"	16'-0"	N/R[c]
B	~~120~~150	8'-0"	11'-3"	14'-9"	16'-0"
B	~~130~~165	8'-0"	11'-3"	14'-9"	16'-0"
B	~~140~~180	7'-6"	10'-6"	13'-6"	16'-0"
B	~~150~~190	7'-0"	10'-0"	12'-3"	16'-0"
	Retrofit Configuration	A	B	C	D

For SI: 1 inch = 25.4 mm, 1 Foot = 304.8 mm

a. Interpolation between given wind speeds not permitted.
b. Existing gable end studs less than or equal to 3'-0" in height shall not require retrofitting.
c. N/R = Not Required. Configuration C is acceptable to 16'-0" maximum height.

[B] TABLE C104.5.1
SPACING OF GUSSET ANGLES

EXPOSURE CATEGORY	BASIC WIND SPEED (mph)	SPACING OF GUSSET ANGLES (inches)
C	~~110~~140	38
C	~~120~~150	32
C	~~130~~165	28
C	~~140~~180	24
C	~~150~~190	20
B	~~110~~140	48
B	~~120~~150	40
B	~~130~~165	36
B	~~140~~180	30
B	~~150~~190	26

[B] TABLE C104.5.2
SPACING OF LAG OR MASONRY SCREWS USED TO CONNECT SILL PLATE OF GABLE END WALL TO TOP OF THE WALL BELOW

EXPOSURE CATEGORY	BASIC WIND SPEED (mph)	SPACING OF LAG OR MASONRY SCREWS (inches)
C	~~110~~140	19
C	~~120~~150	16
C	~~130~~165	14
C	~~140~~180	14
C	~~150~~190	10
B	~~110~~140	24
B	~~120~~150	20
B	~~130~~165	18
B	~~140~~180	15
B	~~150~~190	13

Commenter's Reason: The purpose of this public comment is to correlate tables in Appendix C1 with the new ultimate wind speeds in the 2012 IBC and ASCE 7-10. As a result of confusion regarding potential changes to Appendix C1, a proposal was not submitted to update Tables C104.2, C104.5.1, and C104.5.2 at the same time as proposals were submitted to correlate Section 706.3.2 and Table C202.1.2. This public comment makes the appropriate correlations to the basic wind speeds in the Appendix C1 tables and will provide consistency with the approval of the similar revisions to Section 706.3.2 and Appendix C2.

EB38-12
Final Action: AS AM AMPC____ D

EB39-12
[B] Figure A3-1, [B] Figure A3-2

Proposed Change as Submitted

Proponent: David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] FIGURE A3-1
NEW REINFORCED CONCRETE FOUNDATION SYSTEM

a. Where frost conditions occur, the minimum depth shall extend below the frost line.
b. The ground surface along the interior side of the foundation may be excavated to the elevation of the top of the footing.
c. ~~When expansive soil is encountered~~ Where the code official has designated the soil as expansive, the foundation depth and reinforcement shall be ~~as directed~~ approved by the ~~building~~ code official.

(Portions of figure not shown remain unchanged)

[B] FIGURE A3-2
NEW MASONRY CONCRETE FOUNDATION

a. Where frost conditions occur, the minimum depth shall extend below the frost line.
b. The ground surface along the interior side of the foundation may be excavated to the elevation of the top of the footing.
c. ~~When expansive soil is encountered~~ Where the code official has designated the soil as expansive, the foundation depth and reinforcement shall be ~~as directed~~ approved by the ~~building~~ code official.

(Portions of figure not shown remain unchanged)

Reason: This proposal clarifies the intended applicability and alternative criteria for expansive soil conditions. The intent of these notes is simply that the default, tabulated values might not be appropriate for highly expansive soil. Since most building departments are aware of local expansive soil conditions (and might even have their own prescriptive pre-approved details), the intent is to call attention to those known cases. Thus, the current wording about "when expansive soil is encountered" gives the wrong impression. Instead, since this chapter presumes no engineered design, there should be no burden on the builder to know or discover the soil conditions. Rather, the burden should merely be to check if the code official has made a designation, and if so, to get appropriate plan check approval for the footing details.

Cost Impact: This code change proposal will not increase the cost of construction.

F A3-1-EB-BONOWITZ

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that Building Officials would not want to be the one to designate soils as expansive as the proposed wording would require. It would make the Building Official part of the design team.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

David Bonowitz, representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[B] FIGURE A3-1
NEW REINFORCED CONCRETE FOUNDATION SYSTEM

a. Where frost conditions occur, the minimum depth shall extend below the frost line.
b. The ground surface along the interior side of the foundation may be excavated to the elevation of the top of the footing.
c. Where the ~~code official has designated the~~ soil is designated as expansive, the foundation depth and reinforcement shall be approved by the code official.

(Portions of figure not shown remain unchanged)

[B] FIGURE A3-2
NEW MASONRY CONCRETE FOUNDATION

a. Where frost conditions occur, the minimum depth shall extend below the frost line.
b. The ground surface along the interior side of the foundation may be excavated to the elevation of the top of the footing.
c. Where the ~~code official has designated the~~ soil is designated as expansive, the foundation depth and reinforcement shall be approved by the code official.

(Portions of figure not shown remain unchanged)

Commenter's Reason: Existing wording in the 2012 IEBC makes the owner responsible for identifying expansive soil. This is improper, and EB39 tries to correct it, for three reasons: First, Chapter A3 is specifically intended to be prescriptive and not to require the input of a design professional or geotechnical engineer. Second, Chapter A3 applies only to relatively old houses where the impacts of expansive soil, if it exists at the site, would presumably already be known. Third, Chapter A3 facilitates highly beneficial seismic improvements that are only marginally affected by the presence of expansive soil. Certainly, if the soil is expansive, the foundation should have appropriate detailing. But burdening the owner with a soil investigation is not necessary. Rather, the intent of this provision has always been that where the soil is known to be expansive, one should use the appropriate detail.

The ICC Structural Committee had two concerns with the original proposal. One was that the code official would have become responsible for identifying expansive soil. That was not the intent; rather, as the original reason statement explained, most building departments already have information about local soil types, as well as alternative details for house construction. But given this concern, the comment revises the wording so that the burden is now shared; either party may identify the soil as expansive. This achieves the necessary goal of the proposal, which is to relive the non-expert owner from having to investigate the soil on what is supposed to be a straightforward and inexpensive improvement to an old house.

The other committee concern was that the proposal would have made the code official part of the design team. This is simply incorrect. On the contrary, the current language says the code official “directs” the design. Only proposal EB39 (both the original and this comment) revises the code official’s role back to one of approval.

EB39-12
Final Action: AS AM AMPC____ D

EB42-12
[B] Table A3-A, [B] Figure A3-3

Proposed Change as Submitted

Proponent: David Bonowitz, S.E., representing NCSEA Code Advisory Committee, Existing Buildings Subcommittee (dbonowitz@att.net)

THIS PROPOSAL IS ON THE AGENDA OF THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THE IBC STRUCTURAL CODE DEVELOPMENT COMMITTEE.

Revise as follows:

[B] TABLE A3-A
SILL PLATE ANCHORAGE AND CRIPPLE WALL BRACING

a. Sill plate anchors shall be chemical anchors or expansion bolts in accordance with Section A304.3.1.
b. All washer plates shall be 3 inches by 3 inches by .229 inch (76 mm x 76 mm x 5.8 mm) ~~2 inches by 2 inches by $^{3}/_{16}$ inch (51 mm by 51 mm by 4.8 mm)~~ minimum.
c. See Figure A3-10 for braced panel layout.
d. Braced panels at ends of walls shall be located as near to the end as possible.
e. All panels along a wall shall be nearly equal in length and shall be nearly equal in spacing along the length of the wall.
f. The minimum required underfloor ventilation openings are permitted in accordance with Section A304.4.4.

(Portions of Table not shown remain unchanged)

[B] FIGURE A3-3
SILL PLATE BOLTING TO EXISTING FOUNDATION

For SI: 1 inch = 25.4 mm.
NOTES:
1. Plate washers shall comply with the following:
   ½ in. anchor or bolt – ~~2 in. x 2 in. x 3/16 in.~~ 3 in x 3 in x 0.229 in (76 mm x 76 mm x 5.8 mm) minimum
   $^{5}/_{8}$ in. anchor or bolt – ~~2 in. x 2 in. x 3/16 in.~~ 3 in x 3 in x 0.229 in (76 mm x 76 mm x 5.8 mm) minimum
2. See Figure A3-5 or A3-6 for cripple wall bracing.

(Portion of Figure not shown remains unchanged)

Reason: This proposal coordinates the minimum washer size with provisions in IRC Section R602.11. The change is made to both Table A3-A (note b) and Figure A3-3 (note 1).

Note to ICC: The washer size listed in 2012 Figure A3-3 note 1 should already be 3” x 3” x 1/4” per EB54-09/10, but that approved change was apparently not picked up in publication. This should be corrected through IEBC errata

Cost Impact: This code change proposal will not increase the cost of construction.

T A3-A-EB-BONOWITZ

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This proposal fills in needed information on sill plate anchorage. The committee also supports a public comment to introduce slotted holes in the plate washers as allowed under the IBC & IRC.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Siu, representing City of Seattle Dept of Planning & Development, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

[B] TABLE A3-A
SILL PLATE ANCHORAGE AND CRIPPLE WALL BRACING

a. Sill plate anchors shall be chemical anchors or expansion bolts in accordance with Section A304.3.1.
b. All washer plates shall be 3 inches by 3 inches by 0.229 inch (76 mm x 76 mm x 5.8 mm) minimum. <u>The hole in the plate washer is permitted to be diagonally slotted with a width of up to 3/16 inch (4.76 mm) larger than the bolt diameter and a slot length not to exceed 1-3/4 inches (44 mm), provided a standard cut washer is placed between the plate washer and the nut.</u>
c. See Figure A3-10 for braced panel layout.
d. Braced panels at ends of walls shall be located as near to the end as possible.
e. All panels along a wall shall be nearly equal in length and shall be nearly equal in spacing along the length of the wall.
f. The minimum required underfloor ventilation openings are permitted in accordance with Section A304.4.4.

(Portions of Table not shown remain unchanged)

[B] FIGURE A3-3
SILL PLATE BOLTING TO EXISTING FOUNDATION

For SI: 1 inch = 25.4 mm.

NOTES:
1. Plate washers shall comply with the following:
½ in. anchor or bolt – 3 in x 3 in x 0.229 in (76 mm x 76 mm x 5.8 mm) minimum
$^{5}/_{8}$ in. anchor or bolt – 3 in x 3 in x 0.229 in (76 mm x 76 mm x 5.8 mm) minimum
<u>A diagonal slot in the plate washer is permitted in accordance with Table A3-A, Footnote b.</u>

2. See Figure A3-5 or A3-6 for cripple wall bracing.

(Portion of Figure not shown remains unchanged)

Commenter's Reason: Precise anchor bolt placement can be a problem when coupled with the 3x3 plate washers in a wall with 2x4 framing. The slotted hole allows the plate washer location to be adjusted. The text for the footnote in Table A3-A is taken verbatim from IBC Section 2308.12.8. This public comment is consistent with the direction given by the Structural Committee in its approval.

EB42-12
Final Action: AS AM AMPC____ D

S4-12
202 (NEW), 1507.16, 1507.16.1, 1607.12.3, 1607.12.3.1

Proposed Change as Submitted

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Add new text as follows:

SECTION 202
DEFINITIONS

Vegetative roof. An assembly of interacting components designed to waterproof and normally insulate a building's top surface that includes, by design, vegetation and related landscape elements.

Revise as follows:

1507.16 Vegetative roofs, roof gardens and landscaped roofs. Vegetative roofs, roof gardens and landscaped roofs shall comply with the requirements of this chapter and Sections 1607.12.3 and 1607.12.3.1 and the *International Fire Code*.

1507.16.1 Structural fire resistance. The structural frame and roof construction supporting the load imposed upon the roof by the vegetative roof, roof gardens or landscaped roofs shall comply with the requirements of Table 601.

Revise as follows:

1607.12.3 Occupiable roofs. Areas of roofs that are occupiable, such as vegetative roofs, roof gardens, or for assembly or other similar purposes, and marquees are permitted to have their uniformly distributed live loads reduced in accordance with Section 1607.10.

1607.12.3.1 Vegetative and landscaped roofs. The uniform design live load in unoccupied landscaped areas on roofs shall be 20 psf (0.958 kN/m2). The weight of all landscaping materials shall be considered as dead load and shall be computed on the basis of saturation of the soil.

Reason: This code change proposal is intended to use terminology in the IBC that is consistent with that of the *International Green Construction Code* (IgCC). IgCC uses the terminology "vegetative roof" for what is referred to in the IBC as a "roof garden" or "landscaped roof".

This code change proposal adds a definition for the term "vegetative roof" in Section 202. The definition is identical to that in the IgCC and ASTM D1079, "Standard Terminology Relating to Roofing and Waterproofing." The term "vegetative roof" is also added where appropriate in Section 1507.16 and Section 1607.12.3.

Cost Impact: The code change proposal will not increase the cost of construction.

1507.16-S-GRAHAM

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The proposed definition of "vegetative roof" coordinates the IBC with the IGCC, providing a needed link.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Craig Conner, Building Quality, representing self, requests Disapproval.

Commenter's Reason: The definition is confusing – What are "interacting components"? what does "normally insulate" mean? The definition includes text that is commentary. The IBC and IECC use the terms "roof gardens" and "landscape roofs". The terms "vegetative roofs", "roof gardens" and "landscaped roofs" are overlapping. Are there vegetative roofs that are not "roof gardens and landscaped roofs?" In a code section referring to one should the other terms be used too? Best to stick with one set of terms, the terms already used in the IBC and IECC.

S4-12

Final Action: AS AM AMPC____ D

S9-12
1504.3.1.1 (New), Chapter 35 (New)

Proposed Change as Submitted

Proponent: Mike Ennis, Single Ply Roofing Industry (SPRI) (m.ennis@mac.com)

Add new text as follows:

1504.3.1.1 Nonballasted low slope roofs. Nonballasted low slope (roof slope < 2:12) roof systems with built-up, modified bitumen, fully adhered or mechanically attached single-ply shall be installed in accordance with ANSI/SPRI WD-1.

Add new standard to Chapter 35 as follows:

ANSI/SPRI

WD-1-XX Wind Design Standard Practice for Roofing Assemblies

Reason: There are two primary reasons that ANSI/SPRI WD-1 should be included as a reference standard in the IBC.

1. The International Building Code provides specific requirements for calculating the wind uplift load pressure on the roof assembly. However it does not currently provide a prescriptive method to enhance the perimeter and corner attachment due to the higher wind loads in these regions. ANSI/SPRI WD-1 is a national consensus standard that has been reviewed by testing laboratories, membrane manufacturers, roofing system component suppliers, contractors and consultants. This standard provides prescriptive requirements for corner and perimeter enhancement. The user first identifies a suitable roof assembly that will resist the calculated wind uplift pressure for the field of the roof, then enhances the fastening pattern to meet the calculated corner and perimeter wind uplift load pressure. Designing the roof system to resist the higher wind loads at the perimeter and corner regions is accomplished by either adding additional fasteners or increasing the amount of adhesive used, depending upon the specific roof system chosen. This approach allows the user to work from one base assembly and enhance the attachment of the base assembly for perimeter and corner regions instead of trying to locate tested assemblies for each of these areas.

The ANSI/SPRI standard also requires that a 2.0 safety factor be applied to tested wind uplift values, unless another value is specified. So, for example, if a roof system passes a wind uplift test at 120 lbs/ft2, this value is divided by 2 before determining if the system will resist the calculated wind uplift pressure loads for the building. This safety factor has historically been used by the roofing industry to account for variables between tested loads and performance in the field. These variables include deviations in installation and the fact that the wind load test procedures used incorporate static applied loads while dynamic, cyclic loads occur in the field. The IBC does not currently contain this requirement.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1504.3.1.1 (NEW)-S-ENNIS

Public Hearing Results

Note: For staff analysis of the content of SPRI WD-1 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Disapproved**

Committee Reason: There are concerns about wind loading requirements in the proposed reference standard and opposing testimony suggests it could circumvent ASCE 7. Also the committee reviewed the 2008 edition of the standard, while a proposed modification would have adopted a different edition.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, Single Ply Roofing Industry Inc. (SPRI), requests Approval as Submitted.

Commenter's Reason: The Code Committee recommended this proposal for disapproval because there were concerns about wind loading requirements in the proposed reference standard and opposing testimony suggesting it could circumvent ASCE 7. Also the committee reviewed the 2008 edition of the standard, while a proposed modification would have adopted a different edition.

The proposed reference standard does not circumvent ASCE 7. The formulas developed for the extrapolation methods are based on an empirical analysis of wind resistance test results. The extrapolation methods can be used to enhance perimeter and corner attachment to meet the higher wind loads in these areas. The increased fastening, as determined by the extrapolation method, in these locations assures that the perimeter and corner regions can resist the wind loads as calculated in accordance with ASCE 7.

Both the version of ANSI/SPRIWD-1 that was in force at the time the code change proposal was submitted, and the draft version that was being updated to ASCE 7-10 requirements were submitted with the code change proposal. The new version of ANSI/SPRI WD-1 was approved by the ANSI Board of Standards review on July 10, 2012.

S9-12
Final Action: AS AM AMPC____ D

S11-12
1504.3.1

Proposed Change as Submitted

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute (bmanley@steel.org)

Revise as follows:

1504.3.1 Other roof systems. ~~Roof systems with built~~ <u>Built</u>-up, modified bitumen, fully adhered or mechanically attached single-ply ~~through fastened metal panel~~ roof systems, and other types of membrane roof coverings shall also be tested in accordance with FM 4474, UL 580 or UL 1897.

Reason: The first change is purely editorial – the sentence doesn't need to reference "roof systems" twice. Also, this section should not include reference to through fastened metal panel roof systems, since they are covered in Section 1504.3.2.

Cost Impact: The code change proposal will not increase the cost of construction.

1504.3.1-S-MANLEY

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1504.3.1 Other roof systems. Built-up, modified bitumen, fully adhered or mechanically attached single-ply roof systems, <u>metal panel roof systems applied to a solid or closely fitted deck,</u> and other types of membrane roof coverings shall also be tested in accordance with FM 4474, UL 580 or UL 1897.

Committee Reason: This proposal is editorial in nature, deleting redundant wording. The modification assures that metal panel roof systems that are installed over solid decking are covered.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John C. Harrington, representing FM Global, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1504.3.2 Metal panel roof systems. This section applies to structural metal panel roof systems where the roof panel deck acts as the roof deck and roof covering and provides both weather protection and support for structural loads. Structural standing seam metal panel roof systems shall be tested in accordance with ASTM E 1592 <u>or</u> <u>FM 4474</u>. Structural through-fastened metal panel roof systems shall be tested in accordance with <u>FM 4474</u>, UL 580 or ASTM E 1592.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The existing language in 1504.3.1 included FM 4474 as a means of testing metal panel roof systems. Code proposal S11-12 (Approved as Modified) changed the language in this section of the code and narrowed the scope of what type of metal panel roof systems that FM 4474 could be used for. We were fine with the existing 1504.3.1 but after this scope change was made, we need to provide this comment for the broader category of metal panel roof systems in 1504.3.2 to include FM 4474 as a means of testing on any type of metal panel roof system in accordance with the scope of this testing standard. The scope of FM 4474 includes both standing seam and lap seam (through-fastened) metal roof systems. There are numerous roof manufacturers who already have certified their metal panel roofing systems to FM 4474 and many other systems where the roofs are in the process of this testing certification and it is critical to the roofing industry that this alternate means of roofing certification be maintained. Note that this modification to Section 1504.3.2 uses the updated wording based on S13-12 (AM).

S11-12
Final Action: AS AM AMPC____ D

S13-12
1504.3.2

Proposed Change as Submitted

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute (bmanley@steel.org) and Lee Shoemaker, Metal Building Manufacturer's Association

Revise as follows:

1504.3.2 Metal panel roof systems. ~~Metal~~ Standing seam metal panel roof systems ~~through fastened or standing seam~~ shall be tested in accordance with ~~UL 580 or~~ ASTM E 1592. Through-fastened metal panel roof systems shall be tested in accordance with UL 580 or ASTM E1592.

> **Exception:** Metal roofs constructed of cold-formed steel, where the roof deck acts as the roof covering and provides both weather protection and support for structural loads, shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2210.1.

Reason: The recommended language provides consistency with the uplift test requirements for standing seam roofs systems as specified in AISI S100, Section D6.2.1. AISI S100 requires that standing seam roofs be tested in accordance with ASTM E1592 to determine panel strength and UL580 is not an optional test for this type of roof system. Panel strengths for through fastened roofs, on the other hand, as specified in AISI S100, can be developed either analytically or through testing in accordance with either UL 580 or ASTM E1592.

Cost Impact: The code change proposal will not increase the cost of construction.

1504.3.2-S-MANLEY

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1504.3.2 Metal panel roof systems. This section applies to structural metal panel roof systems where the roof panel deck acts as the roof deck and roof covering and provides both weather protection and support for structural loads. Structural standing seam metal panel roof systems shall be tested in accordance with ASTM E 1592. Structural through-fastened metal panel roof systems shall be tested in accordance with UL 580 or ASTM E1592.

> **Exception:** Metal roofs constructed of cold-formed steel~~, where the roof deck acts as the roof covering and provides both weather protection and support for structural loads,~~ shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2210.1.

Committee Reason: This proposal clarifies the application of this section to different types of structural metal panel roof systems and better coordinates these requirements with other code provisions. The modification provides clarity by stating that this section applies to metal panel roof systems that are structural.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Humble, AIA, NCARB, LEED BD&C, representing American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1504.3.2 Structural metal panel roof systems. ~~This section applies to structural metal panel roof systems~~ Where the roof panel ~~deck acts~~ functions as the roof deck and roof covering and provides both weather protection and support for ~~structural~~ loads, the structural metal panel roof system shall comply with this section. Structural standing seam metal panel roof systems shall be tested in accordance with ASTM E 1592. Structural through-fastened metal panel roof systems shall be tested in accordance with UL 580 or ASTM E1592.

> **Exception:** Metal roofs constructed of cold-formed steel shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2210.1.

Commenter's Reason: The public comment proposes to further modify the committee recommendation to effectively overcome some grammatical and ICC manual of style issue. We propose to:

- Change the first sentence in order to read as a mandatory introduction.
- Use a more appropriate word "functions" in place of "deck acts".
- Change the title to reflect the content of the section.

S13-12

Final Action: AS AM AMPC____ D

S14-12
1504.4

<u>Proposed Change as Submitted</u>

Proponent: Mike Ennis, Single Ply Roofing Industry (SPRI) (m.ennis@mac.com)

Revise as follows:

1504.4 Ballasted low-slope roof systems. Ballasted lowslope (roof slope < 2:12) single-ply roof system coverings installed in accordance with Sections 1507.12 and 1507.13 shall be designed in accordance with ~~Section 1504.8 and~~ ANSI/SPRI RP-4. <u>Ballasted roof systems shall be subject to the special inspection requirements of Section 1705.10 to verify conformance to ANSI/SPRI RP-4 standard.</u>

Reason: During the 2005/2006-code change cycle a proposal was submitted to prohibit gravel or stone used as ballast on the roof of a building located in a hurricane-prone regions or on any other building with a mean roof height exceeding prescribed limits based on the building height, exposure category and basic wind speed at the site. These requirements are contained in Section 1504.8. These restrictions were imposed due to damage that occurred reportedly due to wind borne roof aggregate during high wind events. The building height restrictions were imposed due to calculated values.

Prior to this code change proposal the design of ballasted roofs were required to meet ANSI/SPRI RP-4 Wind Design Standard For Ballasted Single-ply Roofing Systems. While this is still a requirement, the code change that occurred due to this proposal now requires that both requirements be met, i.e. the requirements included in the proposal and the requirements of RP-4. This leads to conflicting requirements.

The issue with gravel blow-off that was raised by the NCSEA is that non-code compliant ballasted roof systems are being installed, which is particularly problematic in areas with the potential for high wind events. If these roof systems were installed in accordance with ANSI/SPRI RP-4, then this would not be an issue since this standard is specifically designed to prevent gravel blow-off. This statement is based on the fact that the roof systems that were reported by the NCSEA were investigated and found that they did not conform to the design requirements of the code-referenced standard, ANSI/SPRI RP-4.

To address the issue of gravel blow-off, this code change proposal requires special inspection of ballasted roof assemblies to verify conformance with ANSI/SPRI RP-4 if they are being installed in high wind regions as defined in Section 1705.10 Special inspections for wind resistance.

The ANSI/SPRI RP-4 standard was first included in the building code in 1988. It has demonstrated excellent performance, with no reports of gravel or roof blow-off on systems designed in accordance with the standard. Over 6 billion square feet of ballasted single ply roofing applications have been installed over the last two decades The vast majority of these systems have performed very well with respect to their resistance to wind pressure loads. However some damage has been observed due to aggregate blowing off non-code compliant roofs during high wind events, as noted in the NCSEA proposal.

The ANSI/SPRI Ballast Design Guide is based on over 200 wind tunnel tests conducted at the National Research Council of Canada (NRCC). This is the largest commercially available wind tunnel in North America. The tunnel and the experts at the NRCC have used this tunnel to design some of the largest suspension bridges in the world. In addition, over 40 years of field experience and observations from hurricane investigation teams from RICOWI and FEMA have been used in the development of the design criteria.

ANSI/SPRI RP-4 was revised and re-approved in 2008 and is currently being balloted for re-approval. The ballot currently out for re-approval updates the standard to ASCE7-10 requirements. One of the design objectives of ANSI/SPRI RP-4 is to prevent gravel blow-off. The above-mentioned wind tunnel testing evaluated conventional stone ballasted and stone and paver ballasted protected membrane roofs. For the systems containing stone ballasting the primary objective was to determine 4 critical wind speeds:

1. U_{c1} – the wind speed at which one or more stones were first observed to move an appreciable distance (i.e. several inches)
2. U_{c2} – the wind speed above which scouring of stones would continue more or less indefinitely as long as the wind speed is maintained.
3. U_{c3} – the wind speed at which stones were first observed to leave the roof by going over the upstream parapet (this was the parapet adjacent to the wind direction)
4. U_{c4} – the wind speed at which stones were first observed to leave the roof by going over the downstream parapet (opposite side from the wind)

In these experiments three nominal stone sizes were used. Each nominal stone size represented a mixture of stone sizes (larger and smaller) similar to the gradation, which would be obtained from a stone quarry. These experiments evaluated the impact of the following variables on the critical wind speeds defined above:

- Stone size
- Parapet height
- Building height
- Building geometry
- Direction of wind impacting the building
- Rooftop wind speed, rooftop gust wind speed, and the shape of the approaching wind velocity profile

The basic approach taken in the ANSI/SPRI RP-4 standard is that as the anticipated wind load on the roof increases due to variables such as design wind speed, building height, exposure category and parapet height, the ballast design requirements get more robust by using larger stone, or substituting pavers for stone, and ultimately not allowing for the use of a ballasted roof system.

The ballast designs contained in the national consensus standard provide restrictions on the use of ballasted single ply roof systems that will allow for the responsible use of aggregate surfacing. There is often the potential for building envelope materials, and many other materials, to become windborne debris in hurricane force wind exposures. In these situations, the approach is to learn how to properly use these materials in high wind areas, not ban their use. The ANSI/SPRI RP-4 standard allows for the continued use of ballasted roofing systems, which are a cost effective method to keep the roof system in place and to improve the energy performance of the building. (Reference the SPRI/DOE/ORNL report on energy effectiveness of ballasted roof systems by going to the following web link, http://www.spri.org/publications/policy.htm under Technical Reports. Select the research report entitled: Evaluating the Energy Performance of Ballasted Roof Systems.

Two of the most critical controlling factors identified through this extensive test program on the various critical wind speeds were stone size and parapet height. A brief summary of the wind tunnel test program, and reports written as part of this program follows. The reports can be viewed in the entirety at the same web link provided above for the energy study report. The wind tunnel reports are located at the bottom of that page under Miscellaneous.

LTR-LA-142 Estimation of Critical Wind Speeds for Scouring of Gravel or Crushed Stone on Rooftops January 1974

Objectives:

- Determine the critical wind speeds and corresponding surface shear stress that cause movement of various stone sizes and shapes by taking direct measurements of these values via wind tunnel testing.
- Use this data to determine constants that can be used in equations to calculate critical surface shear stress
- Obtain guidance about the effects of parapets and obstacles, which cause strong three-dimensional effects, notably vortices.

Conclusions:

- The surface shear stress required to cause stone motion is directly proportional to nominal stone diameter.
- The constant of proportionality appears to be essentially independent of stone size and shape and of the detailed shape of the velocity profile near the gravel surface.
- Critical wind speeds to initiate stone motion can therefore be easily predicted if the relationship between surface shear stress and wind speed is known for the situation of interest.
- The dead air region behind a parapet extended downstream about 15 parapet heights. The turbulence of natural wind will tend to reduce the dead air zone.

LTR-LA-162 Wind Tunnel Tests on Some Building Models to Measure Wind Speeds at Which Gravel is Blown Off Rooftops June 1974

Objectives:

- This series of tests was conducted to build upon the data obtained in the January 1974 test series. Specifically to provide data for some typical building geometries and to investigate the effects of building form, building height, parapet height, wind direction, and gravel size on the critical wind speeds required to cause scouring and blow-off of roofing gravel.
- In this series 1/10 scale models were evaluated in a 30’ x 30’ wind tunnel.

Conclusions

- The critical wind speeds at which scouring of nominal 0.9”, 1.5” and 2.8” diameter gravel (scaled to 1/10 size) occurs and begins to blow-off rooftops were investigated. The nominal sizes represent the average size of a typical mixture.
- The critical wind speeds are lowest when the wind direction is at or about 45° to the walls of the building.
- For a given building configuration the critical wind speeds are proportional to the square root of the gravel size.
- The critical wind speeds increase with increasing parapet height and decrease with increasing building height.
- The length:width ratio of the building is unimportant as long as the width and length are large compared to the parapet height.

NRC No. 15544 Design of Rooftops Against Gravel Blow-Off September 1976

Objectives:

- This report describes a procedure that can be used to estimate the wind speeds at which gravel of a given nominal size will be blown off rooftops.
- The report also describes a procedure for determining design wind speeds at rooftop level.
- The gravel blow-off procedure is based on data obtained from previous wind tunnel tests described above.

Conclusions

- The results of wind tunnel tests conducted to determine critical wind speeds for scour or blow-off of roofing gravel for a specific low-rise building shape can be generalized to apply to any low-rise rectangular building having a flat rooftop.
- Similar generalization is possible for high-rise shapes of any particular length: width ratio.
- This permits development of a general, easy to use procedure for estimating critical wind speeds required to cause scour or blow-off of roofing gravel from various building configurations.

LTR-LA-189 Further Wind Tunnel Tests on Building Models to Measure Wind Speeds at Which Gravel is Blown Off Rooftops August 1977

Objectives:

- Obtain additional data to permit previously obtained results to be generalized so as to be applicable to any rectangular flat-roofed low-rise building.
- Provide data on the effects of substituting solid paving blocks for loose gravel in the most wind sensitive areas of the rooftop.

Conclusions:

- The wind speed at rooftop level appears to be the dominant factor in controlling gravel scour and blow-off as opposed to the wind velocity profile.
- The measured wind speeds at rooftop level were used to reinterpret the data from previous wind tunnel tests.
- Within the boundaries of experimental scatter the critical wind speeds are independent of the rooftop level in the wind

boundary layer, allowing for generalization of results to various building heights and geometries.

LTR-LA-234 Model Studies of the Wind Resistance of Two Loose-Laid Roof-Insulation Systems May 1979

Objectives:

- Investigate the resistance of protected membrane roof systems to damage from high winds.
- Identify wind speeds and failure mechanisms for protected membrane roof systems.

Conclusions:

- The results show that wind flows induce pressure distributions underneath the roof-insulation systems as well as on their exterior surfaces.
- These pressure differences cause uplift and are responsible for system failure.
- The wind speed to cause failure for the 2 ft. x 2 ft. paver slabs was found to be proportional to the square root of the system weight per unit area. This relationship should also be true for different geometries.

LTR-LA-269 Further Model Studies of the Wind Resistance of Two Loose-Laid Roof-Insulation Systems (High Rise Buildings) April 1984

Objectives:

- This study is an extension of the May 1979 study, to investigate the resistance of various protected membrane roof systems to damage from high winds when they are installed on high-rise buildings.

Conclusions:

- The mechanisms for wind damage are the same as those identified in earlier tests, namely gravel scour and uplifting of boards by pressure forces.
- The static pressure underneath boards or pavers tend to become equal to the exterior surface because of airflow through the joints between boards or pavers. Complete equalization cannot occur, however, in regions where the exterior pressure distribution is highly non-linear and uplifting pressure differences occur in those regions. System failure therefore tends to occur in these regions.
- High parapets are very effective in increasing resistance to wind damage.
- Mechanical interconnection of boards or pavers by use of strapping, tongue & groove, etc. is an effective method for increasing wind resistance.
- For any particular system configuration, the wind speed to cause failure is proportional to the square root of the system weight per unit area.
- Gust speed at rooftop level is the pertinent speed for use in assessing the resistance of the roofing system to wind damage.

LTR-LA-294 Further Wind Tunnel Tests of Loose-Laid Roofing Systems April 1987

Objectives:

- Conduct extensive wind tunnel work to further assess the resistance to wind damage of protected membrane roofing system using paver slabs, or similar elements.
- Low, intermediate and high-rise buildings were tested, each with several parapet heights.

Conclusions:

- When a membrane is loose-laid on a leaky roof deck, ballooning will occur due to air flowing through holes in the deck from the interior of the building. This will normally result in failure at wind speeds well below those required to product failure by other mechanisms.
- In the case of immobile membranes, failure results from pressure differences, which develop across elements in some regions of the roof.
- Increased parapet height generally resulted in more favorable pressure distributions. That is, maximum suctions were reduced and suction peaks were broadened, so that pressure was less non-uniform and therefore increased failure speeds could be expected.
- Element size has a noticeable effect on failure speed, i.e. failure speeds were higher for larger elements.
- Pressure non-uniformity is reduced by vortex generators mounted on the parapets near the upwind corner of the roof, thus increasing failure wind speeds.

LTR-LA-295 Pressure Distribution Data Measured During the September 1986 Wind Tunnel Tests on Loose-Laid Roofing Systems September 1987

Objectives:

- This report supplements LTR-LA-294 by including contour plots of mean and peak roof surface pressure coefficients and mean and peak coefficients for pressure differential between the upper surface and the underside of the roofing system.

Cost Impact: This proposal will increase the cost of construction. The cost increase will be due to the cost of doing a special inspection if the system is being installed in a region described in Section 1705.10 Special inspections for wind resistance.

1504.4-S-ENNIS

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: It is unclear what special inspections requirements would apply to ballasted roof systems with the proposed reference to Chapter 17 – the section in question covers inspections of lateral force-resisting systems. Disapproval of this code change is consistent with past committee actions.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, representing Single Ply Roofing Industry Inc., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1504.4 Ballasted low-slope roof systems. Ballasted low-slope (roof slope < 2:12) single-ply roof system coverings installed in accordance with Sections 1507.12 and 1507.13 shall be designed in accordance with ANSI/SPRI RP-4. ~~Ballasted roof systems shall be subject to the special inspection requirements of Section 1705.10 to verify conformance to ANSI/SPRI RP-4 standard.~~

1504.4.1 Special inspection. Special inspection of ballasted low-slope (roof slope < 2:12) single-ply roof system coverings shall be provided in accordance with Section 1705.18.

1705.18 Ballasted low-slope roof systems. Ballasted low-slope (roof slope < 2:12) single-ply roof system coverings installed in hurricane-prone regions as defined in Section 202 shall be subject to periodic special inspection to verify that the assembly has been installed in accordance with ANSI/SPRI RP-4.

Commenter's Reason: The Code Committee recommended the original code change proposal for disapproval because it was unclear what special inspections requirements would apply to ballasted roof systems with the proposed reference to Chapter 17. The modification clarifies the special inspection requirements.

The ANSI/SPRI RP4 standard is based on hundreds of wind tunnel tests, field studies and post hurricane field inspections. In 1988 it was included in the building code as the design guide to be used for ballasted single ply roofs. It has been revised five times to include current information and recommendations. The link to Section 1504.8 was added in the 2006 version of the IBC due to a concern with gravel blow-off. Upon investigating the situations where gravel blow-off occurred, two conclusions were drawn:
1) The blow-off occurred during exposure to very high wind events.
2) The roofs where blow-off occurred were not installed per the ANSI/SPRI RP4 standard.

The solution to the blow-off problem is to verify that the roof has been installed per the standard via special inspection. SPRI believes in the use of national consensus standards, which have been developed and reviewed by subject matter experts as compared to imposing requirements that conflict with the requirements of the consensus standard. ANSI/SPRI RP4 should be a stand-alone design standard for ballasted single ply roofs as no blow-off problems have been reported for roofs installed per the requirements of this standard.

S14-12
Final Action: AS AM AMPC____ D

S15-12
1504.5.1 (New), Chapter 35 (New)

Proposed Change as Submitted

Proponent: Mike Ennis, Single Ply Roofing Industry (SPRI) (m.ennis@mac.com)

Add new text as follows:

1504.5.1 Gutter securement for low-slope roofs. Low-slope (roof slope < 2:12) roof system gutter securement shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with ANSI/SPRI GD-1, except V_{ult} wind speed shall be determined from Figure 1609A, 1609B, or 1609C as applicable.

Add new standard to Chapter 35 as follows:

SPRI

ANSI/SPRI GD-1-2010 Structural Design Standard for Gutter Systems Use with Low-Slope Roofs

Reason: Currently the IBC contains no requirement that gutters be designed and installed to resist wind and static loads. Studies of the aftermaths of hurricanes revealed a need for better gutter system design. Examples of these observations are shown below. SPRI developed this Standard in response to those studies.

The wind resistance tests contained in this standard measure the resistance of the gutter system to wind forces acting outwardly (away from the building.) and to wind forces acting upwardly tending to lift the gutter off the building. The standard also measures the resistance of the gutter system to static forces of water and ice acting downwardly.

Following are observations of results of gutter failures during high wind events. These observations were made during post hurricane investigations conducted by RICOWI (Roofing Industry Committee on Weather Issues).

Figure 1

Figure 1 is a photo was taken of the gutter/cleat attachment after Hurricane Ike, and is a good example of damage progression. This building, located in Anahuac, TX, experienced wind speeds of 110 mph. The inspection team determined that an overhanging gutter and fractured nailer provided a starting point for peel-back of this multi-ply membrane. The roof membrane peeled away from the insulation layer over most of the roof as shown in Figure 2.

Figure 2

Figure 3 is a photo of a building located in Dickinson, TX after Hurricane Ike. This building experienced wind speeds of 100 mph.

Figure 3

In this case the inspection team determined that a cornering wind caused detachment of the gutter and metal edge, allowing wind to infiltrate and pressurize the roof membrane which led to roll-back of the metal roof membrane, exposing the underlying substrate.

Figure 4 is of a building located in Lumberton, MS. This photo was taken after Hurricane Katrina. Estimated wind speed at this location was 110 to 120 mph.

Figure 4

The inspection team noted that approximately two-thirds of the roof membrane was blown off the roof. Initial failure appears to have occurred at the south roof edge where approximately 25 ft of gutter and edge nailer separated from the structure. A vented 3 ft deep soffit may have contributed to the damage by pressurizing the space between deck and roof assembly. However, the roof assembly may have been pressurized by failure of the south roof edge.

Cost Impact: The code change proposal may increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1504.5.1 (NEW)-S-ENNIS

Public Hearing Results

Note: For staff analysis of the content of SPRI GD-1 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: Disapproved

Committee Reason: There's no industry consensus on the adoption of the proposed standard for gutter systems. It uses ASCE 7-05 and would mix those requirements with 2010 edition referenced by the IBC, making the outcome of its adoption unclear and enforcement a moving target.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, representing Single Ply Roofing Industry Inc. (SPRI), requests Approval as Submitted.

Commenter's Reason: The Code Committee recommended this proposal for disapproval because they concluded that there's no industry consensus on the adoption of the proposed standard for gutter systems and it uses ASCE 7- 05 and would mix those requirements with 2010 edition referenced by the IBC, making the outcome of its adoption unclear and enforcement a moving target.

It is very important that the test requirements contained in this standard be adopted into the International Building Code. Failure of the edge securement in low slope roof systems has been found to be the primary cause for damage when these systems are exposed to high wind events. A study of 145 FM Global losses involving built-up (BUR) systems showed 85 losses (59%) occurred because the roof perimeter failed.

The Committee is correct that the standard references load calculations per ASCE7-05, however the code change proposal states that the load shall be calculated per the requirements of Chapter 16. Once these loads are determined per Chapter 16, the test procedures contained in ANSI/SPRI GD-1 are to be used to evaluate the strength of the attachment. This is then compared to the calculated loads to verify that the gutter is attached in a manner to resist the calculated wind loads.

S15-12

Final Action: AS AM AMPC____ D

S18-12
1504.9 (New), Chapter 35 (New)

Proposed Change as Submitted

Proponent: Mike Ennis, Single Ply Roofing Industry (SPRI) (m.ennis@mac.com)

Add new text as follows:

1504.9 Roof gardens and landscaped roofs. Roof gardens and landscaped roofs shall comply with Section 1507.16 and shall be installed in accordance with ANSI/SPRI RP14. Garden and landscaped roof systems shall be subject to the special inspection requirements of Section 1705.10 to verify conformance to ANSI/SPRI RP-14.

Add new standard to Chapter 35 as follows:

SPRI
ANSI/SPRI RP-14-2010 Wind Design Standard for Vegetative Roofing Systems

Reason: Section 1507.16 requires that roof gardens and landscaped roofs comply with the requirements of Chapter 15. Section 1504.1 provides requirements for wind resistance of various roofing assemblies, however no guidance is provided for designing roof gardens and landscaped roofs to withstand wind loads. Roof gardens and landscaped roofs perform in the same manner as ballasted single ply roof assemblies when exposed to wind loads. ANSI/SPRI RP14 is a national consensus standard that has been developed in cooperation with Green Roofs for Healthy Cities with input from roof membrane manufacturers, component suppliers, contractors, green roofing professionals, testing organizations, and consultants. This design standard is much like the ballast design guide for single-ply roofs currently recognized by the IBC (ANSI/SPRI RP4). It provides the user with a series of tables that define requirements based on design wind speed, building height, parapet height and wind exposure. Three design options are provided. These design options vary in their ability to resist wind loads. Design option 1 uses a 10 lbs/ft2 minimum required load of growth media or trays, Design option 2 also requires minimum 10 lbs/ft2 of growth media or trays in the field of the roof and 13 lbs/ft2 of growth media or interlocking trays or 22 lbs/ft2 of individual trays in the corner and perimeter regions. Design option 3, which is designed for high wind load areas, requires 13 lbs/ft2 of growth media or interlocking trays, or 22 lbs/ft2 of individual trays in the field of the roof and does not allow any loose growth media or trays in the perimeter and corner regions. The perimeter of the building is defined as 40% of the building height. Adjustments are provided to increase the wind resistance of the design based on specific building conditions such as the buildings importance factor, large openings in adjacent walls and rooftop projections to name a few. The standard also provides requirements for newly planted garden roofs that do not have fully developed root systems. Fully developed root systems allow the garden roof assembly to perform very well when exposed to high wind situations, however prior to development of the root system special precautions must be taken.

This proposal includes a requirement for special inspection to verify conformance to the ANSI/SPRI RP14 design standard when the system is installed in a high wind region as described in Section 1705.10.

The basis for the standard includes wind tunnel data generated in support of the ballasted single ply design guide. This wind tunnel testing helped develop an understanding of the impact of particle size and parapet height on the performance of ballasted assemblies. It also provided information regarding the weight of ballast required to keep the roof systems in place at various wind speeds. This data, along with 50-years of garden roof performance data from both the US and Europe were used in the development of this standard.

Cost Impact: The code change proposal may increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1504.9 (NEW) #2-S-ENNIS

Public Hearing Results

Note: For staff analysis of the content of SPRI RP-14 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Disapproved**

Committee Reason: The proposal does not appear to address all variations of vegetative roof systems. The proposed referenced standard is not based on current wind load requirements of the code and the committee does not see a consensus regarding the adoption of this new standard. Furthermore, the proposed special inspection for conformance with a design standard does not work, since the special inspection should be for the installation.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mike Ennis, representing Single Ply Roofing Industry Inc., (SPRI) requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1504.9 Roof gardens and landscaped roofs. Roof gardens and landscaped roofs shall comply with Section 1507.16 and shall be installed in accordance with ANSI/SPRI RP14. ~~Garden and landscaped roof systems shall be subject to the special inspection requirements of Section 1705.10 to verify conformance to ANSI/SPRI RP-14.~~

<u>**1504.9.1 Special inspection.** Special inspection of roof gardens and landscaped roofs shall be provided in accordance with Section 1705.18.</u>

<u>**1705.18 Roof gardens and landscaped roofs.** Roof gardens and landscaped roofs installed in hurricane-prone regions as defined in Section 202 shall be subject to periodic special inspection as defined in Section 202 to verify that the assembly has been installed in accordance with ANSI/SPRI RP-14.</u>

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: Section 1507.16 of the IBC requires that Roof gardens and landscaped roofs meet the requirements of Chapter 15, Sections 1607.12.3 and 1607.12.3.1 and the *International Fire Code*. However, no guidance is provided regarding how to meet the requirements of Section 1504.1 Wind resistance of roofs.

Roof gardens and landscaped roofs are not new. They have been used in Europe and North America for over 70 years. Methods for keeping the roof system in place when they are exposed to high wind conditions are well established.

The ANSI/SPRI RP14 standard provides design guidelines for vegetative roofs to meet wind resistance requirements. It is based on wind tunnel data, European design guides and FM Loss Prevention Guide 1-35.

Following are the reasons provided by the Code Committee for recommending this proposal for disapproval, and our response.

1) The Standard does not address all variations of vegetative roof systems - The Standard provides design requirements based on variables such as design wind speed, exposure category, building height and parapet height. It also provides specific requirements for special building conditions such as positive pressure in buildings, and rooftop projections to name a couple. These requirements can be applied to any type of vegetative roofing system.

2) The Standard is not based on proposed current wind load requirements of the code. The standard is based on nominal design wind speeds, not wind loads. The wind speed maps referenced in the code are based on ultimate wind speeds. Table 1609.3.1 provides conversions from ultimate wind speed to nominal wind speed, which can then be used with the Standard.

3) The committee did not see consensus regarding the adoption of this new standard. - It is an ANSI National Consensus standard. This does not mean that there is unanimous support, but the majority of the canvass body supports the Standard.

4) The proposed special inspection for conformance with a design standard does not work, since the special inspection should be for the installation. - The proposed modification addresses this issue.

S18-12

Final Action: AS AM AMPC____ D

S24-12
1505.9 (New), Chapter 35 (New)

Proposed Change as Submitted

Proponent: Mike Ennis, Single Ply Roofing Industry (SPRI) (m.ennis@mac.com)

THIS CODE CHANGE PROPOSAL IS ON THE AGENDA OF THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTEE. SEE THE HEARING ORDER FOR THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTTEE

Add new text as follows:

1505.9 Roof gardens and landscaped roofs. Roof gardens and landscaped roofs shall comply with Section 1507.16 and shall be installed in accordance with ANSI/SPRI VF-1.

Add new standard to Chapter 35 as follows:

SPRI
VF-1-2010 External Fire Design Standard for Vegetative Roofs

Reason: Section 1507.16 requires that roof gardens and landscaped roofs comply with the requirements of Chapter 15. Section 1505 requires that roofing assemblies be fire classified. The current test procedures used to provide this fire classification are not applicable to garden and landscape roofs due to the many variables (plant types, moisture content, etc.) that exist for these types of systems. ANSI/SPRI VF-1 is a national consensus standard that has been developed in conjunction with Green Roofs for Healthy Cities with input from roof membrane manufacturers, component suppliers, contractors, green roofing professionals, testing organizations, and consultants. This standard provides a design method to assure an acceptable level of performance of roof gardens and landscaped roofs when exposed to exterior fire sources. The general approach used in this standard is to design in fire breaks for large roof areas, around rooftop equipment and penetrations, and next to adjacent walls. Some of the specific requirements are:

- Exposed membrane areas must conform to the designed fire resistance requirements as determined by the authority having jurisdiction.
- For all vegetated roofing systems abutting combustible vertical surfaces, a Class A (per ASTM E108 or UL790) rated assembly must be achieved for a minimum 6 ft (1.83 m) wide continuous border placed around rooftop structures and all rooftop equipment.

For large roof areas: Partition the roof area into sections not exceeding 15,625 ft2 (1,450 m^2), with each section having no dimension greater than 125 ft (39 m) by installing a a minimum of 3ft. (0.9 m) wide, Class A rated assembly barrier zones.

Cost Impact: The code change proposal may increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1505.9-S-ENNIS.doc

Public Hearing Results

This code change was heard by the IBC Fire Safety code development committee.

Note: For staff analysis of the content of SPRI VF-1 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that fire design contained within the SPRI VF-1 standard was appropriate for roof gardens and landscaped roofs rather than the traditional test methods used to determine fire classification. Further, the committee felt that the standard was compliant with ICC Council Policy 28 (CP28).

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julie Ruth, JRuth Code Consulting representing American Architectural Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1505.9 Roof gardens and landscaped roofs. Roof gardens and landscaped roofs shall comply with Section 1507.16 and shall be installed in accordance with ANSI/SPRI VF-1.

Exception: Skylights shall comply with Section 711.4, Chapters 15, 17, 24 and 26 of the IBC, and shall not be considered as roof penetrations.

Commenter's Reason: This Public Comment addresses an error in a newly proposed IBC referenced standard. Specifically, the standard, ANSI/SPRI VF-1, classifies skylights as roof penetrations. Skylights are fenestration products and should not be classified as roof penetrations.

The International Building Code distinguishes between penetrations of an assembly, and openings such as fenestrations. Penetrations, such as ductwork or piping, pass through an assembly and extend beyond the plane of the assembly extensively on either side of it.

Openings, on the other hand, occur primarily within the plane of the assembly. Typically the only projection of products installed in those openings may be pieces of trim or other finishing type materials.

More significantly, products intended for installation into openings, such as fenestration products, are designed and developed to maintain the integrity of the assembly into which they are inserted. Fenestration must be designed and installed to preserve the integrity of the building envelope. Specifically, all fenestration products, including skylights, must provide resistance to the applicable structural loads, water penetration resistance, resistance to air leakage, reduced thermal transmittance and solar heat gain while providing appropriate transmittance of visible light to the building interior.

Skylights are included within the definition of fenestration in the *International Energy Conservation Code* and the *International Residential Code*, They are dealt with as fenestration throughout the International Codes.

The fire resistance characteristics of skylights as a component of the building envelope are already addressed in Chapters 7, 15 and 26 of the International Building Code.

Penetrations of the building envelope are dealt with differently than fenestration throughout the IBC, IRC and IgCC. Classifying skylights as penetrations of the roof assembly would not be appropriate.

S24-12

Final Action: AS AM AMPC____ D

S25-12
1506.1

<u>Proposed Change as Submitted</u>

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

1506.1 Scope. The requirements set forth in this section shall apply to the application of roof-covering materials specified herein. Roof coverings shall be applied in accordance with this chapter and the manufacturer's <u>printed</u> installation instructions. Installation of roof coverings shall comply with the applicable provisions of Section 1507.

Reason: This code change proposal clarifies the intent of the code by specifically stipulating manufacturers' installation instructions need to be in print. Other forms of instructions, such as verbal statements, are not appropriate for code compliance purposes.

Cost Impact: The code change proposal will not increase the cost of construction.

1506.1-S-GRAHAM

<u>Public Hearing Results</u>

Committee Action: **Approved as Modified**

Modify proposal as follows:

1506.1 Scope. The requirements set forth in this section shall apply to the application of roof-covering materials specified herein. Roof coverings shall be applied in accordance with this chapter and the manufacturer's ~~printed~~ *<u>approved</u>* installation instructions. Installation of roof coverings shall comply with the applicable provisions of Section 1507.

Committee Reason: The proposal does clarify which installation instructions are applicable to roof covering installations. The modification substitutes the term "approved" which is preferred because it will allow the jurisdiction to verify the roof covering installation.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jonathan Siu, representing City of Seattle Department of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1506.1 Scope. The requirements set forth in this section shall apply to the application of roof-covering materials specified herein. Roof coverings shall be applied in accordance with this chapter and the manufacturer's *~~approved~~* <u>documented</u> installation instructions. Installation of roof coverings shall comply with the applicable provisions of Section 1507.

Commenter's Reason: The original proposal had the right idea, in that it prevented verbal statements from overriding the code. However, as the Structural Committee modified this section, the building official now has to approve all manufacturers' installation instructions. This is not something most building officials have the time or expertise to do—on what basis will he/she approve the instructions? Will he/she have to review the test reports for each and every roofing products being installed in the jurisdiction? The text approved by the Committee seems to indicate so. Will the jurisdiction take on the liability for failed roofs if the building official's "approved" installation instructions contradict the manufacturers' instructions? In addition, from the roofing contractors' side, the modified text appears to introduce a lot of subjectivity and uncertainty into what should be a simple and straightforward process.

The reason statement published in the Report of Hearings indicates the Committee felt it was appropriate for the jurisdiction to verify the roofing installation. We agree with the statement, but feel this is why the installation is inspected by the jurisdiction.

During the discussions in Dallas, the issue was raised that not all manufacturers' instructions are actually printed (which was the term added in the original proposal)—many are now available electronically. This public comment accomplishes the intent of the original proposal by requiring the instructions be "documented" in some fashion, but leaves flexibility as to the media used.

Public Comment 2:

Steven P. Regoli, Ohio Board of Building Standards, requests Disapproval.

Commenter's Reason: Both the original code change proposal to Chapter 15, Roof Assemblies and Rooftop Structures, Section 1506 Materials, 1506.1 Scope, and the subsequent committee action to approve as modified have created an odd internal inconsistency within the language in the codes.

The original change proposal suggested that this language needed modification to clarify the intent of the code because manufacturers' installation instructions need to be *in print* and other forms of instructions, such as verbal statements, are not appropriate for code compliance purposes.

The proposal, after adjusting the language on-the-fly during the committee hearing, was approved as modified. The committee did not accept the code change as submitted because digital versions of installation instructions exist which may not be reflected by the use of the introduced word "printed." Instead, the committee modified the code change to replace the word "printed" with the word "approved". Unfortunately rather than deny the change and maintain consistency within the codes, the committee modified it in an unrelated way and the language now presents two problems.

First, the IBC definition of the term "approved" reads, "Acceptable to the code official or authority having jurisdiction" and, as the IBC Commentary explains, "Whenever this term is used, it intends that only the enforcing agency can accept a specific installation or component as complying with the code."

The implication is that the code official would now have to approve roof material manufacturer's installation instructions (with no criteria provided with which to make that determination).

Additionally, the term "manufacturer's installation instructions" is used 181 times (refer to attached table) in the Public Hearing (Group A) codes heard in Dallas. The committee inadvertently created a condition in which only the roof material manufacturer's installation instructions must be approved while all others incidences of the term will not need this clarification. This changes the way in which manufacturer's installation instruction are used, implies that perhaps all manufacturer's installation instructions should be approved by the code official, or suggests that roof material manufacturer's installation instructions are more critical than others.

Given the frequency of the use of this term and the fact that the original code change only intended to address of the form of the installation instructions and not the approval of them, this modification adds a unique material manufacturer's installation instruction approval to a code official's duties with no approval criteria provided for the approval and no explanation off why these instructions should be addressed in the codes differently than the hundreds of others referenced in code language.

INSTANCES OF "*MANUFACTURER'S INSTALLATION INSTRUCTONS*" IN HEARING GROUP A CODES

2012 IBC - 38 Instances

IBC Section	Title
704.13.2	Manufacturer's installation instructions
704.13.4	Temperature
717.2	Installation
717.6.2.1	Ceiling radiation dampers
906.7	Hangars and brackets
1404.11	Polypropylene siding
1405.18	Polypropylene siding
1407.6	Weather resistance
1409.6	Weather resistance
1503.5	Roof ventilation
1506.1	Scope
1507.1	Scope
1507.3.8	Application
1507.3.9	Flashing
1507.4.2	Deck slope
T1507.4.3(1)	Metal Roof Coverings
1507.4.5	Underlayment and high wind - 2X
1507.5.3.1	Underlayment and high wind
1507.6.3.1	Underlayment and high wind - 2X
1507.7.3.1	Underlayment and high wind
1507.8.3.1	Underlayment and high wind - 2X
1507.8.8	Flashing
1507.9.3.1	Underlayment and high wind - 2X
1507.9.9	Flashing
1507.17.2	Attachment
1509.7.4	Photovoltaic panels and modules
1510.6	Flashings
1805.2.1	Floors
1805.3	Floors
2111.11	Fireplace clearance, Exception 1
2112.2	Installation
2405.4	Framing, Exception
2610.2	Mounting
K105.2	Design criteria

2012 IPC - 9 Instances

IPC Section	Title
301.7	Conflicts
303.2	Installation of materials
306.2	Trenching and bedding
417.5.2	PVC sheets
417.5.2.2	Chlorinated polyethylene (CPE) sheets
421.2	Installation
421.5	Access to pump
502.1	General
604.3	Water distribution system design criteria

2012 IPSDC - 3 Instances

IPSDC Section	Title
505.6.3	Mechanical joint coupling
505.10.1	Mechanical joints
505.11.1	Mechanical joints

2012 IFGC - 67 Instances

TOTAL = 181 INSTANCES

2013 IMC - 64 Instances

IMC Section	Title
304.1	General - 2X
304.2	Conflicts - 3X
304.1	Clearances from grade
306.1.1	Central furnaces - Exception
307.1	Fuel-burning appliances
502.11.1	Projectors with an exhaust discharge
504.6.4.2	Manufacturer's instructions
504.7	Commercial clothes dryers
506.3.11.2	Field-applied grease duct enclosures
506.3.11.3	Factory-built grease duct assemblies
506.4.2	Type II terminations
603.6.4	Flexible air duct and air connector clearance
603.9	Joints, seams and connections
603.11	Furnace connections
603.18	Registers, grilles and diffusers
607.2	Installation
607.6.2	Ceiling radiation dampers
801.10.2	Connection to factory-built fireplace flue
801.14	Connections to exhauster
801.16	Flue lining - 2X
801.2	Plastic vent joints
802.3	Installation
802.4	Vent termination caps required
802.6	Minimum vent heights - Exceptions 2 and 3
802.8	Insulation shield
804.1	Direct-vent terminations
804.2	Appliances with integral vents
804.3.7	Exhauster sizing
805.1	Listing
905.1	General
906.1	General
907.1	General
908.1	General
909.1	General
910.1	General
911.1	General
912.3	Clearances
913.1	General
914.2	Installation
915.2	Powered equipment and appliances
916.1	General
917.1	Cooking appliances
918.2	Minimum duct sizes - 3X
920.1	General
923.1.1	Installation
924.1	General
1002.1	General
1002.2	Water heaters utilized for space heating
1002.3	Supplemental water-heating devices
1003.1	General
1004.4	Mounting
1006.3	Pressure relief for pressure vessels
1006.7	Boiler safety devices
1104.2	Machinery room - Exception 1
1203.3.7	Grooved and shouldered mechanical joints
1209.4	Not embedded related piping
1401.4	Solar energy equipment and appliances

S25-12

Final Action: AS AM AMPC____ D

S28-12
1507.10.3 (New)

Proposed Change as Submitted

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Add new text as follows:

1507.10.3 Mopping asphalt. Asphalt used in the field application of hot-applied built-up roofs shall comply with ASTM D312 and have a minimum 125°F (69.4°C) temperature differential between the asphalt's equiviscous temperature and its flash point temperature. Asphalt shall not be heated to or above its flash point temperature.

Reason: This code change proposal is intended to add requirements to the Code to provide for the safe and proper installation of hot-applied built-up roofs.

The application of most built-up roofs involves heating asphalt at the jobsite, typically in either an asphalt kettle or asphalt tanker located at ground level, to temperatures in excess of 500 °F (260°C) in order to dispense the asphalt at the point of application (rooftop) at an adequate temperature for proper application. The material standard for roofing asphalt--ASTM D312, which is already referenced in the Code--provides for the testing and labeling of asphalt's maximum heating temperature (flash point temperature) and proper application temperature (equiviscous temperature).

In order to minimize the risks of fires associated with jobsite heating of asphalt, an asphalt should not be heated to its flash point temperature. To allow for the proper application of mopping asphalt, a temperature differential between the asphalt's heating temperature and its equiviscous temperature is necessary to account for the asphalt's cooling during transportation from the heating location (e.g., ground level) and the point of applcaition (rooftop). *The NRCA Roofing Manual* suggests a minimum 125°F (69.4°C) differential between an asphalt's equiviscous temperature and it's flash point temperature for this purpose.

This code change proposal establishes a minimum temperature differential between and asphalt's equiviscous temperature and it's flash point temperature, and stipulates asphalt shall not be heated to or above its flash point temperature.

Cost Impact: The code change proposal will not increase the cost of construction.

1507.10.3 (NEW)-S-GRAHAM

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: The committee agreed that adding the minimum temperature differential for asphalt to the code is a good idea that will provide direction to installers/contractors.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Steven P. Regoli, Ohio Board of Building Standards, requests Disapproval.

Commenter's Reason: This National Roofing Contractors Association code change proposal adds requirements to the Code to provide for the safe and proper installation of hot-applied built-up roofs by introducing an asphalt kettle or asphalt tanker temperature requirements. This is being proposed, apparently , to assure that the dispensing of asphalt at the point of application (rooftop) is at an adequate temperature for proper application.

This was done, as explained by the proponent, "*to minimize the risks of fires associated with jobsite heating of asphalt by stipulation that asphalt should not be heated to its flash point temperature.*" No data was provided to indicate the scope or frequency of these fires and the need to bring the requirement into the code. By adding this language, the proposal thereby makes this an item of inspection by and potentially the responsibility of the local building department.

The proponent explained that this language would "*assure, for the proper application of mopping asphalt, a temperature differential between the asphalt's heating temperature and its equiviscous temperature necessary to account for the asphalt's* *cooling during transportation from the heating location (e.g., ground level) and the point of application (rooftop). This code change proposal establishes a minimum temperature differential between and asphalt's equiviscous temperature and its flash point temperature, an dstipulates asphalt shall not be heated to or above its flash point temperature."* No explanation was provided as to why this type of roofing systems needed this additional requirement when other systems do not. The IBC lists several roofing systems that may be temperature sensitive in their application – 1507.12 Thermoset single-ply roofing, 1507.15 Liquid-applied coatings – yet installation procedures are not specified in the way this proposal does. The consensus standards referenced in these sections are material standards not installation guidelines.

ASTM D312, to which this new language refers, is itself titled, "A Standard *Specification* for Asphalt Used in Roofing" and, as a specification, states within the document that it is intended for general asphalt classification purposes only. It is not an installation guideline or safety standard. The document even includes the statement, in section 1.2 Scope that, "*This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitation prior to use."*

A result of this proposed change one could now expect, in the event of a fire associated with jobsite heating of asphalt, that a contractor could argue that the building department failed to make the code required inspection on the temperature differential of 125 degrees between the asphalt's heating temperature and its equiviscous temperature. While the committee felt this requirement was "a good idea that will provide direction to installers/contractors," by inserting these installation requirements into the code without specifying contractor responsibility, they make them an inspection responsibility of the building department. As the proponent indicated in the original supporting statement, an installation manual by National Roofing Contractors Association (NRCA) Roofing Manual is already being used that directs the installer to maintain a minimum 125°F differential between an asphalt's equiviscous temperature and its flash point temperature for this purpose.

The proponent and the committee have uniquely, whether inadvertently or intentionally, made the preparation and temperature of the asphalt for built-up roofs an item requiring that the temperatures to be evaluated by the building department whenever asphalt is heated for this roof type. These and other means and method of construction are traditionally the responsibility of the contractor and mechanic doing the installation. This could be seen as an example of scope creep as more and more of the means and methods of the construction process are finding their way into the code. If there does exist a hazard, although no data was provided by the proponents indicating the scope or magnitude of any problem, perhaps these inspections checking the temperature differential between the asphalt equiviscous temperature and its flash point temperature should be made a part of special inspections requirements in IBC Chapter 17.

S28-12

Final Action: AS AM AMPC____ D

S29-12

1507.2 (New), 1507.2.1 (New), 1507.2.2 (New), 1507.2.3 (NEW), 1507.2.8.1, 1507.3.3.3, 1507.4.5, 1507.5.3.1, 1507.6.3.1, 1507.7.3.1, 1507.8.3.1, 1507.9.3.1, Chapter 35

Proposed Change as Submitted

Proponent: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (IBHS)

Revise as follows:

1507.2. Sealed roof decks. When required, a sealed roof deck shall be installed in accordance with Section 1507.2.1, 1507.2.2 or 1507.2.3.

1507.2.1 Self-adhering cap sheet. The entire roof deck shall be covered with a self adhering polymer modified bitumen membrane complying with ASTM D 1970. An approved underlayment for the applicable roof covering shall be applied over the cap sheet, unless the top surface of the membrane provides a bond break between the membrane and the roof covering.

1507.2.2 Self-adhering strips. A minimum 4 inch wide strip of self adhering polymer modified bitumen membrane complying with ASTM D 1970 shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering shall be applied.

1507.2.3 Synthetic underlayment. The roof deck shall be covered with a reinforced synthetic roof underlayment approved as an alternate to ASTM D 226 Type I or II. The synthetic underlayment shall have a minimum tear strength of 20 lbs in accordance with ASTM D 1970 or ASTM D 4533. This underlayment shall be attached using annular ring or deformed shank roofing fasteners with minimum 1 inch diameter caps at 6 inches on center spacing along all laps and at 12" on center in the field or a more stringent fastener schedule if required by the manufacturer for high wind installations. Metal caps are required for areas where the V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 110 mph. Side laps shall be a minimum of 2 inches and end laps shall be a minimum of 6 inches. All seams shall be sealed with a compatible adhesive or a compatible 4 inch wide tape. For roofs with slopes of 45 degrees and higher, seams are not required to be sealed provided laps are a minimum of 18 inches. No additional underlayment is required.

1507.2.8.1 High wind attachment. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section 1507.2.8 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

> **Exception:** As an alternative, ~~adhered underlayment complying with ASTM D 1970~~ a sealed roof deck installed in accordance with Section 1507.2 shall be permitted.

1507.3.3.3 High wind attachment. Underlayment applied in areas subject to high wind [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Sections 1507.3.3.1 and 1507.3.3.2 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

> **Exception:** As an alternative, ~~adhered underlayment complying with ASTM D 1970~~ <u>a sealed roof deck installed in accordance with Section 1507.2</u> shall be permitted.

1507.4.5 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

> **Exception:** As an alternative, ~~adhered underlayment complying with ASTM D 1970~~ <u>a sealed roof deck installed in accordance with Section 1507.2</u> shall be permitted.

1507.5.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

> **Exception:** As an alternative, ~~adhered underlayment complying with ASTM D 1970~~ <u>a sealed roof deck installed in accordance with Section 1507.2</u> shall be permitted.

1507.6.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32- gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

> **Exception:** As an alternative, ~~adhered underlayment complying with ASTM D 1970~~ <u>a sealed roof deck installed in accordance with Section 1507.2</u> shall be permitted.

1507.7.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

> **Exception:** As an alternative, ~~adhered underlayment complying with ASTM D 1970~~ <u>a sealed roof deck installed in accordance with Section 1507.2</u> shall be permitted.

1507.8.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

> **Exception:** As an alternative, ~~adhered underlayment complying with ASTM D 1970~~ <u>a sealed roof deck installed in accordance with Section 1507.2</u> shall be permitted.

1507.9.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

> **Exception:** As an alternative, ~~adhered underlayment complying with ASTM D 1970~~ a sealed rood deck installed in accordance with Section 1507.2 shall be permitted.

Add new standard to Chapter 35 as follows:

ASTM

D 4533-11 Standard Test Method for Trapezoid Tearing Strength of Geotextiles

Reason: This code change proposal simply seeks to expand and provide additional specification for using self-adhering polymer modified bitumen membrane to prevent water intrusion. The commonly used term "secondary water barrier" is no longer used, since some have argued that underlayment itself is a secondary water barrier. Secondary water barrier has been replaced by the term "sealed roof deck." Regardless of the terminology, the purpose of these provisions is provide an additional level of protection to the roof decking in the event that the primary roof covering is blown off due to high winds. It's important to note that this code change proposal does not require a sealed roof deck. Rather, it provides specific criteria for creating a sealed roof deck as an alternative to the requirements for underlayment in high winds (e.g., Section 1507.2.8.1). While providing specific installation criteria for the bitumen membrane, this code change proposal also incorporates the use of reinforced synthetic underlayment for creating a sealed roof deck. The criteria specified are consistent with the IBHS Fortified program requirements for creating a sealed roof deck.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1507.2 (NEW)-S-STAFFORD

Public Hearing Results

Note: For staff analysis of the content of ASTM D 4533 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: Disapproved

Committee Reason: There is confusion over when and where these provisions for self-adhering polymer are required. Since the reports provided to the committee were nonpersuasive, there's a lack of technical date to substantiate this change.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

T. Eric Stafford, T. Eric Stafford & Associates, LLC, representing Insurance Institute for Business and Home Safety (IBHS), requests Approval as Submitted.

Commenter's Reason: We are seeking Approval as Submitted for S29-12. During the code development hearings on this proposal, there was a good bit of confusion amongst committee members regarding where and when the provisions for self-adhering polymer modified bitumen membrane was required. Much of the confusion was due, in part, to some incorrect statements from a few of the opponents to this code change. This code change does not require the use of the self-adhering polymer modified bitumen membrane. It simply provides clarification on the proper installation if that option is chosen. Sections 1507.2.8.1, 1507.3.3.3, 1507.4.5, 1507.5.3.1, 1507.6.3.1, 1507.7.3.1, 1507.8.3.1, and 1507.9.3.1 currently require “enhanced” underlayment methods (thicker felt and tighter fastening) where the V_{asd} equals of exceeds 120 mph. An exception to each of these sections permits the use of an adhered underlayment complying with ASTM D 1970 in lieu of the enhanced underlayment methods. This exception was added during the last code development cycle and is contained in the 2012 IRC and 2012 IBC, at the request of the IBC Structural Committee. This code change does not change either of those requirements that are currently in the 2012 IBC and 2012 IRC. It simply clarifies how to properly apply the self-adhering underlayment – 1) apply the membrane over the entire roof (proposed Section 1507.2.1); or 2) apply minimum 4 in. wide strips over all the joints in the roof decking (proposed Section 1507.2.2).

Additionally, this proposal provides one other alternative to the enhanced underlayment methods. Synthetic underlayment installed in accordance with proposed Section 1507.2.3 is a recognized option for creating a sealed roof deck in the IBHS Fortified program. This code change does not require the use of a synthetic underlayment. It simply provides clarification on proper installation of the synthetic underlayment to provide an additional level of protection from water penetration that is consistent with the enhanced underlayment methods currently required in the 2012 IBC and IRC. Several manufacturers of synthetic underlayment have ICC ES reports and this underlayment is currently in use. During the hearings, one of the opponents suggested that there was some research indicating that there were issues with synthetic underlayments properly shedding water. We repeated requested that information from the opponent and to this point have not received any information to support his claim. In fact, in subsequent conversations, the opponent has backed off his claim to a degree. We are not aware of any data or research that suggests synthetic underlaymnets do not properly shed water.

S29-12

Final Action: AS AM AMPC____ D

S31-12

1507.2.6.1 (New), 1507.2.8.1, 1507.3.3.3, 1507.3.6.1 (New), 1507.4.5, 1507.5.3.1, 1507.6.3.1, 1507.7.3.1, 1507.8.3.1, 1507.9.3.1

Proposed Change as Submitted

Proponent: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (IBHS)

Revise as follows:

1507.2.6.1 Fasteners and high winds. In areas where the ultimate design wind speed, V_{ult} equals or exceeds 130 mph, fasteners for asphalt shingles shall be annular ring shank nails having not less than 20 rings per inch in addition to the requirements of Section 1507.2.6.

1507.2.8.1 High wind attachment. Underlayment applied in areas subject to high winds ~~[V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1]~~ [V_{ult} equals to or greater than 130 mph, shall be applied with corrosion-resistant fasteners complying with Section 1507.2.6.1 in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.

Underlayment installed where ~~V_{asd}, in accordance with Section 1609.3.1,~~ the ultimate design wind speed, V_{ult} equals or exceeds ~~120~~ 140 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section 1507.2.8 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a ~~head~~ cap diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall comply with Section 1507.2.6.1 and shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.3.3.3 High wind attachment. Underlayment applied in areas subject to high wind ~~[V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1]~~ [V_{ult} equal or greater than 130 mph] shall be applied with minimum 12 gage [0.105 inch (2.67 mm) corrosion-resistant ~~fasteners in accordance with the manufacturer's installation instructions~~ annular ring shank nails having not less than 20 rings per inch, with a minimum 3/8 inch-diameter (9.5 mm) head, of a length to penetrate through the roofing sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where ~~V_{asd}, in accordance with Section 1609.3.1,~~ the ultimate design wind speed, V_{ult} equals or exceeds ~~120~~ 140 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Sections 1507.3.3.1 and 1507.3.3.2 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. ~~The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.3.6.1 Fasteners and high winds. In areas where the ultimate design wind speed, V_{ult} equals or exceeds 130 mph, fasteners for tile shall be a minimum 11 gage [0.105 inch (2.67 mm)] annular ring shank nails having not less than 20 rings per inch shank, with a minimum 5/16 inch-diameter (9.5 mm) head, of a length to penetrate through the roofing sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

1507.4.5 Underlayment and high wind. Underlayment applied in areas subject to high winds ~~[V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1]~~ [V_{ult} equal to or greater than 130 mph] shall be applied with minimum 12 gage [0.105 inch (2.67 mm) corrosion-resistant ~~fasteners in accordance with the manufacturer's installation instructions.~~ annular ring shank nails having not less than 20 rings per inch, with a minimum 3/8 inch-diameter (9.5 mm) head, of a length to penetrate through the roofing sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where ~~V_{asd}, in accordance with Section 1609.3.1,~~ the ultimate design wind speed, V_{ult} equals or exceeds ~~120~~ 140 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. ~~The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.5.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds ~~[V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1]~~ [V_{ult} equal to or greater than 130 mph shall be applied with minimum 12 page [0.105 inch (2.67 mm) corrosion-resistant ~~fasteners in accordance with the manufacturer's installation instructions~~ annular ring shank nails having not less than 20 rings per inch, with a minimum 3/8 inch-diameter (9.5 mm) head, of a length to penetrate through the roofing sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where ~~V_{asd}, in accordance with Section 1609.3.1~~ the ultimate design wind speed, V_{ult}, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a ~~head~~ cap diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. ~~The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.~~

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.6.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds ~~[V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1]~~ [V_{ult} equal to or greater than 130 mph] shall be applied with minimum 12 gage [0.105 inch (2.67 mm) corrosion resistant ~~fasteners in accordance with the manufacturer's installation instructions.~~ annular ring shank nails having not less than 20 rings per inch, with a minimum 3./8 inch-diameter (9.5 mm) head, of a length to penetrate through the roofing sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where ~~V_{asd}, in accordance with Section 1609.3.1,~~ the ultimate design winds peed, V_{ult} equals or exceeds ~~120~~ 140 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a ~~head~~ cap diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. ~~The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.7.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds ~~[V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1]~~ [V_{ult} equal to or greater than 130 mph] shall be applied with minimum 12 gage [0.105 inch (2.67 mm) corrosion resistant ~~fasteners in accordance with the manufacturer's installation instructions.~~ annular ring shank nails having not less than 20 rings per inch, with a minimum 3/8 inch-diameter (9.5 mm) head, of a length to penetrate through the roofing sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where ~~V_{asd}, in accordance with Section 1609.3.1,~~ the ultimate design wind speed, V_{ult} equals or exceeds ~~120~~ 140 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a ~~head~~ cap diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. ~~The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.8.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds ~~[V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1]~~ [V_{ult} equal to or greater than 130 mph shall be applied with minimum 12 gage [0.105 inch (2.67 mm) corrosion resistant fasteners ~~in accordance with the manufacturer's installation instructions.~~ annular ring shank nails having not less than 20 rings per inch, with a minimum 3/8 inch-diameter (9.5 mm) head, of a length to penetrate through the roofing sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where ~~V_{asd}, in accordance with Section 1609.3.1,~~ the ultimate design wind speed, V_{ult} equals or exceeds ~~120~~ 140 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a ~~head~~ cap diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. ~~The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.~~

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.9.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds ~~[V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1]~~ [V_{ult} equal to or greater than 130 mph] shall be applied with minimum 12 gage [0.105 inch (2.67 mm) corrosion resistant ~~fasteners in accordance with the manufacturer's installation instructions.~~ annular ring shank nails having not less than 20 rings per inch, with a minimum 3/8 inch-diameter (9.5 mm) head, of a length to penetrate through the roofing sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where ~~V_{asd}, in accordance with Section 1609.3.1,~~ the ultimate design wind speed, V_{ult} equals or exceeds ~~120~~ 140 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a ~~head~~ cap diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. ~~The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.~~

> **Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

Reason: Water intrusion continues to be an issue with hurricanes and high wind events. Significant improvements have been made recently to the codes and other voluntary methods that help prevent water intrusion through the roof decking when the primary roof covering has been blown off or damaged. These include the underlayment and high wind requirements in the 2012 IBC and the 2012 IRC in addition to the Sealed Roof Deck provisions recommended by the IBHS Fortified program and FEMA hurricane retrofit program guidance. However, recent tests on sealed roof decks at the IBHS Research Center indicate that water intrusion through nail holes left in the roof decking when the primary roof covering has been lost is still an issue. In the areas specified, this code change proposal requires the roof underlayment to be attached with ring shank nails. Where nails are specified for the roof covering attachment, this code change proposal requires the use of ring shank nails. Ring shank nails have a significantly higher withdrawal capacity to similar sized smooth shank nails (up to 131% higher). The use of ring shank nails will help keep the nails in place when the roof covering is blow off and reduce the chance that unfilled nail holes will allow water intrusion.

This code change proposal also changes the wind speed trigger for when the improved underlayment and fastening methods are required. The wind speed is changed to a V_{ult} value consistent with the wind speeds represented in Figures 1609A, 1609B, and 1609C. Additionally, the wind speed threshold that triggers the improved underlayment and fastening methods has been slightly reduced. The proposed 130 mph and 140 mph V_{ult} wind speed triggers are more comparable geographically to the 110 mph and 120 mph wind speeds in the 2009 IBC. The triggers are also consistent with the wind speed limitations on conventional construction and the prescriptive non-high wind provisions of the 2012 IRC (The Wind Design Required Region in the 2012 IRC is tied to the 130 mph V_{ult} wind speed). Post-storm investigations also show that water intrusion is an issue in inland areas when the primary roof covering has been blown off.

Cost Impact: The code change proposal will increase the cost of construction.

1507.2.6.1 (NEW)-S-STAFFORD

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed change to the wind speed threshold for underlayment in high wind regions was more than a conversion from nominal to ultimate design wind speeds. The more restrictive threshold that was proposed seemed arbitrary in that insufficient technical justification was given for this change.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

T. Eric Stafford, T. Eric Stafford & Associates, LLC, representing Insurance Institute for Business and Home Safety (IBHS), requests Approval as Submitted.

Commenter's Reason: We are seeking Approval as Submitted for S31-12. There were two primary opposition points to this proposal. The first was that the change to the wind speed threshold for underlayment in high wind regions was more than just a conversion from nominal to ultimate design wind speeds. This is true, and the reason statement for S31-12 clearly states this. When this code change was adopted, a separate proposal was approved that updated the wind speed maps in the IBC to be consistent with the strength-design level maps in ASCE 7-10. The original 120 mph threshold was chosen, largely based on engineering judgment, to apply to areas that had the highest risk of an impact from a Category III or higher hurricane. The proposed V_{ult} equal to or exceeding 140 mph threshold is approximately consistent geographically with the 120 mph contour on the wind speed maps in the 2009 IBC and ASCE 7-05.

The second point of opposition was primarily to specifying the use of ring shank nails for attaching the roof covering and the underlayment in areas where V_{ult} equal to or exceeding 130 mph. The opposition was not due to cost, as the cost of using ring shank nails over smooth shank nails is negligible. The debated centered on the supposed lack of specification for the nail and whether or not this nail was covered by ASTM F 1667. Deformed shank nails are specifically covered by ASTM F 1667. Section 10.3 in ASTM F 1667, *Altered Shapes and Dimensions*, specifically addresses mechanically formed or deformed nail shanks. In fact, deformed shank shingle and underlayment nails are specifically addressed in other sections of ASTM F 1667. Ring shank nails have a significantly higher withdrawal capacity to similar sized smooth shank nails. The use of ring shank nails will help keep the nails in place when the roof covering is blown off and reduce the chance that unfilled nail holes will allow water intrusion into the building.

S31-12

Final Action: AS AM AMPC____ D

S33-12
1507.2.8.2

Proposed Change as Submitted

Proponent: Bill McHugh, Chicago Roofing Contractors Association (bill@crca.org)

Revise as follows:

1507.2.8.2 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the *exterior wall* line of the building.

Exceptions:

1. Detached accessory structures that contain no conditioned floor area.
2. Roofs with slope equal to or greater than 8/12, the ice barrier shall be applied to a point 36 inches (914 mm) past the outside part of the inside wall line of the building up the slope of the roof deck.

Reason: The Chicago Roofing Contractors Association (CRCA) and other steep slope roofing contractors work in all climates from hot summer to the dead of cold, snowy winters. We have enough snow most years to get much experience in ice dam situations.

In steep slope applications in climates where ice forms at the eave edge of roofs. Ice melts due to heat from below melting snow, then freezes where the water meets roof surfaces that are over unheated areas, making a buildup of ice. This buildup becomes a 'dam' that backs water up under the roof covering and underlayment leaking into the building.

The purpose of this proposal is to bring to the Code into alignment with the practical application of the ice barrier underlayment products in the field. Since gravity stops water from backing up very far on super steep slopes greater than 8" in 12" there needs to be a limit to the amount of ice barrier underlayment applied.

On very steep sloped roofs, the ice dams will still occur. However, buildup of ice cannot build far beyond the ball that forms at the gutter edge on slopes greater than 8" in 12". Secondly, the water will not defy gravity and move very far upward, when the physics of the application are that the water will drip over the dam due to gravity first.

The way the current code is written, ice barrier material may be needed on the complete roof deck rather than to protect just the eave edges and 3' up slope. Through clarifying this requirement with the exception, the intent of the code is met while reducing costs to builders and building owners and managers.

Cost Impact: The code change proposal will not increase the cost of construction.

1507.2.8.2 #1-S-MCHUGH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt the proponent may have a good idea and perhaps it should be added to the base requirements for ice barriers rather than formatted as a new exception. The actual overhang length is not addressed and there is a problem with the 8:12 slope or greater.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bill McHugh, Chicago Roofing Contractors Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1507.2.8.2 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the *exterior wall* line of the building.

Exceptions:

1. Detached accessory structures that contain no conditioned floor area.
2. On ~~roofs with~~ roof slopes ~~equal to or greater than 8/12~~, not less than 8 units vertical in 12 units horizontal the ice barrier shall be applied from the eave to a point 36 inches (914 mm) ~~past the outside part of the inside wall line of the building~~ measured up the slope of the roof deck.

Commenter's Reason: The Chicago Roofing Contractors Association (CRCA) and other steep slope roofing contractors work in all climates from hot summer to the dead of cold, snowy winters. We have enough snow most years to be familiar with ice dam situations.

In steep slope roofs in climates where ice forms at the eave edge of roofs due to heat from below contacting snow on roofs. The Ice that melts due to heat from below melting snow then freezes where the water meets roof surfaces that are over unheated areas, creating a buildup of ice. This buildup becomes a 'dam' that backs water up under the roof covering and underlayment leaking into the building.

The purpose of this proposal is to bring to the Code into alignment with the practical application of the ice barrier underlayment products in the field on 'super steep' slope roofs. Since gravity stops water from backing up very far on slopes greater than 8" in 12" there needs to be a limit to the amount of ice barrier underlayment required by the code.

The way the current code is written, on a 'mansard roof'' the slope may require full coverage of the mansard to comply. Therefore, more ice barrier material may be needed on the complete roof deck rather than to protect just the eave edges and 3' up slope.

Through clarifying this requirement with the exception, the intent of the code is met while reducing extraneous costs to developers, building owners and managers and construction firms. On roofs sloped 8" in 12" and greater, ice dams may occur. However, the resulting ice formation cannot extend vertically upslope far.

Secondly, the resulting ice dam cannot defy gravity and traverse vertically upslope due to the physics of the application. Water will drip over the ball shaped dam due to gravity rather than keep backing upslope. When calculating the distance up the slope the ice barrier membrane applied seems to equate to 36" up the slope. Rolls of ice barrier material are supplied in 36" wide rolls.

S33-12

Final Action: AS AM AMPC____ D

S34-12
1507.2.8.2

Proposed Change as Submitted

Proponent: Bill McHugh, Chicago Roofing Contractors Association (bill@crca.org)

Revise as follows:

1507.2.8.2 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend 2 inches (51 mm) down the fascia and under the drip edge, from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the *exterior wall* line of the building.

Exceptions:

1. Detached accessory structures that contain no conditioned floor area.
2. Roof recover applications where no new metal drip edges or gutters are incorporated.

Reason: The Chicago Roofing Contractors Association (CRCA) and other steep slope roofing contractors work in all climates from hot summer to the dead of cold, snowy winters. We have enough snow most years to get much experience in ice dam situations.

In steep slope applications in climates where ice forms at the eave edge of roofs. Ice melts due to heat from below melting snow, then freezes where the water meets roof surfaces that are over unheated areas, making a buildup of ice. This buildup becomes a 'dam' that backs water up under the underlayment and roof covering.

Studies show that roof recover applications typically fail at flashings on all roof slopes. The roof edge flashings are most susceptible to leaks from water backing up under the underlayment and roof covering because it freezes at the eave edge first driving water up-slope.

According to CRCA roofing contractors, if the code required ice barrier is applied improperly to the top of the metal drip edge, the water will leak into the structure. The leak(s) may be difficult to detect in the concealed space location.

In new construction, tear off and roof replacement situations the roofing underlayment construction is easily phased to be installed before the drip edges at the eave edge.

In roof recover applications where metal is not removed, surfaces may be dirty, uneven, and very difficult even for the best contractors to provide a water tight seal.

To provide the building owner the best application and give the code requirement the best chance at working as intended, this proposal from the Chicago Roofing Contractors Association is presented.

Cost Impact: The code change proposal will not increase the cost of construction.

1507.2.8.2 #2-S-MCHUGH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The wording of this proposal needs work. The requirement to extend underlayment 2 inches down the fascia should be separated from the current phrase "from the lowest edges". Placing the recover application in an exception could appear to eliminate the ice barrier.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bill McHugh, Chicago Roofing Contractors Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1507.2.8.2 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend 2 inches (51 mm) down the fascia and under the drip edge, from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the *exterior wall* line of the building.

Exception:

1. Detached accessory structures that contain no conditioned floor area
2. ~~Roof recover applications where no new metal drip edges or gutters are incorporated.~~

Commenter's Reason: The Chicago Roofing Contractors Association (CRCA) and other steep slope roofing contractors work in all climates from hot summer to the dead of cold, snowy winters. We have enough snow most years to get much experience in ice dam situations.

In steep slope applications in climates where ice forms at the eave edge of roofs. Ice melts due to heat from below melting snow, then freezes where the water meets roof surfaces that are over unheated areas, making a buildup of ice. This buildup becomes a 'dam' that backs water up under the underlayment and roof covering.

Studies show that roof recover applications typically fail at flashings on all roof slopes. The roof edge flashings are most susceptible to leaks from water backing up under the underlayment and roof covering because it freezes at the eave edge first driving water up-slope.

According to CRCA roofing contractors, if the code required ice barrier is applied improperly to the top of the metal drip edge, the water will leak into the structure. The leak(s) may be difficult to detect in the concealed space location.

In new construction, tear off and roof replacement situations the roofing underlayment construction is easily phased to be installed before the drip edges at the eave edge.

In roof recover applications where metal is not removed, surfaces may be dirty, uneven, and very difficult even for the best contractors to provide a water tight seal, hence removing the exception we proposed in May in Dallas as was pointed out by the committee. We believe this clarifies the proposal as the committee recommended.

To provide the building owner the best application and give the code requirement the best chance at working as intended, this proposal from the Chicago Roofing Contractors Association is presented.

The proposed exception is removed by this modification in response to the committee reason.

S34-12

Final Action: AS AM AMPC____ D

S35-12
1507.2.8.2

Proposed Change as Submitted

Proponent: Bill McHugh, Chicago Roofing Contractors Association (bill@crca.org)

Revise as follows:

1507.2.8.2 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of ~~at least two layers of underlayment cemented together or of~~ a self adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the *exterior wall* line of the building.

Exception: Detached accessory structures that contain no conditioned floor area.

Reason: In a survey of CRCA Steep & Shingle Committee Members it appears this method for ice barrier protection is no longer used due to labor intensive and messy application.

At the time the ice barrier materials were introduced to the code, this was an application used because the ice barrier materials were not in the code. After years of use, it seems the two layers of underlayment cemented together method is not used as it is much more costly than the self adhering polymer modified bitumen sheet materials.

Therefore, we propose to remove this option from the code.

Cost Impact: The code change proposal will not increase the cost of construction.

1507.2.8.2 #3-S-MCHUGH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There is no need to eliminate the option of two layers of underlayment cemented together. It is still a valid application and retaining it keeps the minimum code requirements.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bill McHugh, Chicago Roofing Contractors Association, requests Approval as Submitted.

Commenter's Reason: The code currently allows an option of either 'at least two layers of (felt) underlayment cemented together' or a 'self adhering polymer modified bitumen' sheet instead. The ice barrier sheets were developed in the late 1970's and mastic layers used prior to that time widely.

In a survey of CRCA Steep & Shingle Committee Members and others currently in the roofing contractor industry, it appears this 'two layers of felt underlayment with roof cement method for ice barrier protection used very infrequently and seems to provide a risky application as well. The method of using wet mastics to felt in layers is no longer used due to safety concerns, labor intensive costs, and displacement when stepping on the material before cure of the mastics that can cause falls on or from the roof.

There is an alternative to the 'mastic and felt underlayment' method of underlayment. The alternative is an ice barrier sheet. These products are widely available with several manufacturers of this product providing competition and alternatives. The products are also available worldwide through wholesale distributors and retail outlets in all 50 states and internationally as well.

Secondly, the mastic and underlayment method has technical limitations. In order to apply shingles over the mastic and felt, a worker must walk on the application. If the worker walks before the material is fully cured, the worker's foot may displace the mastic forming an undetectable void under the 1st layer of underlayment and also under shingles. A workers hammer may also displace the material leaving a void.

Third, if the mastic is not fully cured, the worker, even tied off, is more likely to fall due to a slippery mass of material under the felt which may move under his or her feet. This can cause slips and possibly falls on the roof or off the roof to the ground.

Fourth, the labor intensive method that the material is applied could be better used more efficiently.

This was an application allowed by the code prior to the ice barrier materials being invented and available to allow in the code. After years of use, it seems the 'two layers of underlayment cemented together' method is not used as it is much less efficient than the self adhering polymer modified bitumen sheet materials.

For safety and practical application we propose to remove this option from the code.

S35-12

Final Action: AS AM AMPC____ D

S37-12
1507.2.8.1, Table 1507.2.8.1 (New), 1507.3.3.3, 1507.4.5, 1507.5.3.1, 1507.6.3.1, 1507.7.3.1, 1507.8.3.1, 1507.9.3.1

Proposed Change as Submitted

Proponent: John Kurtz, International Staple, Nail & Tool Association (isanta@ameritech.net)

Revise as follows:

1507.2.8.1 High wind attachment. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section 1507.2.8 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

Exceptions:

1. As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.
2. As an alternative, cap nails and cap staples complying with requirements of ASTM F1667 and fastened in accordance with Table 1507.2.8.1 shall be permitted.

TABLE 1507.2.8.1
ROOF COVERING UNDERLAYMENT ATTACHMENT

Alternate Fastener [a]	Maximum center-to-center spacing of alternate fasteners and grid lines if required center-to-center spacing of code fastener is	
	6” (152 mm) o.c.	12” (305 mm) o.c.
5/8” leg, 21 gage staple	3” (76 mm)	6” (152 mm)
21 gage staple	3” (76 mm)	7” (178 mm)
20 gage staple	4” (102 mm)	8” (203 mm)
0.080 -.083 diam. nail	4” (102 mm)	9” (229 mm)
0.090 diam. Nail 18 gage staple	5” (127 mm)	10” (254 mm)
0.105 diam. Nail (12 gage) 17 gage staple 0.120 diam. nail (11 gage)	6” (152 mm)	12” (305 mm)

a. Minimum nail shank length or staple leg length is 3/4” (19 mm) unless otherwise stated.

1507.3.3.3 High wind attachment. Underlayment applied in areas subject to high wind [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer’s installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where $V_{asd,}$ in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Sections 1507.3.3.1 and 1507.3.3.2 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

Exceptions:

1. As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.
2. As an alternative, cap nails and cap staples complying with requirements of ASTM F1667 and fastened in accordance with Table 1507.2.8.1 shall be permitted.

1507.4.5 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

Exceptions:

1. As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.
2. As an alternative, cap nails and cap staples complying with requirements of ASTM F1667 and fastened in accordance with Table 1507.2.8.1 shall be permitted.

1507.5.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exceptions:

1. As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.
2. As an alternative, cap nails and cap staples complying with requirements of ASTM F1667 and fastened in accordance with Table 1507.2.8.1 shall be permitted.

1507.6.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32- gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

Exceptions:

1. As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.
2. As an alternative, cap nails and cap staples complying with requirements of ASTM F1667 and fastened in accordance with Table 1507.2.8.1 shall be permitted.

1507.7.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.

Exceptions:

1. As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.
2. As an alternative, cap nails and cap staples complying with requirements of ASTM F1667 and fastened in accordance with Table 1507.2.8.1 shall be permitted.

1507.8.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exceptions:

1. As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.
2. As an alternative, cap nails and cap staples complying with requirements of ASTM F1667 and fastened in accordance with Table 1507.2.8.1 shall be permitted.

1507.9.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where $V_{asd,}$ in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exceptions:

1. As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.
2. As an alternative, cap nails and cap staples complying with requirements of ASTM F1667 and fastened in accordance with Table 1507.2.8.1 shall be permitted.

Reason: The fastener listed for attachment of roof covering underlayment in high-wind areas does not reflect commercially available fasteners successfully used in roofing material application. The code presently lists only one nail shank diameter, 0.105". This proposal addresses both commercially available hand-driven and power-driven cap-fasteners.

Tighter spacing of fasteners specified in the proposed table ensures that spacing of fasteners with diameters not currently specified in the Code would achieve equal (or greater) withdrawal strength than the currently listed nail diameter. Sufficient fastener withdrawal ensures that fastener shanks remain in roof deck while cap transfers uplift forces to the deck. This is a conservative approach because developing data indicates that the relevant failure mode is cap pulling through underlayment, rather than fastener shank withdrawal.

ASTM F1667-11a controls fastener nominal dimensions and tolerances as well as relevant fastener features.
Structure of proposal minimizes complexity of code requirements. An "Exception" is added to each roof covering's section. One table presents fastener spacing for all roof coverings.

Cost Impact: The code change proposal will not increase the cost of construction. The numerous options would allow contractors to select options which provide equivalent protection with minimized material and labor costs.

T1507.2.8.1(NEW)-S-KURTZ.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee believes the proposal to have merit but some corrections are needed. There are some questions as to the minimum size of the alternative cap nails. Test data should be examined and provided to the committee.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Kurtz, Executive Vice President, International Staple, Nail & Tool Association, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1507.2.8.1 High wind attachment. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section 1507.2.8 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails or staples with a nominal cap diameter of not less than 1 inch (25 mm.) Hand-driven metal caps shall have a minimum thickness of 0.030 inch (0.76 mm). Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap nail ring shank diameter shall be a minimum of 0.083 inch (2.11 mm). Cap nail smooth shank diameter shall be a minimum of 0.091 inch (2.31 mm). Staple gage shall be a minimum 21 gage. Cap fasteners shall have a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.3.3.3 High wind attachment. Underlayment applied in areas subject to high wind [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where $V_{asd,}$ in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Sections 1507.3.3.1 and 1507.3.3.2 except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails or staples with a nominal cap diameter of not less than 1 inch (25 mm.) Hand-driven metal caps shall have a minimum thickness of 0.030 inch (0.76 mm). Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap nail ring shank diameter shall be a minimum of 0.083 inch (2.11 mm). Cap nail smooth shank diameter shall be a minimum of 0.091 inch (2.31 mm). Staple gage shall be a minimum 21 gage. Cap fasteners shall have a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.4.5 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails or staples with a nominal cap diameter of not less than 1 inch (25 mm.) Hand-driven metal caps shall have a minimum thickness of 0.030 inch (0.76

mm). Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap nail ring shank diameter shall be a minimum of 0.083 inch (2.11 mm). Cap nail smooth shank diameter shall be a minimum of 0.091 inch (2.31 mm). Staple gage shall be a minimum 21 gage. Cap fasteners shall have a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.5.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails or staples with a nominal cap diameter of not less than 1 inch (25 mm.) Hand-driven metal caps shall have a minimum thickness of 0.030 inch (0.76 mm). Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap nail ring shank diameter shall be a minimum of 0.083 inch (2.11 mm). Cap nail smooth shank diameter shall be a minimum of 0.091 inch (2.31 mm). Staple gage shall be a minimum 21 gage. Cap fasteners shall have a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.6.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. ~~Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32- gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails or staples with a nominal cap diameter of not less than 1 inch (25 mm.) Hand-driven metal caps shall have a minimum thickness of 0.030 inch (0.76 mm). Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap nail ring shank diameter shall be a minimum of 0.083 inch (2.11 mm). Cap nail smooth shank diameter shall be a minimum of 0.091 inch (2.31 mm). Staple gage shall be a minimum 21 gage. Cap fasteners shall have a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.7.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails or staples with a nominal cap diameter of not less than 1 inch (25 mm.) Hand-driven metal caps shall have a minimum thickness of 0.030 inch (0.76 mm). Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap nail ring shank diameter shall be a minimum of 0.083 inch (2.11 mm). Cap nail smooth shank diameter shall be a minimum of 0.091 inch (2.31 mm). Staple gage shall be a minimum 21 gage. Cap fasteners shall have a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.8.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails or staples with a nominal cap diameter of not less than 1 inch (25 mm.) Hand-driven metal caps shall have a minimum thickness of 0.030 inch (0.76 mm). Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap nail ring shank diameter shall be a minimum of 0.083 inch (2.11 mm). Cap nail smooth shank diameter shall be a minimum of 0.091 inch (2.31 mm). Staple gage shall be a minimum 21 gage. Cap fasteners shall have a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

1507.9.3.1 Underlayment and high wind. Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.

Underlayment installed where $V_{asd,}$ in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). ~~Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.~~ Underlayment shall be attached using metal or plastic cap nails or staples with a nominal cap diameter of not less than 1 inch (25 mm.) Hand-driven metal caps shall have a minimum thickness of 0.030 inch (0.76 mm). Power-driven metal caps shall have a minimum thickness of 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). Cap nail ring shank diameter shall be a minimum of 0.083 inch (2.11 mm). Cap nail smooth shank diameter shall be a minimum of 0.091 inch (2.31 mm). Staple gage shall be a minimum 21 gage. Cap fasteners shall have a length to penetrate through the roof sheathing or a minimum of ¾ inch (19.1 mm) into the roof sheathing.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

Commenter's Reason: Purpose of Public Comment is to broaden IBC to include cap fasteners established in building construction. This means (1) cap nails with smaller nail diameters than the IBC's 0.105" nail shank diameter (down to 0.083"), and (2) cap staples (21 gage and larger.) All proposed cap fasteners have the same 1" diameter cap.

Initial S37 suggested tighter spacing of expanded cap fasteners with lower withdrawal strength than the 0.105" nail. (At the time we feared fastener shank withdrawal failures.)

A Floor Amendment proposed same spacing for all cap fasteners because testing with ASTM D 226, Type I ("15 pound felt") showed that underlayment tore before cap fasteners failed.

Subsequently, we did further testing with ASTM D 4869 Type IV underlayment ("30 pound"). That underlayment is at high end of the thickness and toughness range of code required underlayment - a "worst-case test" for the fastener.

Test results indicate that cap nails of minimum diameter 0.083" and cap staples of minimum 21 gage may be used in place of the cap nail required by the IBC. Average failure force of every additional fastener exceeded IBC fastener with D 4869 Type IV underlayment. Failure forces approximately doubled with heavier underlayment.

Based on testing, S37 has been simplified to broaden the description of cap fasteners in "Underlayment" sections for each roof covering.

Cap fastener descriptions are based on the relevant ASTM specification, ASTM F1667.

Test procedure and results accompany this proposal.

Report on Testing
July 2012

Testing was performed by Stanley Black & Decker at the request of International Staple, Nail and Tool Association (ISANTA.)

Reference Standards

State of Florida

- Testing Application Standards (TAS) published in the State of Florida Building Code, 2007 for High Velocity Hurricane Zone (HVHZ) product approval testing.
- TAS 111(B)-95, Test Procedure for Edge Metal Pull-off Performance.
- TAS 117(C)-95, Test Procedure for Dynamic Pull-off Performance of Roofing Nail Heads or Fasteners with Bearing Plates.
- TAS 117(A)-95, Test Procedure for Withdrawal Resistance Testing of Mechanical Fasteners Used in Roof System Assemblies.
- TAS 117(B)-95, test Procedure for Dynamic Pull-through Performance of Roofing Membranes over Fastener Heads or Fasteners with Metal Bearing Plates.

ASTM Standards

- D1037, Standard Test Methods for Evaluating Properties of Wood-base fiber and Particle Panel Materials, Nail head Pull-through Test.
- D4869, Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing.
- D412, Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.

Acceptance Criteria

- ICC-ES, AC188: Acceptance Criteria for Roof Underlayments. July 2007.

Materials

- Roofing paper, 30# (ASTM D 4869, Type IV)
- Sheathing material – 4-ply, 15/32-in. Southern Pine Plywood, cut in 2 by 2 in. squares
- Fasteners – Ring shank cap nails with nail shank diameters before threading of 0.083 inch and 0.105 inch. Cap staples, 18 gage and 21 gage.
- Caps – 1 inch diameter plastic caps

Method

The test method was designed to facilitate one of three potential failure modes: cap failure, fastener withdrawal, or cap pulling through underlayment. A 14x14-in. sheet of underlayment was cut from the roll. The cap-fastener was driven through the center of the underlayment sheet into a 2x2-in. block of sheathing material. The assembled test specimen was turned over so that the sheathing block was visible and the fastener head was down. The assembled specimen was secured in the test fixture base with the fastener centered below sheathing block clamping fixture. The sheathing block was clamped by the fixture attached to the traversing head of the test machine. The test specimen was loaded at constant displacement of 1 in./min. until failure. Load and displacement were monitored continuously during the test. Failure mode was observed and peak force was recorded as the failure load. Photographs provided.

Discussion

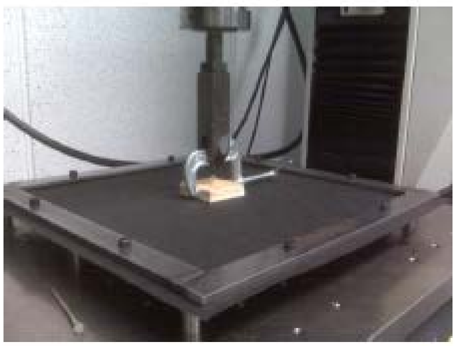
The test is intended to evaluate the functionality of the ISANTA proposal for adding additional commercially available cap fasteners for use on same spacing as IBC's 0.105" cap nail with a plastic or metal 1" diameter cap (as specified.) The underlayment is not wind qualified. However, AC188 evaluation includes a requirement for tensile strength by using one of three ASTM standards, for example, ASTM D412. The AC does not include a punch-through or pull-through evaluation. The minimum tensile strength criterion of AC188 is 20 lbf/in-width. The 20 lbf/in-width is a valuable benchmark in that it could also be used to assess the potential uplift resistance of the underlayment because that is controlled by tensile strength.

Tensile strength also appears to be a predictor of pull-through performance. The 1-in. caps generally pulled through the underlayment at approximately 32 lb. Some nonlinear behavior occurs at the start of the loading process, then the load-deflection diagram becomes linear, and as the load approaches the maximum a minor plastic region develops that reflects fiber separation and cap yielding. This was generally characteristic for all cap-fasteners.

Conclusions

From the testing and review of test standards and acceptance criteria, we can conclude that the underlayment minimum tensile strength is the controlling strength property of the system and it can be used as a reasonable approximation of the potential holding capacity of the cap-fasteners based on the cap diameter. Engineering analysis of the negative pressures on roof surfaces should provide reasonable estimates of expected forces that will be resisted by fasteners and can be used to establish fastening schedules that reflect the fastener holding capacity (pull-through or withdrawal) and tensile strength of the underlayment when loaded as a membrane between fasteners.

Test machine fixtures for the pull-through test.



Pull-through test in progress; (left) early in test; (right) nearing failure.

Metal cap with roofing nail fastener after the pull-through test. Observe the permanent deformation of the metal cap and the pull-through tears in the underlayment.

Results of Cap Fastener Testing with ASTM D 4869, Type IV Underlayment

Cap Fastener [1]	Failure Load (pounds)	Number of Failures, by Failure Mode		
		Fastener Withdrawal	Cap Failure	Under-layment Tear
<u>"Code" Nail</u> 2012 IBC Cap Nail 0.105" nail diameter ring shank nail	31.8	1	7	8
0.083" nail diameter ring shank nail	32.4	0	4	2
21 Gage staple	36.2	0	0	5
18 Gage staple	32.1	0	2	9

[1] All cap fasteners had plastic caps meeting IBC requirements.

S37-12

Final Action: AS AM AMPC____ D

S51-12

202 (New), 1509 (New), 1509.1 (New), 1509.2 (New), 1509.3 (New), Chapter 35 (New)

Proposed Change as Submitted

Proponent: Ken Sagan, NRG Code Advocates, representing Reflective Insulation Mfg. Assoc. International (ken@nrgcodeadvocates.com)

THIS CODE CHANGE PROPOSAL IS ON THE AGENDA OF THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTEE. SEE THE HEARING ORDER FOR THE IBC FIRE SAFETY CODE DEVELOMPENT COMMITTEE.

Add new text as follows:

SECTION 202
DEFINITIONS

RADIANT BARRIER. A material having a low emittance surface (0.1 or less) and where installed in building assemblies, the low emittance surface shall face a ventilated or unventilated air space.

Add new text as follows:

SECTION 1509
RADIANT BARRIER-ABOVE DECK

1509.1 General. The use of above-deck radiant barriers shall be permitted provided that the radiant barrier is covered with an *approved* roof covering and passes the tests of FM 4450 or UL 1256 when tested as an assembly.

1509.2 Radiant barrier. Installed above-deck shall have a continuous 0.5 inch (minimum) air space on the low emittance side of the product.

1509.3 Material standards, Above-deck radiant barrier shall comply with ASTM C1313/1313M

Add new standard to Chapter 35 as follows:

ASTM

C1313/C1313M-10 Standard Specification for Sheet Radiant Barriers for Building Construction Applications

Reason: There is a common misunderstanding in the market that some radiant barrier products installed above-deck, typically between the deck and the felt, provide some level of thermal benefit. This is not the case and this proposal intends to clarify the air gap requirements for above-deck radiant barriers.

References:
ASTM C1313/C1313M-10 Standard Specification for Sheet Radiant Barriers for Building Construction Applications

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1509-S-SAGAN

Public Hearing Results

This code change was heard by the IBC Fire Safety code development committee.

Note: For staff analysis of the content of ASTM C 1313 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: Disapproved

Committee Reason: The committee felt that the proposal needed too many modifications; the proponent wants to substitute an updated version of the standard, modification of the definition of "radiant barrier" is suggested to be consistent with industry standards and clarification of the radiant barrier airspace as being minimum or maximum in necessary.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Marcelo M Hirschler, GBH International, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Section 202 - Definitions

RADIANT BARRIER. A material having a low emittance surface of ~~(~~0.1 or less~~)~~ ~~and when~~ installed in building assemblies~~, the low emittance surface shall face a ventilated or unventilated air space~~.

SECTION 1509
RADIANT BARRIER-ABOVE DECK

1509.1 General. ~~The use of above-deck radiant barriers shall be permitted provided that the radiant barrier is covered with an *approved* roof covering and passes the tests of FM 4450 or UL 1256 when tested as an assembly.~~ <u>A radiant barrier installed above a deck shall comply with Sections 1509.2 through 1509.4.</u>

~~**1509.2 Radiant barrier.** Installed above-deck shall have a continuous 0.5 inch (minimum) air space on the low emittance side of the product.~~

<u>**1509.2 Fire Testing.** Radiant barriers shall be permitted for use above decks where the radiant barrier is covered with an *approved* roof covering and the system consisting of the radiant barrier and the roof covering complies with the requirements of either FM 4550 or UL 1256.</u>

~~**1509.3 Material standards,** Above-deck radiant barrier shall comply with ASTM C1313/1313M.~~

<u>**1509.3 Installation.** The low emittance surface of the radiant barrier shall face the continuous air space between the radiant barrier and the roof covering.</u>

<u>**1509.4 Material standards.** A radiant barrier installed above a deck shall comply with ASTM C1313/C1313M.</u>

Add new standard to Chapter 35 as follows:

ASTM

C1313/C1313M-~~10~~ <u>12</u> Standard Specification for Sheet Radiant Barriers for Building Construction Applications

Commenter's Reason: A key issue that needs to be addressed in the new proposed section 1509, and that was unclear in the original proposal, was how the fire testing of the system is to be done. The comment clarifies that the testing must be done using the combination of the radiant barrier <u>**and**</u> the approved roof covering and that the system needs to pass the fire test.

The new text is necessary because there are differences between a reflective insulation and a radiant barrier, even if there are many similarities and the fire testing is similar. For example, one difference is that a radiant barrier often does not provide thermal insulation. ASTM has issued separate specifications for radiant barriers used in buildings (ASTM C1313, Standard Specification for

Sheet Radiant Barriers for Building Construction Applications) and for reflective insulations used in buildings (ASTM C1224, Standard Specification for Reflective Insulation for Building Applications).

The original proposal also contained a definition that was incorrect in that it did not just explain what a radiant barrier is but it also told users how to install products, which it should not do.

The public comment also includes the reference standard specification and includes the updated edition, without the non-mandatory language identified by the ICC standards committee. The abstract of the ASTM C1313 specification reads as follows. “This specification covers the general physical property requirements of radiant barrier materials for use in building construction. The scope is specifically limited to requirements for radiant barrier sheet materials that consist of at least one surface, such as metallic foils or metallic deposits mounted or unmounted on substrates. Sheet radiant barrier materials shall consist of low emittance surface(s) that may be in combination with any substrates and adhesives required to meet the specified physical material properties. The following test methods shall be performed: surface emittance; water vapor transmission; surface burning characteristics; corrosivity; tear resistance; and adhesive performance.”

There is a companion proposal, FS199, dealing with a radiant barrier section in Chapter 26, and it proposes the same definition as this one. The proposals can be handled independently and are not a function of each other.

Public Comment 2:

Vickie Lovell, InterCode Incorporated, representing Reflective Insulation Manufacturers Association International, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

SECTION 202
DEFINITIONS

RADIANT BARRIER. A material having a low emittance surface of 0.1 or less installed in building assemblies.

SECTION 1509 RADIANT BARRIERS INSTALLED ABOVE DECK

1509.1 General. A Radiant barrier installed above a deck shall comply with Sections 1509.2 through 1509.4.

1509.2 Fire Testing. Radiant barriers shall be permitted for use above decks where the radiant barrier is covered with an *approved* roof covering and the system consisting of the radiant barrier and the roof covering complies with the requirements of either FM 4550 or UL 1256.

1509.3 Installation. The low emittance surface of the radiant barrier shall face the continuous air space between the radiant barrier and the roof covering.

1509.4 Material standards. A Radiant barrier installed above a deck shall comply with ASTM C1313/1313M.

Add new standard to Chapter 35 as follows:

ASTM

C1313/C1313M-12 Standard Specification for Sheet Radiant Barriers for Building Construction Applications

Reason: Both the original proposal and this public comment intend to codify the correct fire testing requirements, proper installation, and the appropriate ASTM material standard for a radiant barrier installed above a roof deck. The proposed definition is derived from the definition for radiant barrier in ASTM C1313.

The new section as proposed in this public comment is necessary. Although, there are many inherent similarities including similar fire testing, there are significant differences between reflective insulation and radiant barriers that warrant this additional language to the code. A key issue that was addressed in the new proposed section 1509, and that was unclear in the original proposal, was how the fire testing of the system was to be done. This public comment clarifies that the testing must be done using the combination of the radiant barrier **and** the approved roof covering and that the system needs to pass the fire test.

There is a common assumption that some radiant barrier products installed above-deck, typically between the deck and the felt, provide some level of thermal benefit. This is not the case. ASTM has issued separate specifications for radiant barriers used in buildings (ASTM C1313, Standard Specification for Sheet Radiant Barriers for Building Construction Applications) and for reflective insulations used in buildings (ASTM C1224, Standard Specification for Reflective Insulation for Building Applications).

The abstract of the ASTM C1313 specification for radiant barriers reads as follows. “This specification covers the general physical property requirements of radiant barrier materials for use in building construction. The scope is specifically limited to requirements for radiant barrier sheet materials that consist of at least one surface, such as metallic foils or metallic deposits mounted or unmounted on substrates. Sheet radiant barrier materials shall consist of low emittance surface(s) that may be in combination with any substrates and adhesives required to meet the specified physical material properties. The following test methods shall be performed: surface emittance; water vapor transmission; surface burning characteristics; corrosivity; tear resistance; and adhesive performance.”

At the time the originals proposals were due, the most recent edition of ASTM C1313 was not yet published. It is available now, and a live link to the read-only file has been provided by ASTM. The link is www.astm.org/

C1313. The 2012 revisions to the 2010 edition were to remove the permissive language with no other significant technical changes.

References:
ASTM C1313/C1313M "Standard Specification for Sheet Radiant Barriers for Building Construction Applications"

S51-12
Final Action: AS AM AMPC____ D

S53-12
1509.7.1

Proposed Change as Submitted

Proponent: Christine Covington, Solar Energy Industries Association

Revise as follows:

1509.7.1 ~~Wind resistance~~ Structural loads. Rooftop mounted photovoltaic systems shall be ~~designed for wind loads for component and cladding~~ capable of resisting applicable structural loads in accordance with Chapter 16 ~~using an effective wind area based on the dimensions of a single unit frame~~.

Reason: Rooftop PV systems may be subjected to structural loads other than wind. Seismic and snow loads may also be applicable and should be evaluated as part of the design.

IBC Chapter 16 addresses design loads with reference to ASCE 7. Chapter 16 and ASCE 7 include requirements for combinations of loads. Wind requirements are the subject of Chapters 26-31 of ASCE 7-10, which include multiple methods of determining wind loads. Components and cladding methods are appropriate for some rooftop PV systems, but not all. For example, some tall rooftop systems experience wind behavior appropriate to the Main Wind Force Resisting System, and some systems held close to the roof surface have been studied using Wind Tunnel testing. These approved wind load evaluation methods appear to be prohibited by the current language without justification.

Cost Impact: The code change proposal will increase the cost of construction.

1509.7.1-S-COVINGTON

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt the current wording is necessary, while the proposed revision would remove the specific reference to wind load requirements.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Joseph H. Cain, P.E. SolarCity Corporation, representing self, and John Smirnow, representing Solar Energy Industries Association (SEIA), request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1509.7.1 Structural loads. Rooftop mounted photovoltaic panel systems shall be ~~capable of resisting applicable structural loads~~ designed for wind loads for components and cladding in accordance with Chapter 16 using an effective wind area in accordance with Chapter 16 and ASCE 7 Section 26.2.

Commenter's Reason: The term "photovoltaic panel systems" is used, consistent with the new definition approved in S5-12.

The term "components and cladding" is used, consistent with usage in ASCE 7.

The proposed public comment modification to Section 1509.7.1 is intended to correct a significant error in the 2012 IBC. The requirement "using an effective wind area based on the dimensions of a single unit frame" is in conflict with the definition of Effective Wind Area in ASCE 7-10.

Effective Wind Area (EWA) is defined in ASCE 7-10 Section 26.2:

EFFECTIVE WIND AREA, *A*: The area used to determine *(GCp).* For component and cladding elements, the effective wind area in Figs. 30.4-1 through 30.4-7, 30.5-1, 30.6-1, and 30.8-1 through 30.8-3 is the span length multiplied by an effective width that need not be less than one-third the span length. For cladding fasteners, the effective wind area shall not be greater than the area that is tributary to an individual fastener.

The Structural Engineers Association of California (SEAOC) Solar Photovoltaic Systems Committee recently published a white paper titled *Wind Loads on Low-Profile Solar Photovoltaic Systems on Flat Roofs.* This paper will be presented at the SEAOC Annual Convention on September 14, 2012. The Solar Photovoltaic Systems Committee carefully considered Effective Wind Area for solar photovoltaic systems, with specific consideration of 2012 IBC Section 1509.7.1. The Committee chose to publish extensive commentary on Effective Wind Area in Section 5 of the white paper. Full text of Section 5 is provided below. It is important to note the final paragraph of the Commentary.

"The requirements and commentary above differ from the provision of IBC 2012 (14) Section 1509.7.1 that states, 'Rooftop mounted photovoltaic systems shall be designed … using an effective wind area based on the dimensions of a single unit frame.' It is the consensus opinion of the SEAOC Solar Photovoltaic Systems Committee that this provision is not appropriate for many types of systems and parts of solar arrays. The provision can be un-conservative for a fastener with tributary area less than a 'single unit frame' and is overly conservative for elements of a solar array, such as main supports or members that have a tributary area of several solar modules. The provision may also be overly conservative if applied to a framing member of a building supporting multiple attachments from a solar array."

5. Effective Wind Area

The following is proposed code language to amend ASCE 7-10 Section 26.2 (ASCE 7-05 Section 6.2) by adding the definition of effective wind area for roof mounted solar arrays.

EFFECTIVE WIND AREA, A for solar arrays: The area used to determine GC_m per Figure 29.9-1 is equal to the tributary area for the structural element being considered, except that the width of the effective wind area need not be less than one-third its length. For a fastener attaching solar modules, the effective wind area shall not be greater than the area tributary to the individual fastener.

The SEAOC Solar Photovoltaic Systems Committee chose to include the following commentary. In the last paragraph of the commentary, the Committee specifically mentioned consensus opinion that differs from 2012 IBC Section 1509.7.1.

Commentary:

The definition of effective wind area for solar arrays is similar to that for components and cladding. As with components and cladding, the width of the effective wind area need not be less than one-third its length (which is typically equal to the span of the framing element being considered). The induced wind pressure is calculated per Figure 29.9-1 using this effective wind area, and the wind pressure is then applied over the actual area tributary to the element.

Effective wind area is equal to tributary area except in cases where the exception is invoked that the width of the effective wind area need not be less than one-third its length. In such cases the effective wind area will be larger than the tributary area.

The use of effective wind area in wind design is based on the phenomenon that the highest wind pressures come from instantaneous gust effects that are concentrated on small areas. Larger areas have lower design pressure because wind pressures over the entire area do not peak at the same time (13). The concentrated pressures from gusts tend to be circular or elliptical in shape and are very unlikely to occur in an elongated shape directly over the span of a long framing member. Thus if the tributary area of a member is more elongated than a 3:1 ratio of length to width, the effective wind area can be increased to that corresponding to a width equal to 1/3 the length of the effective wind area. Further discussion is provided in Section 9.2.3 of (13).

Tributary area for a spanning structural member of a solar array depends on the span length of that member times the perpendicular distances to adjacent parallel members. For a support point or fastener, tributary area depends on the span of members framing into that support point.

Tributary area (and effective wind area) can depend on the characteristics of the solar array support system and the load path. For a roof bearing system having different load paths for upward, downward, and lateral forces, the appropriate effective wind area for each direction of forces is used.

If the support system for the solar array has adequate strength and interconnectedness to span across a support or ballast point that is subject to yielding or uplift, the tributary area (and effective wind area) can be correspondingly increased, provided that strengths are not governed by brittle failure and that the deformation of the array is evaluated and does not result in adverse performance.

The requirements and commentary above differ from the provision of IBC 2012 (14) Section 1509.7.1 that states, "Rooftop mounted photovoltaic systems shall be designed … using an effective wind area based on the dimensions of a single unit frame." It is the consensus opinion of the SEAOC Solar Photovoltaic Systems Committee that this provision is not appropriate for many types of systems and parts of solar arrays. The provision can be un-conservative for a fastener with tributary area less than a "single unit frame" and is overly conservative for elements of a solar array, such as main supports or members that have a tributary area of several solar modules. The provision may also be overly conservative if applied to a framing member of a building supporting multiple attachments from a solar array.

EFFECTIVE WIND AREA, *A*: The area used to determine (GC_p). For component and cladding elements, the effective wind area in Figs. 30.4-1 through 30.4-7, 30.5-1. 30.6-1, and 30.8-1 through 30.8-3 is the span length multiplied by an effective width that need not be less than one-third the span length. For cladding fasteners, the effective wind area shall not be greater than the area that is tributary to an individual fastener.

S53-12

Final Action: AS AM AMPC____ D

S60-12
1510.1

Proposed Change as Submitted

Proponent: Mark S. Graham, National Roofing Contractors Association (mgraham@nrca.net)

Revise as follows:

1510.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15.

Exceptions:

1. Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide positive roof drainage.
2. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1503.4 for roofs that provide for positive roof drainage.

Reason: IBC 2006 and subsequent editions include a requirement in Section 1503.4-Roof Drainage that for roof drainage systems with roof drains or scuppers, secondary (emergency overflow) drains or scuppers also be provided in the event the primary roof drainage system becomes clogged.

Section 1510-Reroofing requires all materials and methods used in recovering or replacing an existing roof covering comply with the requirements of Chapter 15 (except the minimum roof slope requirement of ¼:12 can be waived for roofs that provide "…positive roof drainage."). This can be interpreted to require the secondary (emergency overflow) drains and scupper provision also apply in reroofing. Since many existing buildings were designed and constructed before the code included a secondary drainage requirement, the secondary drainage provision being applicable in reroofing and the need for adding secondary drains in exsiting buildings during reroofing can be a very costly and disruptive undertaking for owners and occupants.

This proposed code change adds an exception in Section 1510-Reroofing that waives the secondary drainage provision when reroofing existing buildings when the roof drains properly, that being hat provide for positive roof drainage. The term "positive roof drainage' is already defined in Section 202.

Cost Impact: The code change proposal will not increase the cost of construction.

1510.1-S-GRAHAM

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1510.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15.

Exceptions:

1. Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide positive roof drainage.
2. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1503.4 for roofs that provide for positive roof drainage and are not required to have secondary drains or scuppers.

Committee Reason: This code change adds an exception that recognizes in existing buildings without these drains, they would be difficult to add when reroofing. The modification addresses an unintended consequence of roofs with secondary drainage using the exception to eliminate the required drains.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Cole Graveen, Raths, Raths & Johnson, Inc., representing self, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1510.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15.

Exceptions:

1. Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide positive roof drainage.
2. For roofs that provide positive roof drainage, ~~R~~recovering or replacing an existing roof covering shall not ~~be required to meet the requirement for~~ require the secondary (emergency overflow) drains or scuppers ~~in~~ of Section 1503.4 to be added to the existing roof. ~~for roofs that provide positive roof drainage and are not required to have secondary drains or scuppers.~~

Commenter's Reason: The wording of the proposed change, as modified by the Committee is not clear. The wording proposed in this public comment is more concise and better reflects the intent of both the original change and the committee's modification. The intent of this public comment is not to change the meaning of either the original change or the committee's modification, but only to make the wording more clear.

Public Comment 2:

Jonathan Siu representing City of Seattle Dept of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1510.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15.

Exceptions:

1. Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide positive roof drainage.
2. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1503.4 for roofs that provide for positive roof drainage~~ and are not required to have secondary drains or scuppers~~. For the purposes of this exception, existing secondary drainage or scupper systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or scuppers designed and installed in accordance with Section 1503.4.

Commenter's Reason: The intent of the original proposal was to provide an exception to make sure secondary roof drains would not required to be installed if the only extent of the work was to re-cover or replace the existing roof covering. The Report of Hearings states the Structural Committee's reason for modifying the proposal was that it didn't want to give the false impression that existing secondary roof drains could be removed. However, as actually modified by the Committee, this exception is only allowed to apply where the secondary drains are not required. This modification essentially makes the exception useless—very few building owners would install secondary drainage if it is not required, and if the secondary drainage is required, the exception no longer applies, so the owner has to install the secondary drains. This goes against the whole intent of the original proposal.

The proposed modification in this public comment is intended to preserve the original intent of the proposal, but clarifies this exception cannot be used to remove a required, existing secondary drainage system, unless it is replaced by a code-compliant system.

S60-12

Final Action: AS AM AMPC____ D

S61-12
1510.2

Proposed Change as Submitted

Proponent: Michael D. Fischer, Kellen Company, representing Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

Revise as follows:

1510.2 Structural and construction loads. Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system. <u>Existing structural assemblies shall comply with the requirements of Section 3404.</u>

Reason: Chapter 34 provides good guidance to the designer regarding the types of conditions that should be evaluated during alterations. This proposal provides a necessary reference for the purposes of linking those requirements.

Cost Impact: The code change proposal will not increase the cost of construction.

1510.2-S-FISCHER

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee believes the existing wording is clear. The proposed reference to Section 3404 is not specific and would be confusing.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael D. Fischer, Kellen Company, representing Asphalt Roofing Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1510.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 <u>and Section 3404</u>.

> **Exception:** Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide positive roof drainage.

1510.2 Structural and construction loads. Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system. ~~Existing structural assemblies shall comply with the requirements of Section 3404.~~

Commenter's Reason: This proposal was submitted as part of a package. The proponent requested disapproval of the proposal due to concerns with other technical issues. The intent of this proposal is to make it clear that roof recovering or replacement shall meet the applicable requirements for alterations in Section 3404.

S61-12

Final Action: AS AM AMPC____ D

S62-12
1510.3 (New), 1510.4

<u>Proposed Change as Submitted</u>

Proponent: Michael D. Fischer, Kellen Company, representing Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

Revise as follows:

<u>**1510.3 Roof replacement.** Roof replacement shall include the removal of all existing layers of roof coverings down to the roof deck.</u>

<u>**Exceptions:**</u>

1. <u>Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.</u>
2. <u>Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs where applied in accordance with Section 1510.4.</u>
3. <u>The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.</u>
4. <u>Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.</u>
5. <u>Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.</u>
6. <u>Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.</u>
7. <u>Where the existing roof has two or more applications of any type of roof covering.</u>

~~1510.3~~ <u>1510.4</u> ~~Recovering versus replacement~~ <u>Roof recovering</u>. ~~New roof coverings shall not be installed without first removing all existing layers of roof coverings down to the roof deck~~ <u>Roof recovering shall be prohibited</u> where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.

Exceptions:

1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
2. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1510.4.
3. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.
4. Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and

covered with an additional layer of ice barrier membrane in accordance with Section 1507.

Reason: The current text is confusing and contains directions on what NOT to do regarding roof recovering. The proposal reorganizes the text without making any technical changes in order to add clarity to the code. The revisions provide clear distinction between roof replacement and roof recovering

Cost Impact: The code change proposal will not increase the cost of construction.

1510.3 (NEW)-S-FISCHER

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed text is not clear and contains errors. The proponent requested disapproval, recognizing there was too much to fix with a floor modification.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael D. Fischer, Kellen company, representing Asphalt Roofing Manufacturers Association, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

~~**1510.3 Recovering versus replacement.** New roof coverings shall not be installed without first removing all existing layers of roof coverings down to the roof deck where any of the following conditions occur:~~

1. ~~Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.~~
2. ~~Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.~~
3. ~~Where the existing roof has two or more applications of any type of roof covering.~~

~~**Exceptions:**~~

1. ~~Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.~~
2. ~~Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1510.4.~~
3. ~~The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.~~
4. ~~Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.~~

1510.3 Roof replacement. Roof replacement shall include the removal of all existing layers of roof coverings down to the roof deck.

Exception: Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.

1510.3.1 Roof recover. The installation of a new roof covering over an existing roof covering shall be permitted where any of the following conditions occur:

1. Where the new roof covering is installed in accordance with the roof covering manufacturers approved installation instructions.

2. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
3. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1510.4.
4. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.

1510.3.1.1 A *roof recover* shall not be permitted where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.

Commenter's Reason: This proposal was submitted as part of a package. The proponent requested disapproval of the proposal due to a scoping error and other technical issues. The intent of this proposal is to clarify the requirements for roof recover and roof replacement. In the new Section 1510.3, the requirements for roof replacement (and the exception for ice barrier membranes) remain intact. The new Section 1510.3.1 provides a much clearer path to identify those conditions where recover is permitted by the code. The current provisions for roof recover remain intact, except for two technical changes:
1. The current code contains a conflict related to the covering of wood shakes. The public comment provides a remedy by eliminating the prohibition contained in the source text for the new 1510.3.1.1, which is in conflict the application in accordance with Section 1510.4.
2. The code lists several prescriptive options for recover, but does not specifically provide for other conditions where products have been evaluated for recover applications. The modified proposal includes that option, but requires installation in accordance with the manufacturer's instructions.

S62-12

Final Action: AS AM AMPC____ D

S64-12
1510.7 (New)

Proposed Change as Submitted

Proponent: Al Godwin, CBO, CPM, representing Aon Fire Protection Engineering **(**al.godwin@aon.com)

Add new text as follows:

1510.7 Construction of sloped roof over flat roof. Construction of a new roof over an existing roof, in a manner that creates an attic or concealed space shall require the removal of any existing roofing material composed of tar, asphalt or roof insulation not designed for interior use from the newly created interior space.

Reason: It is not uncommon for building owners to convert a flat roof to a sloped roof. When doing so, the former roofing material should be removed from the newly created interior space.

Cost Impact: This code change proposal will increase the cost of construction.

1510.7 (NEW)-S-GODWIN

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This code change addresses new roof construction under the reroofing provisions and it is poorly structured.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Al Godwin, CBO, CPM, representing Aon Fire Protection Engineering Corporation, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1505.9 Enclosure of an existing roof. Construction of a new roof structure over an existing roof, in a manner that creates an attic or concealed space, shall require the removal of any formerly exposed roofing material composed of tar, asphalt or above roof deck insulation. This provision shall not apply to reroofing in accordance with Section 1510.

Commenter's Reason: Based on the Committee's recommendation, this modification moves the provision to Section 1505.9. It was difficult to find an appropriate section. Since photovoltaic systems appear under Section 1505, it seemed a good place for this provision. The provision has been reworded to not include minor air spaces that might occur under the reroofing process but to only include new structural construction.

S64-12
Final Action: AS AM AMPC____ D

S65-12

1511.1.1

Proposed Change as Submitted

THIS CODE CHANGE WILL BE HEARD BY THE IBC GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Proponent: Maureen Traxler, City of Seattle Department of Planning & Development (Maureen.traxler@seattle.gov); Thomas Meyers, City of Central, CO, representing self

Delete without substitution:

~~**1511.1.1 Structural fire resistance.** The structural frame and roof construction supporting the load imposed upon the roof by the photovoltaic panels/modules shall comply with the requirements of Table 601~~.

Reason:
(Traxler) This section is not needed because Table 601 will apply regardless of this section. In addition, the terminology used is not consistent with the terms used in Table 601, creating confusion about whether the "structural frame…supporting the load imposed upon the roof" is different than the primary structural frame and secondary members referenced in Table 601. If they are different, then Table 601 doesn't have any applicable requirements. If they are the same, the section isn't necessary because compliance with Table 601 is already required by Chapter 6.
(Meyers) This new section was added as part of a comprehensive code change submitted to the IFC and ultimately approved as modified by public comment at the Dallas Final Action Hearings. The new subsection 1511.1.1 has generated considerable confusion. It has been interpreted to require any of the stand-off rack frame used to mount solar panels to the roof to be fire resistance rated consistent with the Type of Construction used by the building. In the case of I-A construction, this interpretation would require the typical aluminum square tube "column" supports to exhibit 3 hour fire endurance. This is extremely excessive and very difficult to achieve in an exposed, exterior application.

It appears that the intent may have been to ensure that the underlying supporting roof structure be provided with the fire performance prescribed by Chapter 6 when supporting any loads imposed by the solar panel array system that includes the racking system. The code already ensures that in Chapter 6. Therefore, this section is completely redundant. As such, it should be eliminated to avoid confusion.

Cost Impact: The code change proposal will not increase the cost of construction.

1511.1.1-S-TRAXLER.doc

Public Hearing Results

This code change was heard by the IBC General code development committee.

Committee Action: **Disapproved**

Committee Reason: The committee did agree with the intent that the photovoltaics were not considered part of the structure but there was concern with the deletion of the section in its entirety. Without this section the potential loading on the roof would not be properly addressed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Thomas Meyers and Stephen Thomas, Colorado Code Consulting, LLC representing the Colorado Chapter of ICC, requests Approval as Submitted.

Commenter's Reason: During the public hearing, come opponents indicated that they believed this section's intent is to direct the user to Table 601, Footnote A. Regardless of the interpretation of Table 601 Footnote A, the language used in this section is very confusing. As currently stated, it implies that the typical aluminum structural framework of a rack-mount PV system would have to be 1, 2, or 3 hour fire resistance rated depending upon the building's construction. This would be onerous, if not completely infeasible.

The committee indicated that it was not their intent to fire protect these elements. They were only interested in providing a reference to T601. T601 Footnote A exists without the cross reference provided at 1511. Deletion of this section by approving this public comment would still permit the enforcement of T601 without the unintentional added confusion created by the existing language.

Public Comment 2:

Thomas Meyers and Stephen Thomas, Colorado Code Consulting, LLC representing the Colorado Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**1511.1.1**~~ <u>**1509.9**</u> **Structural fire resistance**. The structural frame and roof construction supporting ~~the load~~ imposed <u>loads</u> upon the roof by ~~the photovoltaic panels/modules~~ <u>any rooftop structure</u> shall comply with the requirements of Table 601. <u>The fire resistance reduction permitted by Table 601, Footnote a shall not apply to roofs containing rooftop structures.</u>

Reason: During the public hearing, some opponents indicated that they believed this section's intent is to direct the user to Table 601, Footnote A. Should this cross reference be necessary, this proposal would apply the requirement to ALL rooftop structures. This eliminates the current discriminatory condition where only solar PV is addressed. This clarity modification is provided as an alternative to our other public comment that would approved as submitted the original proposal to delete this confusing language altogether.

Public Comment 3:

Steven Pfeiffer, City of Seattle, representing Department of Planning & Development, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1511.1.1 Structural fire resistance. The structural frame and roof construction supporting the load imposed upon the roof by the photovoltaic panels/modules shall comply with the requirements of Table 601.

> <u>**Exception:** The portions of the structure above the roof supporting only the panels/modules need not comply with the requirements of Table 601.</u>

Commenter's Reason: The committee agreed that the photovoltaic panels and modules were not considered part of the structure but there was concern with the deletion of the section in its entirety. The roof, as regulated by Table 601, protects the building from any hazard presented by the photovoltaic equipment. The photovoltaic panels and their supports are not the roof structure.

S65-12

Final Action: AS AM AMPC____ D

S69-12
1603.1.3

Proposed Change as Submitted

Proponent: Edwin Huston, National Council of Structural Engineers Association (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee (huston@smithustoninc.com)

Revise as follows:

1603.1.3 Roof snow load data. The ground snow load, P_g, shall be indicated. In areas where the ground snow load, P_g, exceeds 10 pounds per square foot (psf) (0.479 kN/m2), the following additional information shall also be provided, regardless of whether snow loads govern the design of the roof:

1. Flat-roof snow load, P_f.
2. Snow exposure factor, C_e.
3. Snow load importance factor, *I*.
4. Thermal factor, C_t.
5. Drift surcharge load, p_d, where the sum of p_d and P_f exceeds 20 pounds per square foot (psf).
6. Width of snow drift, *w.*

Reason: The addition of loading information and design assumptions to drawings has been valuable to owners and the engineers who are tasked with re-evaluating existing structures. This additional requirement of snow drift design information supplements the information already required and indicates how the registered design professional interpreted the design codes relative to snow drift intensity and width.

Cost Impact: The code change proposal will not increase the cost of construction.

1603.1.3-S-HUSTON

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1603.1.3 Roof snow load data. The ground snow load, P_g, shall be indicated. In areas where the ground snow load, P_g, exceeds 10 pounds per square foot (psf) (0.479 kN/m2), the following additional information shall also be provided, regardless of whether snow loads govern the design of the roof:

1. Flat-roof snow load, P_f.
2. Snow exposure factor, C_e.
3. Snow load importance factor, *I*.
4. Thermal factor, C_t.
5. Drift surcharge load(s), p_d, where the sum of p_d and P_f exceeds 20 pounds per square foot (psf).
6. Width of snow drift(s), *w.*

Committee Reason: The committee agreed that the drift load and the width of snow drift are important to have on the plans. The increased transparency it affords makes it easier on the plans examiner. It also is beneficial for alterations to existing buildings. The modification is a clarification that recognizes there can be multiple drifts in some cases.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Daniel J. Walker, P.E., Thomas Associates, Inc., representing Metal Building Manufacturers Association, requests Disapproval.

Commenter's Reason: The concept of placing key design load criteria on construction documents has merit, but this proposal that would include snow drift information is excessive due to the complexity of conveying this information for a roof with reentrant corners, multiple steps, parapets, rooftop equipment, etc. All of the other design data that the code requires to be included on the construction documents is a single value or list of values. Snow drift surcharge and the width of snow drifts could involve information that would have to be conveyed with many diagrams that would be more appropriate for engineering calculations than construction documents. It would probably lead to more questions and confusion than a source of valuable information.

S69-12
Final Action: AS AM AMPC____ D

S71-12
1603.1.7

Proposed Change as Submitted

Proponent: John Ingargiola and Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (john.ingargiola@dhs.gov) (gregory.p.wilson@dhs.gov), Rebecca C. Quinn, RCQuinn Consulting, Inc., representing Department of Homeland Security, Federal Emergency Management Agency (rcquinn@earthlink.net)

Revise as follows:

1603.1.7 Flood design data. For buildings located in whole or in part in *flood hazard areas* as established in Section 1612.3, the documentation pertaining to design, if required in Section 1612.5, shall be included and the following information, referenced to the datum on the community's Flood Insurance Rate Map (FIRM), shall be shown, regardless of whether flood loads govern the design of the building:

1. *Risk Category* assigned according to ASCE 24.
~~1.~~ 2. In *flood hazard areas* not subject to high-velocity wave action, the elevation of the proposed lowest floor, including the basement.
~~2.~~3. In *flood hazard areas* not subject to high-velocity wave action, the elevation to which any nonresidential building will be dry flood proofed.
~~3.~~ 4. In *flood hazard areas* subject to high-velocity wave action, the proposed elevation of the bottom of the lowest horizontal structural member of the lowest floor, including the basement.

Reason: The current edition of ASCE 24 uses the assigned occupancy/structure category primarily to determine elevation of buildings above the design flood elevation, in keeping with the general approach that more important buildings be designed for less frequent environmental loads. The next edition of ASCE 24 will include the Risk Category table from ASCE 7-10. The ASCE committee recognized that ASCE 7-10 eliminated the lists of buildings for each category and determined it important to ensure that the assignment of risk category be guided by definitions that are specifically developed to ensure that buildings in flood hazard areas are appropriately protected. Therefore, the next edition of ASCE 24 requires the user to reevaluate and possibly reassign a risk category specifically for the purpose of flood loads and flood resistant construction requirements.

ASCE began the process of updating ASCE 24-05 in early 2011 and the next edition is expected to be published late 2012 or early 2013. The ASCE committee expects to have the near-final draft prepared and available at least a month before the Group A hearings and copies will be provided to the ICC committee.

Cost Impact: The code change proposal will not increase the cost of construction. The definitions of each risk category that will be in the revised ASCE 24 and used only for the purpose of assigning risk category for flood-resistant design essentially retain the descriptions from the 2012 IBC Table 1604.5 of which buildings fall into each of the risk categories.

Analysis: Will the proposal introduce a conflict with Section 1604.5?

1603.1.7-S-INGARGIOLA-WILSON-QUINN.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There was concern with having to consult an additional table in a standard for a risk category for flood purposes. Consideration should be given to identifying it as a flood risk category.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Ingargiola, Gregory Wilson representing Department of Homeland Security, Federal Emergency Management Agency, Rebecca Quinn, RCQuinn Consulting, Inc, representing Department of Homeland Security, Federal Emergency Management Agency, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1603.1.7 Flood design data. For buildings located in whole or in part in *flood hazard areas* as established in Section 1612.3, the documentation pertaining to design, if required in Section 1612.5, shall be included and the following information, referenced to the datum on the community's Flood Insurance Rate Map (FIRM), shall be shown, regardless of whether flood loads govern the design of the building:

1. ~~*Risk Category*~~ Flood design class assigned according to ASCE 24*.*
2. In *flood hazard areas* not subject to high-velocity wave action, the elevation of the proposed lowest floor, including the basement.
3. In *flood hazard areas* not subject to high-velocity wave action, the elevation to which any nonresidential building will be dry flood proofed.
4. In *flood hazard areas* subject to high-velocity wave action, the proposed elevation of the bottom of the lowest horizontal structural member of the lowest floor, including the basement.

Commenter's Reason: The near-final draft of ASCE 24 based on the third ballot no longer uses the structure/risk category designation. Instead, ASCE 24-12 will require each building and structure to be assigned to a "Flood Design Class", which is then used throughout the standard to specify elevation requirements and floodproofing limitations.

S71-12

Final Action: AS AM AMPC____ D

S72-12

1603.1.8.1 (New), 1607.12.5 (New), 1607.12.5.1 (New), 1607.12.5.2 (New), 1607.12.5.3 (New), 1607.12.5.4 (New)

Proposed Change as Submitted

Proponent: Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee (huston@smithhustoninc.com)

Add new text as follows:

1603.1.8.1 Solar Photovoltaic (PV) Panels/Modules. The Roof/PV live load used in the design of Solar PV Panels shall be indicated on the construction documents.

1607.12.5 Solar Photovoltaic (PV) panels/modules. Solar PV panels/modules shall be designed in accordance with Sections 1607.12.5.1 through 1607.12.5.4, as applicable.

1607.12.5.1 Roof/PV live load. The roof/PV live load is a 20 psf uniform load. Unless each Solar PV panel/module is clearly and permanently marked "Do not walk on this surface – not intended for maintenance access or pedestrian traffic", and appropriate maintenance access paths are provided a non-concurrent 300 pound concentrated load as set forth in Table 1607.1 shall also be applied. The individual Solar PV panels/modules shall be designed to withstand the Roof/PV live load, in combination with other applicable loads.

1607.12.5.2 PV panels/modules. Solar PV panels/modules designed to be installed over and supported by a roof, shall have the structural supports of the roof designed to accommodate the full dead load, including the Solar PV panels/modules dead load; the Roof/PV live load in the areas of the Solar PV panels/modules in combination with other applicable loads. The roof area underneath any Solar PV panels/modules shall also be designed for load combinations including roof live load, in combination with other applicable loads, without the Solar PV panels/modules.

1607.12.5.3 PV panels/modules installed as an independent structure. Solar PV panels/modules that are independent structures and do not have accessible /occupied space underneath are not required to accommodate a roof/PV live load, provided they are marked as required in Section 1607.12.5.1, and the area under the structure is restricted to keep the public away. All other loads and combinations per Section 1605 shall be accommodated.

Solar PV panels/modules that are designed to be the roof, and span to structural supports, and have accessible/occupied space underneath shall have the panels/modules and all supporting structure designed to support a Roof/PV live load, as defined in section 1607.12.5.1 in combination with other applicable loads. Solar PV panels/modules in this application are not permitted to be classified as "not accessible" per 1607.12.5.1.

1607.12.5.4 Ballasted systems. Solar PV panels/modules installed on a roof as a ballasted system need not be rigidly attached to the roof or supporting structure. Ballasted systems shall be designed and installed only on roofs with slopes of ½" per foot or less. The structural supports of the roof under a ballasted system shall be designed, or analyzed, per section 1604.4; checked in accordance with Section 1604.3.6 for deflections; and checked in accordance with Section 1611 for ponding. The ballasted system shall be designed to resist sliding and uplift resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles.

Reason: This new section is bringing in requirements for Solar PV panels that is currently absent in the code.

Cost Impact: The code change proposal will not increase the cost of construction.

1603.1.8.1 (NEW)-S-HUSTON

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1603.1.8.1 Solar photovoltaic (PV) panels~~/~~ or modules. The ~~Roof/PV live~~ dead load ~~used in the design~~ of ~~Solar PV Panels~~ solar PV panels or modules, including accessories, shall be indicated on the construction documents.

1607.12.5 Solar photovoltaic (PV) panels~~/~~ or modules. Solar PV panels~~/~~ or modules shall be designed in accordance with Sections 1607.12.5.1 through 1607.12.5.4, as applicable.

1607.12.5.1 Roof/PV live load. ~~The roof/PV live load is a 20 psf uniform load. Unless each Solar PV panel/module is clearly and permanently marked "Do not walk on this surface – not intended for maintenance access or pedestrian traffic", and appropriate maintenance access paths are provided a non-concurrent 300 pound concentrated load as set forth in Table 1607.1 shall also be applied. The individual Solar PV panels/modules shall be designed to withstand the Roof/PV live load, in combination with other applicable loads.~~ Roof surfaces to be covered by solar PV panels or modules shall be designed for the roof live load, L_r, assuming that the PV panels or module are not present. The roof/PV live load in areas covered by solar PV panels or modules shall be in addition to the panel loading unless the area covered by each solar PV panel or module is inaccessible. Areas where the clear space between the panels and the rooftop is 24 inches or less shall be considered inaccessible. Roof surfaces not covered by PV panels shall be designed for the roof live load.

1607.12.5.2 PV panels~~/~~ or modules. ~~Solar PV panels/modules designed to be installed over and supported by a roof, shall have the structural supports of the roof designed to accommodate the full dead load, including the Solar PV panels/modules dead load; the Roof/PV live load in the areas of the Solar PV panels/modules in combination with other applicable loads. The roof area underneath any Solar PV panels/modules shall also be designed for load combinations including roof live load, in combination with other applicable loads, without the Solar PV panels/modules.~~ The structure of a roof that supports solar PV panels or modules shall be designed to accommodate the full solar PV panels or modules and ballast dead load, including concentrated loads from support frames in combination with the loads from Section 1607.12.5.1 and other applicable loads. Where applicable, snow drift loads created by the PV panels or modules shall be included.

1607.12.5.3 PV panels~~/~~ or modules installed as an independent structure. Solar PV panels~~/~~ or modules that are independent structures and do not have accessible /occupied space underneath are not required to accommodate a roof/PV live load, provided ~~they are marked as required in Section 1607.12.5.1, and~~ the area under the structure is restricted to keep the public away. All other loads and combinations in accordance with Section 1605 shall be accommodated.

Solar PV panels~~/~~ or modules that are designed to be the roof, and span to structural supports, and have accessible/occupied space underneath shall have the panels~~/~~ or modules and all supporting structure designed to support a roof/PV live load, as defined in Section 1607.12.5.1 in combination with other applicable loads. Solar PV panels~~/~~ or modules in this application are not permitted to be classified as not accessible in accordance with Section 1607.12.5.1.

1607.12.5.4 Ballasted systems. Solar PV panels~~/~~ or modules installed on a roof as a ballasted system need not be rigidly attached to the roof or supporting structure. Ballasted systems shall be designed and installed only on roofs with slopes of ~~½"~~ 1 inch per foot or less. The structural supports of the roof under a ballasted system shall be designed, or analyzed, in accordance with Section 1604.4; checked in accordance with Section 1604.3.6 for deflections; and checked in accordance with Section 1611 for ponding. The ballasted system shall be designed to resist sliding and uplift resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles. In sites where the Seismic Design Category is C or above, the system shall be designed to accommodate seismic displacement determined by nonlinear response-history analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for non-structural components on roofs.

Committee Reason: This code change adds needed provisions for live loads related to solar photovoltaic panels and modules. The modification, which represents the consensus of the structural engineering community and the industry, reflects prior committee actions related to photovoltaics. It also clarifies treatment of live loads snow drifts, load combinations as well as seismic considerations.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Joseph H. Cain, P.E., SolarCity Corporation, representing self and John Smirnow, Solar Energy Industries Association (SEIA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1603.1.8.1 ~~Solar photovoltaic (PV) panels or modules~~ Photovoltaic panel systems. The dead load of ~~solar PV panels or modules~~ rooftop mounted photovoltaic panel systems, including ~~accessories~~ rack support systems, shall be indicated on the construction documents.

1607.12.5 ~~Solar photovoltaic (PV) panels or modules~~ Photovoltaic panel systems. ~~Solar PV panels or modules~~ Roof structures that provide support for photovoltaic panels sytems shall be designed in accordance with Sections 1607.12.5.1 through 1607.12.5.4, as applicable.

(Portions of proposal not show remain unchanged)

Commenter's Reason: This change is intended to clarify the requirements using language that correlates with newly revised and approved terms while using language that can be easily understood by all users of the code. These revisions are provided in response to comments from the Structural Committee as part of their approval as modified of S72-12.

Sections 1603.1.8.1 and 1607.12.5 are revised for clarity, using newly defined term "photovoltaic panel system," as approved in S5-12.

Language is revised to clarify that this section applies to roof loads for design of the roof structure, not to the design of photovoltaic panels or modules themselves.

Public Comment 2:

Joseph H. Cain, P.E., SolarCity Corporation, representing self and John Smirnow, Solar Energy Industries Association (SEIA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1607.12.5.1 Roof~~/PV~~ live load. Roof ~~surfaces to be covered by solar PV panels or modules~~ structures that provide support for photovoltaic panel systems shall be designed for ~~the~~ roof live load, L_r, ~~assuming that the PV panels or module are~~ for the load case when the photovoltaic panel system is not present. ~~The roof/PV live load in areas covered by solar PV panels or modules shall be in addition to the panel loading unless the area covered by each solar PV panel or module is inaccessible.~~ Where roof surfaces to be covered with photovoltaic panel systems are inaccessible, the design of covered portions of roof structures need not include roof live load. Areas where the clear space between the photovoltaic panels and the rooftop is 24 inches or less, or where signs are posted prohibiting storage under the panels, shall be considered inaccessible. Roof surfaces not covered by PV panels shall be designed for ~~the~~ roof live load.

(Portions of proposal not show remain unchanged)

Commenter's Reason: This change is intended to clarify the requirements using language that correlates with newly revised and approved terms while using language that can be easily understood by all users of the code. These revisions are provided in response to comments from the Structural Committee as part of their approval as modified of S72-12.

Section 1607.12.5.1 is revised for clarity, using newly defined term "photovoltaic panel system," as approved in S5-12. Language is revised to clarify that this section applies to roof loads for design of the roof structure, not to the design of photovoltaic panels or modules themselves. Language is revised to clarify this section is for design of roof structures, not the design of roof surfaces. An option for signage is included, consistent with the language in Interpretation Report IR 16-8, Solar Photovoltaic and Thermal Systems Review and Approval Requirements," by California Department of General Services, Division of the State Architect.

Public Comment 3:

Joseph H. Cain, P.E., SolarCity Corporation, representing self and John Smirnow, Solar Energy Industries Association (SEIA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1607.12.5.2 ~~PV panels or modules~~ <u>Other roof loads</u>. ~~The~~ <u>Roof</u> structure<u>s</u> ~~of a roof~~ that <u>provide</u> supports ~~solar PV panels or modules~~ <u>for photovoltaic panel systems</u> shall be designed to ~~accommodate the full solar PV panels or modules and~~ <u>resist applicable loads from rack support systems. Design loads shall include photovoltaic panel system dead load including</u> ballast dead load, ~~including concentrated loads from support frames~~ <u>if any</u> in combination with ~~the~~ <u>roof live</u> load~~s~~ from Section 1607.12.5.1 and other applicable loads. Where applicable, snow drift loads created by the ~~PV panels or modules~~ <u>photovoltaic panel systems</u> shall be included.

(Portions of proposal not show remain unchanged)

Commenter's Reason: This change is intended to clarify the requirements using language that correlates with newly revised and approved terms while using language that can be easily understood by all users of the code. These revisions are provided in response to comments from the Structural Committee as part of their approval as modified of S72-12.

Section 1607.12.5.2 is revised for clarity, using newly defined term "photovoltaic panel system," as approved in S5-12. Language is revised to clarify that this section applies to roof loads for design of the roof structure, not to the design of photovoltaic panels or modules themselves. Statements have been rearranged for clarity.

Public Comment 4:

Joseph H. Cain, P.E., SolarCity Corporation, representing self and John Smirnow, Solar Energy Industries Association (SEIA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

~~**1607.12.5.3 PV panels/ or modules installed as an independent structure.** Solar PV panels/ or modules that are independent structures and do not have accessible /occupied space underneath are not required to accommodate a roof/PV live load, provided the area under the structure is restricted to keep the public away. All other loads and combinations in accordance with Section 1605 shall be accommodated.~~

~~Solar PV panels/ or modules that are designed to be the roof, and span to structural supports, and have accessible/occupied space underneath shall have the panels/ or modules and all supporting structure designed to support a roof/PV live load, as defined in Section 1607.12.5.1 in combination with other applicable loads. Solar PV panels/ or modules in this application are not permitted to be classified as not accessible in accordance with Section 1607.12.5.1.~~

<u>**1607.12.5.3 Freestanding photovoltaic panel systems.** Design loads for freestanding, ground mounted photovoltaic panel systems with no occupied space underneath need not include roof live load. All other loads and load combinations in accordance with Section 1605 shall be considered.</u>

<u>Photovoltaic panel systems mounted on raised support structures with open grid framing and no roof deck, and with accessible and occupied space underneath, shall have the supporting structure designed to support a reducible roof live load, in combination with other applicable loads. Solar PV panels or modules in this application are not permitted to be classified as inaccessible per Section 1607.12.5.1.</u>

(Portions of proposal not show remain unchanged)

Commenter's Reason: This change is intended to clarify the requirements using language that correlates with newly revised and approved terms while using language that can be easily understood by all users of the code. These revisions are provided in response to comments from the Structural Committee as part of their approval as modified of S72-12.

Section 1607.12.5.3 is revised for clarity, using newly defined term "photovoltaic panel system," as approved in S5-12. The term "freestanding" is used to replace "independent," to be consistent with the language in ICC-ES AC428, "Acceptance Criteria for Modular Framing Systems used to Support Photovoltaic (PV) Modules." Language is revised to clarify that the first paragraph applies to ground mounted systems with no occupancy below, and the second paragraph applies to freestanding structures with occupancy below, such as solar support structures over vehicle parking spaces. Language is clarified to indicate this section applies to design of rack support systems and support structures, not to the design of photovoltaic panels or modules themselves. Language has been revised to "structures with open grid framing and no roof deck," consistent with Interpretation Report IR 16-8, Solar Photovoltaic and Thermal Systems Review and Approval Requirements" by California Department of General Services, Division of the State Architect. Statements have been rearranged for clarity**.**

Public Comment 5:

Joseph H. Cain, P.E., SolarCity Corporation, representing self and John Smirnow, Solar Energy Industries Association (SEIA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1607.12.5.4 Ballasted photovoltaic panel systems. ~~Solar PV panels/ or modules installed on a roof as a ballasted system need not be rigidly attached to the roof or supporting structure. Ballasted systems shall be designed and installed only on roofs with slopes of ½" 1 inch per foot or less. The structural supports of the roof under a~~ Roof structures that provide support for ballasted photovoltaic panel systems shall be designed, or analyzed, in accordance with Section 1604.4; checked in accordance with Section 1604.3.6 for deflections; and checked in accordance with Section 1611 for ponding. ~~The ballasted system shall be designed to resist sliding and uplift resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles. In sites where the Seismic Design Category is C or above, the system shall be designed to accommodate seismic displacement determined by nonlinear response-history analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for non-structural components on roofs.~~

1613.5 Ballasted photovoltaic panel systems. Ballasted, roof-mounted photovoltaic panel systems need not be rigidly attached to the roof or supporting structure. Ballasted non-penetrating systems shall be design and installed only on roofs with slopes of 1 inch per foot or less. Ballasted non-penetrating systems shall be designed to resist sliding and uplift resulting from lateral and vertical forces as required by Section 1605, using a coefficient of friction determined by acceptable engineering principles. In structures assigned to, Seismic Design Category C, D, E or F, ballasted non-penetrating the systems shall be designed to accommodate seismic displacement determined by nonlinear response-history analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for non-structural components on roofs.

(Portions of proposal not show remain unchanged)

Commenter's Reason: This change is intended to clarify the requirements using language that correlates with newly revised and approved terms while using language that can be easily understood by all users of the code. These revisions are provided in response to comments from the Structural Committee as part of their approval as modified of S72-12.

Section 1607.12.5.3 is revised for clarity, using newly defined term "photovoltaic panel system," as approved in S5-12. Language is revised and re-ordered to clarify those statements in the first paragraph apply to all ballasted photovoltaic panel systems, and the statements in the second paragraph apply only to those ballasted systems that are "non-penetrating," and do not have anchorage to the roof structure. The second paragraph is relocated to new Section 1613.5, under Section 1613 Earthquake loads, as it is not appropriate under Section 1607.12 Roof loads.

S72-12

Final Action: AS AM AMPC____ D

S75-12
Table 1604.3, 1607.14, 1607.14.1

Proposed Change as Submitted

Proponent: Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee (huston@smithhustoninc.com)

Revise as follows:

TABLE 1604.3
DEFLECTION LIMITS[a, b, c, h, i]

CONSTRUCTION	L	S or W[f]	D + L[d,g]
Roof Members:[e]			
Supporting plaster ceiling	*l* / 360	*l* / 360	*l* / 240
Supporting plaster ceiling	*l* / 240	*l* / 240	*l* / 180
Not supporting ceiling	*l* / 180	*l* / 180	*l* / 120
Floor Members	*l* / 360	-	*l* / 240
Exterior walls ~~and interior partitions~~:			
With plaster or stucco finishes	-	*l* / 360	-
With other brittle finishes	-	*l* / 240	-
With flexible finishes	-	*l* / 120	-
Interior Partitions:[b]			
With plaster or stucco finishes	*l* / 360	-	-
With other brittle finishes	*l* / 240	-	-
With flexible finishes	*l* / 120	-	-
Farm buildings	-	-	//180
Greenhouses	-	-	//120

(Portions of table not shown remain unchanged)

1607.14 Interior walls and partitions. Interior walls and partitions that exceed 6 feet (1829 mm) in height, including their finish materials, shall have adequate strength and stiffness to resist the loads to which they are subjected but not less than a horizontal load of 5 psf (0.240 kN/m2).

> **Exception:** Fabric partitions complying with Section 1607.14.1 shall not be required to resist the minimum horizontal load of 5 psf (0.24 kN/m2).

1607.14.1 Fabric partitions. Fabric partitions that exceed 6 feet (1829 mm) in height, including their finish materials, shall have adequate strength and stiffness to resist the following load conditions:

1. A horizontal distributed load of 5 psf (0.24 kN/m2) applied to the partition framing. The total area used to determine the distributed load shall be the area of the fabric face between the framing members to which the fabric is attached. The total distributed load shall be uniformly applied to such framing members in proportion to the length of each member.
2. A concentrated load of 40 pounds (0.176 kN) applied to an 8-inch diameter (203 mm) area [50.3 square inches (32 452 mm2)] of the fabric face at a height of 54 inches (1372 mm) above the floor.

Reason: Currently Table 1604.3 does not have deflection limits for Live Loads on Interior walls. The 5.0psf requirement in section 1607.14 is classified as a live load and would not require a deflection check. Under the legacy Uniform Building Code this load was treated as an “other load” and was required to meet the deflection limits similar to those in IBC Table 1604.3. To avoid confusion for walls, and to require deflection checks on interior walls, the proposed code change is necessary.

Cost Impact: The code change proposal will not increase the cost of construction.

T1604.3#2-S-HUSTON.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change separates the deflection limits for interior partitions from those for exterior walls. Furthermore, it appropriately bases the interior partition limits on live load rather than wind.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mark Nowak, MNowak Consulting, LLC, representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1607.14 Interior walls and partitions. Interior walls and partitions that exceed 6 feet (1829 mm) in height, including their finish materials, shall have adequate strength and stiffness to resist the loads to which they are subjected but not less than a horizontal load of 5 psf (0.240 kN/m2).

Exceptions:

1. Fabric partitions complying with Section 1607.14.1 shall not be required to resist the minimum horizontal load of 5 psf (0.24 kN/m2).
2. Interior non-load bearing walls and partitions of light-frame construction not exceeding 20 feet in height shall not be required to verify stiffness in compliance with the deflection limits of Table 1604.3.

(Portions of code change proposal not shown remain unchanged)

Commenter’s Reason: The purpose of this public comment is to address a conflict made transparent by proposal S75-12 by adding partition wall deflection limits for all materials used in partition wall framing without ensuring coordination with existing prescriptive partition wall wood framing requirements which were only partially addressed in a separate proposal S285-12. This public comment will fully resolve the conflict and ensure that partition walls of conventional wood, cold-formed steel framing, engineered wood, and other light-frame materials are treated equitably with regard to conditions where deflection checks are and are not required by the code.

The following analysis (even when accounting for system stiffness) shows that the prescriptive conventional wood stud partition wall framing requirements in Section 2308 (Table 2308.9.1), do not meet the minimum deflection criteria instituted in proposal S75-12; thus, requiring this PC to ensure coordination for conditions addressed within the scope of Table 2308.9.1 (i.e., partition walls up to 20 feet in height) for light frame partition wall construction.

Wood Stud Size	Orientation	Species	Grade	E (in^2)	MOI (in^4)	Stud Spacing	Partition Height	Deflection (in)	Deflection Limit, L/
2x3	flatwise	SPF-South	Std	900,000	0.703	16	10	1.58	76
2x4	flatwise	SPF-South	Std	900,000	0.984	24	10	1.69	71
2x3	edgewise	SPF-South	Std	900,000	1.953	16	10	0.57	211
2x4	edgewise	SPF-South	Std	900,000	5.359	24	14	1.19	141
2x5	edgewise	SFP-South	Std	900,000	11.39	24	16	0.96	200
2x6	edgewise	SPF-South	Std	900,000	20.8	24	20	1.28	187

S75-12

Final Action: AS AM AMPC____ D

S77-12
Table 1604.3

<u>Proposed Change as Submitted</u>

Proponent: John Woestman, Kellen Company, representing Builders Masonry Veneer Manufacturers Association (MVMA) (jwoestman@kellencompany.com)

Revise as follows:

TABLE 1604.3
DEFLECTION LIMITS[a,b,c,h, i]

CONSTRUCTION	L	S OR W[f]	D + L[d, g]
Exterior walls and interior partitions:			
With plaster or stucco finishes	---	//360	---
With other brittle finishes[i]	---	//240	---
With flexible finishes	---	//120	---

<u>i. Includes adhered masonry veneer.</u>

(Portions of Table not shown remain unchanged)

Reason: This code proposal should help with a consistent deflection limit applied to wall systems with adhered masonry veneer.
Adhered masonry veneer does not have the large, flat, monolithic surface of plaster or stucco finishes. As such, adhered masonry veneer can accommodate more deflection.

Cost Impact: The code change proposal will not increase the cost of construction.

T1604.3-S-WOESTMAN.doc

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The committee believes that the deflection limit table is already clear on the treatment of adhered masonry veneer and there was no justification for adding the proposed footnote.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Woestman, Kellen Company, representing Masonry Veneer Manufacturers Association (MVMA), requests Approval as Submitted.

Commenter's Reason: This table in the IBC, since the 2000 IBC, has had a deflection limit for walls with brittle finishes of L/240. However, added to the 2012 IBC is the line item "With plaster or stucco finishes" and a deflection limit of L/360.

Unfortunately, we are seeing differences in interpretation regarding which deflection limit should apply to adhered masonry veneer.

Adhered masonry veneer, while it has similarities to plaster or stucco finishes, also has important differences. Unlike plaster or stucco finishes, adhered masonry veneer consists of numerous small units (i.e. manufactured stones, porcelain tiles, and the like) while plaster or stucco has large, flat, monolithic surfaces. Cracks as a result of deflection of adhered masonry veneer wall systems are much less detrimental to adhered masonry veneer.

We're proposing the footnote to Table 1604.3 to clarify the IBC deflection limit of L/240 applies to walls "With other brittle finishes" of adhered masonry veneer, as the IBC clearly required prior to the 2012 edition.

S77-12

Final Action: AS AM AMPC____ D

S79-12
202, 1602.1, 1604.4, 1610.1 1613.5.6.1

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA, ICC Building Code Action Committee

Delete without substitution:

SECTION 202
DEFINITIONS

DIAPHRAGM. A horizontal or sloped system acting to transmit lateral forces to the vertical-resisting elements. When the term "diaphragm" is used, it shall include horizontal bracing systems.

~~**Diaphragm flexible.** A diaphragm is flexible for the purpose of distribution of story shear and torsional moment where so indicated in Section 12.3.1 of ASCE 7.~~

~~**Diaphragm, rigid.** A diaphragm is rigid for the purpose of distribution of story shear and torsional moment when the lateral deformation of the diaphragm is less than or equal to two times the average story drift.~~

Revise as follows:

SECTION 1602
DEFINITIONS AND NOTATIONS

1602.1 Definitions. The following terms are defined in Chapter 2:

DIAPHRAGM.
Diaphragm, blocked.
Diaphragm boundary.
Diaphragm chord.
~~**Diaphragm flexible.**~~
~~**Diaphragm, rigid.**~~

(Portions of text not shown remains unchanged)

1604.4 Analysis. *Load effects* on structural members and their connections shall be determined by methods of structural analysis that take into account equilibrium, general stability, geometric compatibility and both short- and long-term material properties.

Members that tend to accumulate residual deformations under repeated service loads shall have included in their analysis the added eccentricities expected to occur during their service life.

Any system or method of construction to be used shall be based on a rational analysis in accordance with well-established principles of mechanics. Such analysis shall result in a system that provides a complete load path capable of transferring loads from their point of origin to the load-resisting elements.

The total lateral force shall be distributed to the various vertical elements of the lateral force-resisting system in proportion to their rigidities, considering the rigidity of the horizontal bracing system or diaphragm. Rigid elements assumed not to be a part of the lateral force-resisting system are permitted to be incorporated into buildings provided their effect on the action of the system is considered and provided for in the design~~. Except where diaphragms are flexible, or are permitted to be analyzed as flexible,~~ Provisions shall be made for the increased forces induced on resisting elements of the structural system resulting from torsion due to eccentricity between the center of application of the lateral forces and the center of rigidity of the lateral force-resisting system, except where diaphragms are considered as flexible, permitted to be idealized as flexible or semi-rigid, in accordance with Section 12.3.1 of ASCE for seismic loads or Chapter 26 of ASCE 7 for wind loads.

Every structure shall be designed to resist the overturning effects caused by the lateral forces specified in this chapter. See Section 1609 for wind loads, Section 1610 for lateral soil loads and Section 1613 for earthquake loads.

1610.1 General. Foundation walls and retaining walls shall be designed to resist lateral soil loads. Soil loads specified in Table 1610.1 shall be used as the minimum design lateral soil loads unless determined otherwise by a geotechnical investigation in accordance with Section 1803. Foundation walls and other walls in which horizontal movement is restricted at the top shall be designed for at-rest pressure. Retaining walls free to move and rotate at the top shall be permitted to be designed for active pressure. Design lateral pressure from surcharge loads shall be added to the lateral earth pressure load. Design lateral pressure shall be increased if soils at the site are expansive. Foundation walls shall be designed to support the weight of the full hydrostatic pressure of undrained backfill unless a drainage system is installed in accordance with Sections 1805.4.2 and 1805.4.3.

> **Exception:** Foundation walls extending not more than 8 feet (2438 mm) below grade and laterally supported at the top by ~~flexible~~ diaphragms considered as flexible, permitted to be idealized as flexible or semi-rigid, in accordance with Section 12.3.1 of ASCE for seismic loads or Chapter 26 of ASCE for wind loads shall be permitted to be designed for active pressure.

1613.3.5.1 Alternative seismic design category determination. Where S_1 is less than 0.75, the *seismic design category* is permitted to be determined from Table 1613.3.5(1) alone when all of the following apply:

1. In each of the two orthogonal directions, the approximate fundamental period of the structure, T_a, in each of the two orthogonal directions determined in accordance with Section 12.8.2.1 of ASCE 7, is less than 0.8 T_s determined in accordance with Section 11.4.5 of ASCE 7.
2. In each of the two orthogonal directions, the fundamental period of the structure used to calculate the story drift is less than T_s.
3. Equation 12.8-2 of ASCE 7 is used to determine the seismic response coefficient, C_s.
4. The diaphragms are rigid as defined in Section 12.3.1 of ASCE 7 or, for diaphragms that are considered flexible, permitted to be idealized as flexible or semi-rigid in accordance with Section 12.3.1 of ASCE 7, the distances between vertical elements of the seismic force-resisting system do not exceed 40 feet (12 192 mm).

Reason: The ICC Building Code Action Committee was asked to look at clearing up potential conflicts between the references to, and definitions of, flexible and rigid diaphragms in the IBC and ASCE-7-10. The BCAC did identify potential conflicts between the IBC's definition of a rigid diaphragm and the ASCE 7-10 criteria for classifying a diaphragm as rigid, semi-rigid or flexible. Also, it is considered inappropriate to include enforceable code requirements or references to standards as part of a definition. Thus, by this proposal, the BCAC proposes to remove the separate definitions for flexible and rigid diaphragms from the IBC and supply direct references in IBC Chapter 16 to the relevant requirements in the ASCE 7 seismic and wind chapters for when a diaphragm can be idealized as flexible or semi-rigid. This reference only occurs in the IBC in the sections noted in the code change proposal. In practical application, the code user will be turning to the requirements of ASCE-7 to categorize the diaphragm and perform the design. Therefore, there is no real need or advantage to provide the definitions in the IBC and this will prevent future maintenance of the terms and/or conflict between them.

For reference, ASCE 7-10 states,

12.3.1 Diaphragm Flexibility

The structural analysis shall consider the relative stiffnesses of diaphragms and the vertical elements of the seismic force-resisting system. Unless a diaphragm can be idealized as either flexible or rigid in accordance with Sections 12.3.1.1, 12.3.1.2, or 12.3.1.3, the structural analysis shall explicitly include consideration of the stiffness of the diaphragm (i.e., semirigid modeling assumption).

12.3.1.1 Flexible Diaphragm Condition

Diaphragms constructed of untopped steel decking or wood structural panels are permitted to be idealized as flexible if any of the following conditions exist:

a. In structures where the vertical elements are steel braced frames, steel and concrete composite braced frames or concrete, masonry, steel, or steel and concrete composite shear walls.
b. In one-and two-family dwellings.
c. In structures of light-frame construction where all of the following conditions are met:
1. Topping of concrete or similar materials is not placed over wood structural panel diaphragms except for nonstructural topping no greater than 1 ½" in (38mm) thick.
2. Each line of vertical elements of the seismic force-resisting system complies with the allowable story drift of Table 12.12-1

12.3.1.2 Rigid Diaphragm Condition
Diaphragms of concrete slabs or concrete filled metal deck with span-to-depth ratios of 3 or less in structures that have no horizontal irregularities are permitted to be idealized as rigid.
12.3.1.3 Calculated Flexible Diaphragm Condition
Diaphragms not satisfying the conditions of Sections 12.3.1.1 or 12.3.1.2 are permitted to be idealized as flexible where the computed maximum in-plane deflection of the diaphragm under lateral load is more than two times the average story drift of adjoining vertical elements of the seismic force-resisting system of the associated story under equivalent tributary lateral load as shown in Fig. 12.3-1. The loadings used for this calculation shall be those prescribed by Section 12.8.

Cost Impact: The code change proposal will not increase the cost of construction.

1604.4-S-BAJNAI-BCAC.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal would introduce the term "semi-rigid diaphragm" into the IBC and actually conflict with ASCE 7. A public comment was suggested in hopes the various stakeholders are able to work out some of the conflicts.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Chuck Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 202
DEFINITIONS

DIAPHRAGM. A horizontal or sloped system acting to transmit lateral forces to the vertical-resisting elements. When the term "diaphragm" is used, it shall include horizontal bracing systems.

Revise as follows:

SECTION 1602
DEFINITIONS AND NOTATIONS

1602.1 Definitions. The following terms are defined in Chapter 2:

DIAPHRAGM.
Diaphragm, blocked.
Diaphragm boundary.
Diaphragm chord.

(Portions of text not shown remains unchanged)

1604.4 Analysis. *Load effects* on structural members and their connections shall be determined by methods of structural analysis that take into account equilibrium, general stability, geometric compatibility and both short- and long-term material properties.

Members that tend to accumulate residual deformations under repeated service loads shall have included in their analysis the added eccentricities expected to occur during their service life.

Any system or method of construction to be used shall be based on a rational analysis in accordance with well-established principles of mechanics. Such analysis shall result in a system that provides a complete load path capable of transferring loads from their point of origin to the load-resisting elements.

The total lateral force shall be distributed to the various vertical elements of the lateral force-resisting system in proportion to their rigidities, considering the rigidity of the horizontal bracing system or diaphragm. Rigid elements assumed not to be a part of the lateral force-resisting system are permitted to be incorporated into buildings provided their effect on the action of the system is considered and provided for in the design. A diaphragm is rigid for the purpose of distribution of story shear and torsional moment when the lateral deformation of the diaphragm is less than or equal to two times the average story drift. Where required by ASCE 7, provisions shall be made for the increased forces induced on resisting elements of the structural system resulting from torsion due to eccentricity between the center of application of the lateral forces and the center of rigidity of the lateral force-resisting system, ~~except where diaphragms are considered as flexible, permitted to be idealized as flexible or semi-rigid, in accordance with Section 12.3.1 of ASCE for seismic loads or Chapter 26 of ASCE 7 for wind loads~~.

Every structure shall be designed to resist the overturning effects caused by the lateral forces specified in this chapter. See Section 1609 for wind loads, Section 1610 for lateral soil loads and Section 1613 for earthquake loads.

1610.1 General. Foundation walls and retaining walls shall be designed to resist lateral soil loads. Soil loads specified in Table 1610.1 shall be used as the minimum design lateral soil loads unless determined otherwise by a geotechnical investigation in accordance with Section 1803. Foundation walls and other walls in which horizontal movement is restricted at the top shall be designed for at-rest pressure. Retaining walls free to move and rotate at the top shall be permitted to be designed for active pressure. Design lateral pressure from surcharge loads shall be added to the lateral earth pressure load. Design lateral pressure shall be increased if soils at the site are expansive. Foundation walls shall be designed to support the weight of the full hydrostatic pressure of undrained backfill unless a drainage system is installed in accordance with Sections 1805.4.2 and 1805.4.3.

> **Exception:** Foundation walls extending not more than 8 feet (2438 mm) below grade and laterally supported at the top by flexible diaphragms ~~considered as flexible, permitted to be idealized as flexible or semi-rigid, in accordance with Section 12.3.1 of ASCE for seismic loads or Chapter 26 of ASCE for wind loads~~ shall be permitted to be designed for active pressure.

1613.3.5.1 Alternative seismic design category determination. Where S_1 is less than 0.75, the *seismic design category* is permitted to be determined from Table 1613.3.5(1) alone when all of the following apply:

1. In each of the two orthogonal directions, the approximate fundamental period of the structure, T_a, in each of the two orthogonal directions determined in accordance with Section 12.8.2.1 of ASCE 7, is less than 0.8 T_s determined in accordance with Section 11.4.5 of ASCE 7.
2. In each of the two orthogonal directions, the fundamental period of the structure used to calculate the story drift is less than T_s.
3. Equation 12.8-2 of ASCE 7 is used to determine the seismic response coefficient, C_s.
4. The diaphragms are rigid or are permitted to be idealized as rigid in accordance with ~~as defined in~~ Section 12.3.1 of ASCE 7 or, for diaphragms ~~that are considered flexible,~~ permitted to be idealized as flexible ~~or semi-rigid~~ in accordance with Section 12.3.1 of ASCE 7, the distances between vertical elements of the seismic force-resisting system do not exceed 40 feet (12 192 mm).

Commenter's Reason: The purpose of this public comment is to address issues raised by the FEMA Code Resource Support Community, NCSEA and others, including members of the ICC BCAC work group which developed this change. Four revisions are made to the original proposal:

1) IBC Section 1604.4 is further revised to eliminate conflicts between the proposed language and the ASCE 7 wind load provisions. For wind loads, an automatic exemption from torsional requirements only applies to one-story buildings less than 30 feet in height, one- and two-story light frame buildings, and one- and two-story buildings with flexible diaphragms. Buildings three or more stories in height with flexible diaphragms are not exempt from torsional wind load cases unless additional exemptions in ASCE 7-10 Appendix D based on building dimensions and symmetry of the vertical MWFRS apply. Thus, to avoid having the IBC incorrectly exempt a building from consideration of torsional effects, a simple reference to ASCE 7 is provided in lieu of the extended reference to the wind and seismic sections.
2) Also, the traditional building code definition of a rigid diaphragm is restored to Section 1604.4. This is necessary to avoid requiring semi-rigid analysis per ASCE 7 for a large number of buildings for which such an analysis has not been done in the past and is neither necessary nor an effective use of the engineer's time.
3) The original 2012 IBC language for IBC Section 1610.1 is restored. This section is intended for design of foundation walls to resist active or passive soil pressure, which is a function solely of the soil classification and the diaphragm flexibility. Wind and seismic design requirements do not come into play. Also, a semi-rigid diaphragm will probably be too stiff to permit the use of active pressures. The revisions will leave selecting the appropriate criteria to justify a flexible diaphragm assumption to the engineer's judgment.

4) IBC Section 1613.5.6.1, Item #4 is further revised to more closely mirror ASCE 7 Section 11.6. The key alignment is to use the "permitted to be idealized as flexible" language from ASCE 7 Sections 12.3.1.2 and 12.3.1.3. Thus, the current "considered flexible" phrasing should be deleted and replaced with the ASCE statement. Also, the 40-foot limitation does not apply when a semi-rigid modeling assumption is used because the actual stiffness of the diaphragm will be taken into account. Thus, the reference to semi-rigid diaphragms should be deleted.

Public Comment 2:

Philip Brazil, P.E., S.E., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1604.4 Analysis. *Load effects* on structural members and their connections shall be determined by methods of structural analysis that take into account equilibrium, general stability, geometric compatibility and both short- and long-term material properties.

Members that tend to accumulate residual deformations under repeated service loads shall have included in their analysis the added eccentricities expected to occur during their service life.

Any system or method of construction to be used shall be based on a rational analysis in accordance with well-established principles of mechanics. Such analysis shall result in a system that provides a complete load path capable of transferring loads from their point of origin to the load-resisting elements.

The total lateral force shall be distributed to the various vertical elements of the lateral force-resisting system in proportion to their rigidities, considering the rigidity of the ~~horizontal bracing system or~~ diaphragms. Rigid elements assumed not to be a part of the lateral force-resisting system are permitted to be incorporated into buildings provided their effect on the action of the system is considered and provided for in the design. Provisions shall be made for the increased forces induced on resisting elements of the structural system resulting from torsion due to eccentricity between the center of application of the lateral forces and the center of rigidity of the lateral force-resisting system, except where diaphragms are ~~considered as flexible,~~ permitted to be idealized as flexible ~~or semi-rigid,~~ in accordance with Section 12.3.1 of ASCE 7 for seismic loads or Chapter 26 of ASCE 7 for wind loads.

Every structure shall be designed to resist the overturning effects caused by the lateral forces specified in this chapter. See Section 1609 for wind loads, Section 1610 for lateral soil loads and Section 1613 for earthquake loads.

1610.1 General. Foundation walls and retaining walls shall be designed to resist lateral soil loads. Soil loads specified in Table 1610.1 shall be used as the minimum design lateral soil loads unless determined otherwise by a geotechnical investigation in accordance with Section 1803. Foundation walls and other walls in which horizontal movement is restricted at the top shall be designed for at-rest pressure. Retaining walls free to move and rotate at the top shall be permitted to be designed for active pressure. Design lateral pressure from surcharge loads shall be added to the lateral earth pressure load. Design lateral pressure shall be increased if soils at the site are expansive. Foundation walls shall be designed to support the weight of the full hydrostatic pressure of undrained backfill unless a drainage system is installed in accordance with Sections 1805.4.2 and 1805.4.3.

Exception: Foundation walls extending not more than 8 feet (2438 mm) below grade and laterally supported at the top by diaphragms ~~considered as flexible,~~ permitted to be idealized as flexible ~~or semi-rigid,~~ in accordance with Section 12.3.1 of ASCE 7 for seismic loads or Chapter 26 of ASCE 7 for wind loads shall be permitted to be designed for active pressure.

1613.3.5.1 Alternative seismic design category determination. Where S_1 is less than 0.75, the *seismic design category* is permitted to be determined from Table 1613.3.5(1) alone when all of the following apply:

1. In each of the two orthogonal directions, the approximate fundamental period of the structure, T_a, in each of the two orthogonal directions determined in accordance with Section 12.8.2.1 of ASCE 7, is less than 0.8 T_s determined in accordance with Section 11.4.5 of ASCE 7.
2. In each of the two orthogonal directions, the fundamental period of the structure used to calculate the story drift is less than T_s.
3. Equation 12.8-2 of ASCE 7 is used to determine the seismic response coefficient, C_s.
4. The diaphragms are ~~rigid as defined in~~ permitted to be idealized as rigid in accordance with Section 12.3.1 of ASCE 7 or, for diaphragms ~~that are considered flexible,~~ permitted to be idealized as flexible ~~or semi-rigid~~ in accordance with Section 12.3.1 of ASCE 7, the distances between vertical elements of the seismic force-resisting system do not exceed 40 feet (12 192 mm).

(Portions of code change proposal not shown remain unchanged)

Reason: The purpose for the public comment is to adjust the original proposal so that it is compatible with ASCE 7-10. The original proposal contained several conflicts with ASCE 7-10 and the public comment eliminates them so that the IBC effectively scopes the technical provisions of ASCE 7-10 for diaphragms.

For the seismic design requirements of ASCE 7-10, Section 12.3.1 requires the structural analysis to explicitly include consideration of diaphragm stiffness (e.g., semi-rigid) unless the diaphragm can be idealized as flexible or rigid. Procedures permitting diaphragms to be idealized as flexible or rigid are specified in Sections 12.3.1.1, 12.3.1.2 and 12.3.1.3.

For the wind load requirements of ASCE 7-10, the definition of "diaphragm" in Section 26.2 includes the statement that "diaphragms constructed of wood structural panels are permitted to be idealized as flexible."

In the second paragraph of IBC Section 1604.4, the public comment also deletes "horizontal bracing system," which is redundant given the definition of "diaphragm" in IBC Section 202 that includes horizontal bracing systems. The deletion also eliminates an internal conflict in that the first sentence requires consideration of the rigidity of the "horizontal bracing system or diaphragm" but the last sentence only exempts qualifying diaphragms from the requirement for considering the increased forces resulting from torsion.

S79-12

Final Action: AS AM AMPC____ D

S81-12
1604.5.1

Proposed Change as Submitted

Proponent: Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee (huston@smithhustoninc.com)

Revise as follows:

1604.5.1 Multiple occupancies. Where a building or structure is occupied by two or more occupancies not included in the same *risk category*, it shall be assigned the classification of the highest *risk category* corresponding to the various occupancies. Where buildings or structures have two or more portions that are structurally separated, each portion shall be separately classified. Where a separated portion of a building or structure provides required access to, required egress from or shares life safety components with another portion having a higher *risk category*, both portions shall be assigned to the higher *risk category*.

> **Exception:** A single public assembly room with an occupant load of less than 500 shall be allowed in a *Risk Category II* building or structure and not be considered a multiple occupancy or a separate occupancy.

Reason: The revision to 1604.5.1 will allow a single, modest meeting room or auditorium within an office building (a Risk Category II Building) without requiring the entire building to be designed as a Risk Category III.

Cost Impact: The code change proposal will not increase the cost of construction.

1604.5.1-S-HUSTON

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed exception for multiple occupancies needs further clarification. The committee would prefer to see some information presented on the occupant load trigger of 500 that was originally proposed.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1604.5.1 Multiple occupancies. Where a building or structure is occupied by two or more occupancies not included in the same *risk category*, it shall be assigned the classification of the highest *risk category* corresponding to the various occupancies. Where buildings or structures have two or more portions that are structurally separated, each portion shall be separately classified. Where a separated portion of a building or structure provides required access to, required egress from or shares life safety components with another portion having a higher *risk category*, both portions shall be assigned to the higher *risk category*.

~~**Exception:** A single public assembly room with an occupant load of less than 500 shall be allowed in a *Risk Category II* building or structure and not be considered a multiple occupancy or a separate occupancy.~~ For the purposes of assigning a Risk Category in Table 1604.5 only, an Office building that would be assigned to Risk Category II on the basis of its primary occupancy, and has an occupant load of less than 4,500, shall be allowed to contain one assembly room or area with an occupant load of less than 500. All other requirements for Use, Occupancy and Means of Egress would remain as required by all other provisions of this Code.

Commenter's Reason: This code change would allow a single, modest meeting room or auditorium within an office building (a Risk Category II Building) without requiring the entire building to be designed as a Risk Category III. The total occupancy load of the combined uses would be less than the 5000 as currently allowed by the table. The 500 occupant load also matches what is allowed for an adult educational use.

This Public Comment has revised the change to have the exception clarify that any other requirements relating to Use, Occupancy and Means of Egress (all non- structural concerns) are not to be altered. This change would actually reduce the cost of construction of certain office buildings.

S81-12

Final Action: AS AM AMPC____ D

S86-12
1605.2

<u>Proposed Change as Submitted</u>

Proponent: Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee (huston@smithhustoninc.com)

Revise as follows:

1605.2 Load combinations using strength design or load and resistance factor design. Where strength design or load and resistance factor design is used, buildings and other structures, and portions thereof, shall be designed to resist the most critical effects resulting from the following combinations of factored loads:

$1.4(D + F)$	**(Equation 16-1)**
$1.2(D + F) + 1.6(L + H) + 0.5(L_r \text{ or } S \text{ or } R)$	**(Equation 16-2)**
$1.2(D + F) + 1.6(L_r \text{ or } S \text{ or } R) + 1.6H + (f_1L \text{ or } 0.5W)$	**(Equation 16-3)**
$1.2(D + F) + 1.0W + f_1L + 1.6H + 0.5(L_r \text{ or } S \text{ or } R)$	**(Equation 16-4)**
$1.2(D + F) + 1.0E + f_1L + 1.6H + f_2S$	**(Equation 16-5)**
$0.9D + 1.0W + 1.6H$	**(Equation 16-6)**
$0.9(D + F) + 1.0E + 1.6H$	**(Equation 16-7)**

where:

f_1 = 1 for places of public assembly live loads in excess of 100 pounds per square foot (4.79 kN/m2), and parking garages; and 0.5 for other live loads.

f_2= 0.7 for roof configurations (such as saw tooth) that do not shed snow off the structure, and 0.2 for other roof configurations.

Exceptions:

1. Where other factored load combinations are specifically required by other provisions of this code, such combinations shall take precedence.
2. Where the effect of *H* resists the primary variable load effect, a load factor of 0.9 shall be included with *H* where *H* is permanent and *H* shall be set to zero for all other conditions.
3. <u>Crane wheel loads need not be combined with roof live load or with more than three-fourths of the snow load or one-half of the wind load. Alternatively, industry standard reference documents citing additional crane load combinations shall be permitted for the design of buildings subject to horizontal and vertical crane loads.</u>

1605.3.1 Basic load combinations. Where *allowable stress design* (working stress design), as permitted by this code, is used, structures and portions thereof shall resist the most critical effects resulting from the following combinations of loads:

$D + F$	**(Equation 16-8)**
$D + H + F + L$	**(Equation 16-9)**
$D + H + F + (Lr \text{ or } S \text{ or } R)$	**(Equation 16-10)**
$D + H + F + 0.75(L) + 0.75(L_r \text{ or } S \text{ or } R)$	**(Equation 16-11)**
$D + H + F + (0.6W \text{ or } 0.7E)$	**(Equation 16-12)**
$D + H + F + 0.75(0.6W) + 0.75L + 0.75(L_r \text{ or } S \text{ or } R)$	**(Equation 16-13)**
$D + H + F + 0.75\,(0.7\,E) + 0.75\,L + 0.75\,S$	**(Equation 16-14)**
$0.6D + 0.6W + H$	**(Equation 16-15)**

$0.6(D + F) + 0.7E+H$ **(Equation 16-16)**

Exceptions:

1. Crane ~~hook~~ wheel loads need not be combined with roof live load or with more than three-fourths of the snow load or one-half of the wind load. Alternatively, industry standard reference documents citing additional crane load combinations shall be permitted for the design of buildings subject to horizontal and vertical crane loads.
2. Flat roof snow loads of 30 psf (1.44 kN/m2) or less and roof live loads of 30 psf (1.44 kN/m2) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 psf (1.44 kN/m2), 20 percent shall be combined with seismic loads.
3. Where the effect of *H* resists the primary variable load effect, a load factor of 0.6 shall be included with *H* where *H* is permanent and *H* shall be set to zero for all other conditions.
4. In Equation 16-15, the wind load, *W*, is permitted to be reduced in accordance with Exception 2 of Section 2.4.1 of ASCE 7.
5. In Equation 16-16, 0.6 *D* is permitted to be increased to 0.9 *D* for the design of special reinforced masonry shear walls complying with Chapter 21.

1605.3.2 Alternative basic load combinations. In lieu of the basic load combinations specified in Section 1605.3.1, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations. When using these alternative basic load combinations that include wind or seismic loads, allowable stresses are permitted to be increased or load combinations reduced where permitted by the material chapter of this code or the referenced standards. For load combinations that include the counteracting effects of dead and wind loads, only two-thirds of the minimum dead load likely to be in place during a design wind event shall be used. When using allowable tresses which have been increased or load combinations which have been reduced as permitted by the material chapter of this code or the referenced standards, where wind loads are calculated in accordance with Chapters 26 through 31 of ASCE 7, the coefficient (ω) in the following equations shall be taken as 1.3. For other wind loads, (ω) shall be taken as 1. When allowable stresses have not been increased or load combinations have not been reduced as permitted by the material chapter of this code or the referenced standards, (ω) shall be taken as 1. When using these alternative load combinations to evaluate sliding, overturning and soil bearing at the soil-structure interface, the reduction of foundation overturning from Section 12.13.4 in ASCE 7 shall not be used. When using these alternative basic load combinations for proportioning foundations for loadings, which include seismic loads, the vertical seismic *load effect*, E_v, in Equation 12.4-4 of ASCE 7 is permitted to be taken equal to zero.

$D + L + (L_r \text{ or } S \text{ or } R)$ **(Equation 16-17)**
$D + L + 0.6\ \omega W$ **(Equation 16-18)**
$D + L + 0.6\ \omega W + S/2$ **(Equation 16-19)**
$D + L + S + 0.6\ \omega W/2$ **(Equation 16-20)**
$D + L + S + E/1.4$ **(Equation 16-21)**
$0.9D + E/1.4$ **(Equation 16-22)**

Exceptions:

1. Crane ~~hook~~ wheel loads need not be combined with roof live loads or with more than three-fourths of the snow load or one-half of the wind load. Alternatively, industry standard reference documents citing additional crane load combinations shall be permitted for the design of buildings subject to horizontal and vertical crane loads.
2. Flat roof snow loads of 30 psf (1.44 kN/m2) or less and roof live loads of 30 psf (1.44 kN/m2) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 psf (1.44 kN/m2), 20 percent shall be combined with seismic loads.

Reason: Current code language does not completely or adequately address the issue of load combinations for the design of buildings with bridge cranes. This includes buildings and other structures that have multiple crane runways adjacent to one another and/or multiple cranes on the same runway. An exception pointing to industry standard reference documents, such as the Association of Iron and Steel Technology (AIST) “Technical Report No. 13 - Guide for the Design and Construction of Mill Buildings”, allows the engineer to utilize such resources when determining additional load combinations that may control in the design of such buildings.

Cost Impact: The code change proposal will not increase the cost of construction.

1605.2-S-HUSTON

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This code change had many wording problems that need to be worked out. The committee finds the phrase "Alternatively industry standard reference documents shall be permitted……" to be problematic.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Daniel J. Walker, P.E., Thomas Associates, Inc, representing Metal Building Manufacturers Association, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

1605.2 Load combinations using strength design or load and resistance factor design. Where strength design or load and resistance factor design is used, buildings and other structures, and portions thereof, shall be designed to resist the most critical effects resulting from the following combinations of factored loads:

$1.4(D + F)$	**(Equation 16-1)**
$1.2(D + F) + 1.6(L + H) + 0.5(L_r \text{ or } S \text{ or } R)$	**(Equation 16-2)**
$1.2(D + F) + 1.6(L_r \text{ or } S \text{ or } R) + 1.6H + (f_1L \text{ or } 0.5W)$	**(Equation 16-3)**
$1.2(D + F) + 1.0W + f_1L + 1.6H + 0.5(L_r \text{ or } S \text{ or } R)$	**(Equation 16-4)**
$1.2(D + F) + 1.0E + f_1L + 1.6H + f_2S$	**(Equation 16-5)**
$0.9D + 1.0W + 1.6H$	**(Equation 16-6)**
$0.9(D + F) + 1.0E + 1.6H$	**(Equation 16-7)**

where:

f_1 = 1 for places of public assembly live loads in excess of 100 pounds per square foot (4.79 kN/m2), and parking garages; and 0.5 for other live loads.

f_2 = 0.7 for roof configurations (such as saw tooth) that do not shed snow off the structure, and 0.2 for other roof configurations.

Exceptions:

1. Where other factored load combinations are specifically required by other provisions of this code, such combinations shall take precedence.
2. Where the effect of *H* resists the primary variable load effect, a load factor of 0.9 shall be included with *H* where *H* is permanent and *H* shall be set to zero for all other conditions.
3. <u>Crane hook loads need not be combined with roof live load or with more than three-fourths of the snow load or one-half of the wind load.</u>

Commenter's Reason: The committee disapproved the original proposal because in addition to trying to make all of the load combinations consistent with respect to crane loads plus other transient loads, it tried to permit alternate industry standard reference documents for the load combinations that include crane loads and this was found to be problematic. This public comment seeks to just correct the inconsistency between the allowable stress load combinations and the strength load combinations that currently exists in the IBC, i.e. the proposed new Exception 3 in Section 1605.2 mirrors the exception that already exists for the allowable load combinations and alternate allowable load combinations in Sections 1605.3.1 and 1605.3.2, respectively, in Exception 1

S86-12

Final Action: AS AM AMPC____ D

S87-12
202, Table 1607.1

Proposed Change as Submitted

Proponent: Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB) (gehrlich@nahb.org)

Delete without substitution:

SECTION 202
DEFINITIONS

~~**MARQUEE.** A *canopy* that has a top surface which is sloped less than 25 degrees from the horizontal and is located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the marquee.~~

Revise as follows:

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND
MINIMUM CONCENTRATED LIVE LOADS[g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
~~21. Marquees~~	~~75~~	~~-~~
26. Roofs		
All roof surfaces subject to maintenance workers		300
Awnings and canopies:		
Fabric construction supported by a skeleton structure	5 Nonreducible	
All other construction	20[n]	
Ordinary flat, pitched, and curved roofs (that are not occupiable)	20	
Where primary roof members are exposed to a work floor, at single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs:		
Over manufacturing, storage warehouses, and repair garages		2,000
All other primary roof members		300
Occupiable roofs:		
Roof gardens	100	
Assembly areas	100[m]	
All other similar areas	Note 1	Note 1

<u>n Where a canopy has a top surface sloped less than 25 degrees from the horizontal and is located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the canopy, the minimum live load shall be taken as the live load of the adjacent room or space, but not less than 40psf. The maximum live load for canopies less than or equal to 100 square feet in area shall be 60psf.</u>

(Portions of Table and footnotes not shown remain unchanged)

Reason: The purpose of this amendment is to revise the 2012 IBC language regarding canopies and marquees. The language approved for the 2012 IBC will substantially change the design requirements for many small porch and patio roofs on buildings nowhere near public streets. These roofs are currently designed for standard roof live loads or local ground snow loads (typically in the range of 20 or 30 pounds per square foot). These elements will now need to be designed for 75psf if they happen to be less than

10 feet vertically from a window above or horizontally from a window at the level of the canopy. This represents a substantial increase in design requirements for apartment or condominium complexes with these elements, as well as a substantial issue for renovations. This change deletes the definition for marquees in its entirety and transfers the language regarding canopy slope and ability to access the top surface from nearby openings to a footnote on the standard canopy live load. It also requires the window to be operable. The live load for the accessible canopy condition is set to the adjacent occupancy, with a minimum floor of 40psf (equivalent to the traditional load for a residential deck). To avoid effectively further raising the live load requirement from 75psf to 100psf for a small canopy accessible from an egress hallway or stair, a maximum live load of 60psf is established for canopies not exceeding 100 square feet in area (similar to what the traditional load cases were for residential balconies).

Cost Impact: The code change proposal will not increase the cost of construction.

T1607.1-S-EHRLICH.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal would remove the definition of marquee which in turn leaves Section 3106 without the definition that ties it into code requirements. The increased canopy loads may have been an unintended consequence of prior code changes, but come up with an alternative that leaves the definition of marquees.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, P.E, representing National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

MARQUEE. A canopy that has a top surface which is sloped less than 25 degrees from the horizontal and is located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the marquee.

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND
MINIMUM CONCENTRATED LIVE LOADS[g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
21. Marquees, except one- and two-family dwellings	75	—
~~21~~22. Office Buildings		
~~22~~23. Penal Institutions		
~~23~~24. Recreational uses		
~~24~~25. Residential One- and two-family dwellings Uninhabitable attics without storage[i] Uninhabitable attics with storage [i, j, k] Habitable attics and sleeping areas[k] Canopies, including marquees All other areas Hotels and multifamily dwellings Private rooms and corridors serving them Public rooms[m] and corridors serving them	 10 20 30 20 40 40 100	
~~25~~26. Roofs All roof surfaces subject to maintenance workers Awnings and canopies: Fabric construction supported by a skeleton structure All other construction, except one- and two-family dwellings Ordinary flat, pitched, and curved roofs (that are not occupiable)	 5 nonreducible 20[n]	 300

Where primary roof members are exposed to a work floor, at single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs: Over manufacturing, storage warehouses, and repair garages All other primary roof members Occupiable roofs: Roof gardens Assembly areas All other similar areas	20 100 100[m] Note l	 2,000 300 Note l

a. ~~Where a canopy has a top surface sloped less than 25 degrees from the horizontal and is located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the canopy, the minimum live load shall be taken as the live load of the adjacent room or space, but not less than 40psf. The maximum live load for canopies less than or equal to 100 square feet in area shall be 60psf.~~

(Portions of Table and footnotes not shown remain unchanged)

Commenter's Reason: The purpose of this public comment is to revise our proposal to address issues raised by the IBC Structural Committee and testimony from the floor. The two primary issues were that the committee and testifiers noted a need to retain a definition for marquees, to go with the provisions of Section 3106, and to retain the higher live load for the types of appurtenances likely to be climbed by drunk football fans or used by rock bands filming videos.

NAHB's concern with NCSEA's change last cycle is that it could result in a significant design load increase for canopies and canopy-like structures (porch and patio roofs) associated with Group R-3 dwellings and townhouses and with Group R-2 low-rise apartment and condominium buildings. In addressing this issue, it is difficult to separate Group R-2 buildings in urban environments, where NCSEA's concerns may be applicable, with Group R-2 buildings in planned communities in the suburbs where many of the issues likely do not exist. Addressing Group R-3 dwellings and townhouses, however, can be more easily accomplished. The occupant load of Group R-3 structures is low, so even if a flat or low-slope canopy or canopy-like (porch or patio) roof is used for egress or the family chooses to sit on it to watch fireworks the loads are light and the standard 20psf roof live load is sufficient.

So, the proposal is amended to replace the proposed footnote with an added line under table 1607.1 Item 21 – Residential – One and two-family dwellings for canopies (including marquees) with a live load of 20psf, regardless of roof slope, access or support conditions. This will restore the traditional design requirement for Group R-3 dwellings and maintain consistency with the IRC.

This public comment also restores the definition for marquees as requested by the committee to coordinate with the design provisions for marquees in IBC Section 3106. It is noted that Section 3106.5 indicates that a "marquee" must be supported entirely off of the building, which leaves a potential conflict with the definition in that a canopy supported at both the building and on independent columns becomes a "marquee" if it has a low-slope roof. It is left to future code cycles to address this conflict.

S87-12

Final Action: AS AM AMPC____ D

S94-12
1607.10.2

Proposed Change as Submitted

Proponent: Gary R. Searer/Wiss, Janney, Elstner Associates, Inc., representing self

Revise as follows:

1607.10.2 Alternative uniform live load reduction. As an alternative to Section 1607.10.1 and subject to the limitations of Table 1607.1, uniformly distributed live loads are permitted to be reduced in accordance with the following provisions. Such reductions shall apply to slab systems, beams, girders, columns, piers, walls and foundations.

1. A reduction shall not be permitted where the live load exceeds 100 psf (4.79 kN/m^2) except that the design live load for members supporting two or more floors is permitted to be reduced by a maximum of 20 percent.

   Exception: For uses other than storage, where *approved*, additional live load reductions shall be permitted where shown by the *registered design professional* that a rational approach has been used and that such reductions are warranted.

2. A reduction shall not be permitted in passenger vehicle parking garages except that the live loads for members supporting two or more floors are permitted to be reduced by a maximum of 20 percent.
3. For live loads not exceeding 100 psf (4.79 kN/m^2), the design live load for any structural member supporting 150 square feet (13.94 m^2) or more is permitted to be reduced in accordance with Equation 16-24.
4. For one-way slabs, the area, A, for use in Equation 16-24 shall not exceed the product of the slab span and a width normal to the span of 0.5 times the slab span.

$R = 0.08(A – 150)$ **(Equation 16-24)**

For SI: $R = 0.861(A – 13.94)$

Such reduction shall not exceed the smallest of:

1. 40 percent for ~~horizontal~~ members <u>supporting one floor</u>;
2. 60 percent for ~~vertical~~ members <u>supporting two or more floors</u>; or
3. R as determined by the following equation.

$R = 23.1(1+ D/L_o)$ **(Equation 16-25)**

where:

A = Area of floor supported by the member, square feet (m^2).
D = Dead load per square foot (m^2) of area supported.
L_o = Unreduced live load per square foot (m^2) of area supported.
R = Reduction in percent.

Reason: The alternate live load reductions contained in Section 1607.9.2 originated in the Uniform Building Code and were the primary live load reduction formulas used in the western United States for decades. When the live load reductions were brought into the IBC, they were incorporated as an alternate to Section 1607.9.1. During the incorporation of these reductions into the IBC, the maximum reductions were changed from "40 percent for members receiving load from one level only" and "60 percent for other members" (in the 1997 UBC) to the current 40/60 differentiation between horizontal and vertical members. This current differentiation does not match the original wording (because some horizontal members receive live load from more than one floor and because many vertical elements do not receive live load from more than one floor) and does not match the differentiation in Section 1607.9.1, which, like the UBC, differentiates reductions based on whether a member supports one floor or more than one floor: "L shall not be less than $0.50L_o$ for members supporting one floor and L shall not be less than $0.40L_o$ for members supporting two or more floors." The premise behind differentiating between supporting one floor or more than one floor is basically probability-based, and reasonably assumes that the probability that two or more floors are experiencing a relatively large live load is smaller than that of a single floor experiencing a relatively large live load; hence the larger reduction for elements that support more than one floor. The same premise cannot be said of differentiating live load reductions based on horizontality or verticality of the element under consideration.

Since basing allowable live load reductions on number of floors supported as opposed to whether a member is horizontal or vertical makes more sense, this proposal restores the original intent of the UBC provision and brings the provision into better alignment with Section 1607.9.1.

Cost Impact: The code change proposal will not increase the cost of construction.

1607.9.2-S-SEARER.doc

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The proposed clarification to the alternative live load reduction method, seemed reasonable but the omission of roof loads was not adequately explained.

Assembly Action: **None**

<u>Individual Consideration Agenda</u>

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary Searer, Wiss Janney, Elstner Associates, Inc. (WJE), representing self, requests Approval as Submitted.

Commenter's Reason: During the code hearings and the consideration of S94, the IBC-Structural Committee raised a question regarding reduction of <u>roof</u> live loads in the 1997 UBC versus how they are handled in the 2012 IBC. Since no one had a copy of the language from the 1997 UBC, the Committee opted to disapprove the proposed change until the question could be answered.

As it turns out, roof live loads are not an issue, because roof live load reductions are handled via a different method. The language in this code change proposal is well thought out. The proposal corrects a mistake that was made years ago in moving the UBC language into the IBC.

The alternate live load reductions contained in Section 1607.9.2 originated in the *Uniform Building Code* and were the primary live load reduction formulas used in the western United States for decades. When the live load reductions were brought into the IBC, they were incorporated as an alternate to Section 1607.9.1. During the incorporation of these reductions into the IBC, the maximum reductions were changed from "40 percent for members receiving load from one level only" and "60 percent for other members" (in the 1997 UBC) to the current 40/60 differentiation between horizontal and vertical members.

This current differentiation does not match the original wording (because some horizontal members receive live load from more than one floor and because many vertical elements do not receive live load from more than one floor) and does not match the differentiation in IBC Section 1607.9.1, which, like the UBC, differentiates reductions based on whether a member supports one floor or more than one floor: "L shall not be less than $0.50L_o$ for members supporting one floor and L shall not be less than $0.40L_o$ for members supporting two or more floors."

The premise behind differentiating between supporting one floor or more than one floor is basically probability-based, and reasonably assumes that the probability that two or more floors are experiencing a relatively large live load is smaller than that of a single floor experiencing a relatively large live load; hence the larger reduction for elements that support more than one floor. The same premise cannot be said of differentiating live load reductions based on horizontality or verticality of the element under consideration, which is what the existing language does.

To correct this error, I respectfully ask that this code change be considered for approval as submitted.

S94-12
Final Action: AS AM AMPC____ D

S97-12
1609.1.1, Chapter 35 (New)

Proposed Change as Submitted

Proponent: Ray C. Minor, P.E., Hapco, representing self (ray.minor@hapco.com)

Revise as follows:

1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7 or provisions of the alternate all-heights method in Section 1609.6. The type of opening protection required, the ultimate design wind speed, *Vult*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AF&PA WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with Chapter 31 of ASCE 7.
7. <u>Luminaire support structures designed in accordance with AASHTO LTS-5.</u>

The wind speeds in Figures 1609A, 1609B and 1609C are ultimate design wind speeds, *Vult*, and shall be converted in accordance with Section 1609.3.1 to nominal design wind speeds, *Vasd*, when the provisions of the standards referenced in Exceptions 1 through 5 <u>and 7</u> are used.

Add new standard to Chapter 35 as follows:

<u>AASHTO</u>

<u>American Association of State Highway and Transportation Officials</u>
<u>444 North Capitol Street, NW Suite 249</u>
<u>Washington, DC 20001</u>

<u>LTS-5 Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals</u>

Reason: AASHTO LTS-5 is based on much research and many years of experience in using primarily pole type structures to support signs, luminaires and traffic signals along roadways. These type structures are also used for non-roadway applications such as sports lighting and parking lot lighting which may fall under the jurisdiction of the IBC. AASHTO LTS-5 incorporates the results of wind tunnel tests specific to shapes of these structures and the equipment they support. The wind pressure calculations are based on ASCE-7 except with some refinements such as more detailed drag coefficients. Stadium lighting poles involved in several recent failures would not meet the fatigue requirements of AASHTO LTS-5 primarily because the base plates were too thin. These failures most likely would not have occurred if the poles were designed to AASHTO LTS-5.

AASHTO LTS-5 is developed by an AASHTO committee with a consensus procedure.
There are other exceptions as precedents for this exception, including similar specifications for flagpoles and communications antennae. The flagpole specification NAAMM 1001 Guide Specification for Design of Metal Flagpoles includes flag wind load equations but otherwise uses the AASHTO LTS-5 procedures for flagpoles

Cost Impact: The code change proposal will not increase the cost of construction.

1609.1.1-S-MINOR

Public Hearing Results

Note: For staff analysis of the content of AASHTO LTS-5 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee is not convinced that luminaire support structures need to be addressed in the code. These are typically in the right-of-way and not regulated by the IBC.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Ray C. Minor, Hapco, representing self, requests Approval as Submitted

Commenter's Reason: The IBC-S Code Committee's stated reason for disapproval was "The committee is not convinced that luminaire support structures need to be addressed in the code. These are typically in the right-of-way and not regulated by the IBC." My reply to this is that the two largest manufactures of luminaire support structures in the US (Hapco and Valmont) estimate that half of these structures they sell are for non-roadway use.

Except for using an earlier version of the AASHTO specification, the proposed change is already in the Florida Building Code-2010:

1609.1.1 Exception 7. Designs using AASHTO LTS-4 Structural Specifications for Highway Signs, Luminaires and Traffic Signals.

Public Comment 2:

Michael Fedlberg, P.E., Minnesota, Florida/Valmont Industries Inc., representing self, requests Approval as Submitted.

Commenter's Reason: AASHTO LTS-5 Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals is the only Specification dedicated to pole type structures. It covers them in detail and is highly respected by all pole manufacturers in the United States. ASCE 7 with Commentary does not have special provisions for structural supports for signs and luminaires. These metal pole type structures fall in the same category as Chimneys, Tanks and Similar Structures under Flexible Buildings and Structures in ASCE 7. Since ASCE 7 with Commentary does not provide guidelines for design of pole type structures, a reliable source must be used to determine appropriate formulas that are recognized and documented. In the case of lightpoles and similar structures, a logical source for these formulas and guidelines is the ASSHTO Specification LTS-5. Both ASCE 7 and ICC already recognize the NAAMM FP 1001 as an acceptable specification for the design of metal flagpoles. However, the procedures used to determine design loads for metal flagpole set forth in the AASHTO Specifications, please see the introduction to the NAAMM FP 1001 attached. I believe that ICC should accord the same recognition to the AASHTO Specification LTS-5 and accept the change proposed by Ray C. Minor.

The design of safe flagpoles requires knowledge of the loads to which they will be subjected. The principal loads acting on flagpoles are the wind loads, and it is these loads which must be most carefully determined. Maximum wind speeds to which flagpoles are exposed depend on the geographical location, whether or not it is in the center of a large city, the outskirts of a small town, the seashore at ground level or on the roof of a high rise building. Wind speeds are generally higher along coastal areas than inland. They are also higher in open country than in the center of cities, and wind speed increases with height above ground.

ASCE 7-05, page 300, third paragraph states "It is not the intent of this standard to exclude the use of other recognized literature for the design of special structures,….. For the design of flagpoles, see ANSI/NAAMM FP1001-97, 4th Ed., Guide Specifications for Design of Metal Flagpoles." This 5th Edition of the Guide follows the same design procedure as the 4th Edition.

The wind will exert a force on the pole itself as well as on the flag, and these two forces must be taken into consideration to determine the total load. Different size flags are flown from different poles, and it is important that flagpoles be selected which are capable of supporting the largest size flag intended to be flown under the highest speed wind to which it will be subjected. Loads on the flagpole are resisted by the mounting and the foundation or building structure (roof or wall) to which it is secured. The procedures used to determine wind loads on flagpoles are those set forth in the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. There is sufficient similarity between flagpoles and the poles used for signs, lights and signals to justify this approach. Furthermore, there has been a vast amount of knowledge and data accumulated by AASHTO on the requirements for pole design because of experience with many types of poles installed all across the country which are subjected to the wind conditions occurring in these varied geographical locations. NAAMM believes that the procedures developed by AASHTO over the years provide a sound basis for the determination of flagpole loadings without the flag flying

However, a flagpole's function is to fly flags, and hence this standard presents procedures for determining the loads applied to poles as a result of the wind loads on flags. The original procedures set forth in the first edition of this standard in 1983 were developed by NAAMM as a result of a laboratory test program conducted in the fall of 1979 in which flags attached to a flagpole were subjected to winds generated by an aircraft engine and propeller. There were limitations to flag sizes and wind speeds in this program. Recognizing the limitations of the laboratory test program, NAAMM initiated a program of actual flight testing of flags in sizes ranging from 5 ft x 8 ft (1.5 m x 2.4 m) through 20 ft x 30 ft (6.1 m x 9.1 m) and at air speeds from 60 mph (27 m/s) up to 110 mph (49 m/s). This flight test program, completed in the fall of 1984, yielded the most complete and reliable data obtained to date on the loading of flags under high speed wind conditions. The results of this test program provided the basis for the development of the flag drag formulas given in the later editions of these guide specifications.

In the determination of the pole design, the inclusion of the wind load on the flag with the wind load on the pole, provides an added degree of safety for the flagless pole. Flags are not always lowered when a high speed wind occurs. Under such a circumstance the flag can be ripped off of the pole. Some flags are made of materials such as nylon which are very strong and resist the tendency to rip away as flags in years past were prone to do. NAAMM recommends that flagpole designers consider both pole and flag loads when selecting a flagpole design. Building codes that do not take into account the load caused by the flag drag do not require a design as safe as that required by this standard. Nevertheless, the designer shall check to be certain that his design meets or exceeds the requirements of the governing building code.

This 5th edition of the standard has replaced the basic wind speed map found in the previous editions with the new wind speed map in ASCE 7-05 which is based on 3-second gust speeds.

Public Comment 3:

Carl J. Macchietto, Valmont Industries Inc., requests Approval as Submitted

Commenter's Reason: Valmont is in full support of this proposal. Approximately 50 percent of light pole structures are not on roadways. They are located in parking lots, building security lighting, and athletic fields. Referencing the AASHTO Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals seems prudent given that this specification specializes in the design of these types of structures.

S97-12
Final Action: AS AM AMPC____ D

S98-12
1609.1.1, 1609.3.1

Proposed Change as Submitted

Proponent: Randall Shackelford, P.E., Simpson Strong-Tie Company, Inc. (rshackelford@strongtie.com)

Revise as follows:

1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7 or provisions of the alternate all-heights method in Section 1609.6. The type of opening protection required, the ultimate design wind speed, V_{ult}, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AF&PA WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with Chapter 31 of ASCE 7.

The wind speeds in Figures 1609A, 1609B and 1609C are ultimate design wind speeds, V_{ult}, and shall be converted in accordance with Section 1609.3.1 to nominal design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions ~~1~~ <u>3</u> through 5 are used.

1609.3.1 Wind speed conversion. When required, the ultimate design wind speeds of Figures 1609A, 1609B and 1609C shall be converted to nominal design wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-33.

$$V_{asd} = V_{ult}\sqrt{0.6} \qquad \textbf{(Equation 16-33)}$$

where:

V_{asd}= nominal design wind speed applicable to methods specified in Exceptions ~~1~~ <u>3</u> through 5 of Section 1609.1.1 <u>and other standards not based on ultimate wind speeds</u>.
V_{ult}= ultimate design wind speeds determined from Figures 1609A, 1609B or 1609C.

Reason: The 2012 WFCM, as referenced in Exception 2 above, is based on Ultimate Wind Speeds, V_{ult}, and therefore does not require conversion of the ultimate wind speed to the nominal wind speed, V_{asd}.
Further, the WFCM is the reference standard for wood framing in the ICC-600, so conversion should not take place when using ICC-600 to design wood framing. A committee has been appointed to revise ICC-600, and this code change is written assuming that the basis of ICC-600 will be changed to V_{ult} windspeeds, with conversion factors in the standard for converting to V_{asd} where needed. If by the Public Comment deadline it is not clear that this will be the case, I will prepare a Public Comment to restore Exception 1 to the list of items where conversion is required.

If this code change is not approved, structures designed using the 2012 WFCM with converted windspeeds will be designed for pressures that are only 60% of the pressures they should be designed for.

Section 1609.3.1 needs to be revised for similar reasons. Also, there are other building materials that require testing to "nominal" windspeeds, such as composition shingles in Section 1507.2.7.1. So nominal wind speeds, V_{asd}, is not just used in the Exceptions to 16009.1.1.

Cost Impact: This is not really a fair question for this code change. Yes, there will be a cost impact, because it would definitely be cheaper to design to wind loads that are 40% too low. But you don't want to do that.

1609.1.1-S-SHACKELFORD.doc

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7 or provisions of the alternate all-heights method in Section 1609.6. The type of opening protection required, the ultimate design wind speed, V_{ult}, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AF&PA WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with Chapter 31 of ASCE 7.

The wind speeds in Figures 1609A, 1609B and 1609C are ultimate design wind speeds, V_{ult}, and shall be converted in accordance with Section 1609.3.1 to nominal design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 3 through 5 are used.

1609.3.1 Wind speed conversion. When required, the ultimate design wind speeds of Figures 1609A, 1609B and 1609C shall be converted to nominal design wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-33.

$$V_{asd} = V_{ult}\sqrt{0.6} \quad \textbf{(Equation 16-33)}$$

where:

V_{asd}= nominal design wind speed applicable to methods specified in Exceptions 3 through 5 of Section 1609.1.1 ~~and other standards not based on ultimate wind speeds~~.
V_{ult}= ultimate design wind speeds determined from Figures 1609A, 1609B or 1609C.

Committee Reason: This proposal corrects the exceptions that are referred to in regards to nominal design wind speeds for consistency. The modification removes a proposed reference to "other standards" that is too vague.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bonnie Manley, American Iron and Steel Institute, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7 or provisions of the alternate all-heights method in Section 1609.6. The type of opening protection required, the ultimate design wind speed, V_{ult}, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AF&PA WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with Chapter 31 of ASCE 7.

The wind speeds in Figures 1609A, 1609B and 1609C are ultimate design wind speeds, V_{ult}, and shall be converted in accordance with Section 1609.3.1 to nominal design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions ~~3 through~~ 4 and 5 are used.

1609.3.1 Wind speed conversion. When required, the ultimate design wind speeds of Figures 1609A, 1609B and 1609C shall be converted to nominal design wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-33.

$$V_{asd} = V_{ult}\sqrt{0.6}$$ **(Equation 16-33)**

where:

V_{asd}= nominal design wind speed applicable to methods specified in Exceptions ~~3 through~~ 4 and 5 of Section 1609.1.1
V_{ult}= ultimate design wind speeds determined from Figures 1609A, 1609B or 1609C.

Commenter's Reason: AISI has recently completed the development of Supplement 3-12 for AISI S230-07, which converts the standard to the Ultimate Wind Speed, V_{ult}, basis. Therefore, using it no longer requires conversion of the ultimate wind speed to the nominal wind speed, V_{as}, as specified in Section 1609.3.1. The modifications recommended in this public comment reflect this change.

AISI S230-07 w/S3-12 will be recommended for adoption during the ICC Group B Administrative update process in 2013. It can be downloaded for review from the AISI website: www.steel.org.

S98-12

Final Action: AS AM AMPC____ D

S102-12

202 (New), 1403.7, 1603.1.7, 1612.4, 1612.5, G103.7, G301.2, G401.2; IPC 309.3; IMC 301.16.1

Proposed Change as Submitted

Proponent: John Ingargiola and Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (john.ingargiola@dhs.gov, gregory.p.wilson@dhs.gov) and Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net).

Add new text as follows:

SECTION 202
DEFINITIONS

COASTAL A ZONE. Area within a special flood hazard area, landward of a V zone or landward of an open coast without mapped V Zones. In a coastal A zone, the principal source of flooding must be astronomical tides, storm surges, seiches, or tsunamis, not riverine flooding. During the base flood conditions, the potential for breaking wave height shall be greater than or equal to 1.5 ft. The inland limit of the coastal A zone is (a) the Limit of Moderate Wave Action if delineated on a FIRM, or (b) designated by the authority having jurisdiction.

LIMIT OF MODERATE WAVE ACTION. Line that may be shown on FIRMs to indicate the inland limit of the 1.5-foot wave height during the base flood.

Revise as follows:

1403.7 Flood resistance for high-velocity wave action areas and coastal A zones. For buildings in flood hazard areas subject to high-velocity wave action and coastal A zones as established in Section 1612.3, electrical, mechanical and plumbing system components shall not be mounted on or penetrate through exterior walls that are designed to break away under flood loads.

Revise as follows:

1603.1.7 Flood design data. For buildings located in whole or in part in *flood hazard areas* as established in Section 1612.3, the documentation pertaining to design, if required in Section 1612.5, shall be included and the following information, referenced to the datum on the community's Flood Insurance Rate Map (FIRM), shall be shown, regardless of whether flood loads govern the design of the building:

1. In *flood hazard areas* not subject to high-velocity wave action or coastal A zones, the elevation of the proposed lowest floor, including the basement.
2. In *flood hazard areas* not subject to high-velocity wave action or coastal A zones, the elevation to which any nonresidential building will be dry flood proofed.
3. In *flood hazard areas* subject to high-velocity wave action or coastal A zones, the proposed elevation of the bottom of the lowest horizontal structural member of the lowest floor, including the basement.

1612.4 Design and construction. The design and construction of buildings and structures located in *flood hazard areas*, including flood hazard areas subject to high-velocity wave action and coastal A zones, shall be in accordance with Chapter 5 of ASCE 7 and with ASCE 24.

1612.5 Flood hazard documentation. The following documentation shall be prepared and sealed by a *registered design professional* and submitted to the *building official*:

1. For construction in *flood hazard areas* not subject to high-velocity wave action or coastal A zones:
   1.1. The elevation of the lowest floor, including the basement, as required by the lowest floor elevation inspection in Section 110.3.3.
   1.2. For fully enclosed areas below the design flood elevation where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.6.2.1 of ASCE 24, c*onstruction documents* shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.6.2.2 of ASCE 24.
   1.3. For dry floodproofed nonresidential buildings, *construction documents* shall include a statement that the dry floodproofing is designed in accordance with ASCE 24.
2. For construction in flood hazard areas subject to high-velocity wave action and coastal A zones:
   2.1. The elevation of the bottom of the lowest horizontal structural member as required by the lowest floor elevation inspection in Section 110.3.3.
   2.2. *Construction documents* shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and flood loads acting simultaneously on all building components, and other load requirements of Chapter 16.
   2.3. For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m^2) determined using allowable stress design, *construction documents* shall include a statement that the breakaway wall is designed in accordance with ASCE 24.

Revise as follows:

G103.7 Alterations in coastal areas. Prior to issuing a permit for any alteration of sand dunes and mangrove stands in flood hazard areas subject to high velocity wave action and coastal A zones, the *building official* shall require submission of an engineering analysis which demonstrates that the proposed alteration will not increase the potential for flood damage.

G301.2 Subdivision requirements. The following requirements shall apply in the case of any proposed subdivision, including proposals for manufactured home parks and subdivisions, any portion of which lies within a flood hazard area:

1. The flood hazard area, including floodways, ~~and~~ areas subject to high velocity wave action, and coastal A zones, as appropriate, shall be delineated on tentative and final subdivision plats;
2. Design flood elevations shall be shown on tentative and final subdivision plats;
3. Residential building lots shall be provided with adequate buildable area outside the floodway; and
4. The design criteria for utilities and facilities set forth in this appendix and appropriate *International Codes* shall be met.

G401.2 Flood hazard areas subject to high-velocity wave action and coastal A zones. In *flood hazard areas* subject to high-velocity wave action and coastal A zones:

1. New buildings and buildings that are substantially improved shall only be authorized landward of the reach of mean high tide.
2. The use of fill for structural support of buildings is prohibited.

[B] 309.3 Flood hazard areas subject to high-velocity wave action and coastal A zones. Structures located in flood hazard areas subject to high-velocity wave action and coastal A zones shall meet the requirements of Section 309.2. The plumbing systems, pipes and fixtures shall not be mounted on or penetrate through walls intended to break away under flood loads.

[B] 301.16.1 High-velocity wave action and coastal A zones. In flood hazard areas subject to high-velocity wave action and coastal A zones, mechanical systems and *equipment* shall not be mounted on or penetrate walls intended to break away under flood loads.

Reason: The IBC achieves compliance with the NFIP in Sec. 1612, by reference to ASCE 24 for the specific design and construction requirements. This proposal is to insert the term "coastal A zone" wherever the term "flood hazard area subject to high velocity wave action" appears, to be consistent with ASCE 24. Because of the way the term is defined, only if the Limit of Moderate Wave Action is delineated (or otherwise designated by the AHJ), is the area to be regulated as coastal A zone. ASCE 24-05 has provisions that apply in all Coastal High Hazard Areas (Zone V) and coastal A zones, essentially treating them the same (there are some slight differences because coastal A zones are shown as "Zone A" on Flood Insurance Rate Maps). When 1612.4 refers the user to ASCE 24, one of the first determinations is which flood hazard zone affects the building site. Currently, ASCE 24-05 requires the designer to determine whether conditions landward of Zone V meet the characteristics necessary for coastal A zone conditions. The proposed definition is consistent with the next edition of ASCE 24 that will specify that only if the Limit of Moderate Wave Action (LiMWA) is delineated on the FIRM (or otherwise designated by the AHJ) will the requirements for CAZ apply. FEMA uses the LiMWA to delineate the inland extend of CAZ.

A separate proposal was submitted to change the term "flood hazard area subject to high velocity wave action" to be "coastal high hazard area," which is the term used in the IRC and ASCE 24.

ASCE began the process of updating ASCE 24-05 in early 2011 and the next edition is expected to be published late 2012 or early 2013. The ASCE committee expects to have the near-final draft prepared and available at least a month before the Group A hearings and copies will be provided to the ICC committee.

Cost Impact: Costs will be lower because the RDP and the building official will not have to made independent determinations as to whether a site landward of a Zone V does or does not have coastal A zone conditions. For areas that are subject to coastal A zone conditions there is no change in construction costs because ASCE 24 already has specifications based on whether a building site is or is not subject to coastal A zone conditions.

1403.7-S-INGARGIOLA-WILSON.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed definitions included questionable code wording. The committee felt it was difficult to approve language for consistency with the next edition of ASCE 24 when that standard update was not available to the committee.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Ingargiola, Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency and Rebecca C. Quinn, R CQuinn Consulting, Inc., representing Department of Homeland Security, Federal Emergency Management Agency, request Approval as Modified by this Public Commnet.

Modify the proposal as follows:

SECTION 202
DEFINITIONS

COASTAL A ZONE. Area within a special flood hazard area, landward of a V zone or landward of an open coast without mapped ~~V Zones~~ *coastal high hazard areas*. In a coastal A zone, the principal source of flooding must be astronomical tides, storm surges, seiches, or tsunamis, not riverine flooding. During the base flood conditions, the potential for breaking wave height shall be greater than or equal to 1.5 ft. The inland limit of the coastal A zone is (a) the Limit of Moderate Wave Action if delineated on a FIRM, or (b) designated by the authority having jurisdiction.

LIMIT OF MODERATE WAVE ACTION. Line ~~that may be~~ shown on FIRMs to indicate the inland limit of the 1.5-foot breaking wave height during the base flood.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The committee indicated support for the proposal to define the Coastal A Zone not just by the presence of specific wave conditions, but whether the Limit of Moderate Wave Action has been delineated, or the coastal A zone is otherwise designated by the AHJ. This change mirrors the change to the revised ASCE 24 that's nearing completion. Currently, ASCE 24-05 requires designers to determine if moderate wave conditions are present, without reference to a source of that information. The committee commented on “questionable” wording that was in the proposed definitions (appearing permissive); that wording is proposed to be removed – and the same deletions were included in the third ballot for ASCE 24. The committee also commented that the term “V Zone” should be replaced with the “coastal high hazard area,” which is now defined and used in the IBC.

NOTE: The original S102-12 proposal modified everywhere the term “flood hazard areas subject to high velocity wave action” appears to add “and coastal A zones” in the following sections: 1403.7, 1603.1.7, 1612.4, 1612.5, G103.7, G301.2, G401.2, P309.3 and M301.16.1. Code change S103-12 was Approved as Submitted to replace the phrase “flood hazard areas subject to high velocity wave action” with “coastal high hazard areas.”

S102-12

Final Action: AS AM AMPC____ D

S107-12
1613.1

Proposed Change as Submitted

Proponent: James Bela, Oregon Earthquake Awareness, representing self

Revise as follows:

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions ~~in accordance with ASCE 7,~~ excluding Chapter 14 and Appendix 11A. The *seismic design category* for a structure ~~is permitted to~~ shall be determined in accordance with Section 1613 ~~or ASCE 7~~.

Exceptions:

1. Detached one- and two-family dwellings, assigned to *Seismic Design Category* A, B or C, or located where the mapped short-period spectral response acceleration, S_S, is less than 0.4 g.
2. The seismic force-resisting system of wood-frame buildings that conform to the provisions of Section
   2308 are not required to be analyzed as specified in this section.
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.

Reason: (1) ASCE 7 adopted the NEHRP Provisions (developed at the public's expense) as its "standard, then proceeded to charge the engineering community (and the public) for its "commandeering" of those Provisions as its standard.

(a) NEHRP Provisions previously have been adopted into model building codes, as in the Southern Building Code, with no problems (and, particularly, with no "added expense."
ASCE 7 carries a "disclaimer" for its use.

(2) ASCE 7 contains no "references" to justify its legitimacy.
(3) ASCE 7 was the instigator of so-called:) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) ~~(MCE~~) GROUND MOTION RESPONSE ACCELERATIONS FOR 0.2- and 1SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B.

(a) this is based on fatally flawed "applied mathematics" assumed in probabilistic seismic hazard assessment, or psha: see discussions under Code Change: FIGURES 1613.3.1 (1)(2)(3)(4)(5)(6)

(4) ASCE 7 is "codifying everything," and is becoming a de-facto code. Code provisions need to remain in a public consensus arena; their "disclaimer" perhaps absolves them from the problems they are creating – but they are creating "unintended consequences" for professional practice.
(5) ASCE 7 is full of errata, which casts substantial questions about the quality of effort and rigor that is going into its formulation.

Cost Impact: The code change proposal will decrease the cost of construction.

1613.1-S-BELA.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: By deleting the reference to ASCE 7 in Section 1613.1, this proposal would remove all seismic provisions from the code without a replacement. The ASCE 7 provisions which are maintained through a consensus process are preferable.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

James Bela, Oregon Earthquake Awareness, representing self, requests Approval as Submitted.

Commenter's Reason: The Committee Action for Disapproval incorrectly asserts that deleting the reference to ASCE 7 in Section 1613.1 "would remove all seismic provisions from the code without a replacement." This is not the case, as the present seismic provisions could simply be transferred back into the body of the IBC Structural Code, where they rightfully belong (and where they historically have always been).

This is also correctly an ICC Staff function, which always has (and must have) a current and working knowledge of what is actually in both the approved building code (and also that code's referenced standards). To require this level of effort on the part of proponents would provide an insurmountable barrier to addressing (at the fundamental conceptual level) truly important public safety issues with regard to seismic design provisions. And therefore this is, in fact, an appropriate use of the Code Change submittal process; and it is the first step in returning the seismic design provisions of the IBC Structural to their appropriate docket location and format, where scrutiny and future development changes can be more clearly stated, tracked, implemented and finally enforced.

I believe the ASCE 7 so-called "consensus process" is very questionable at best, because: (a) too much of it is conducted in secret; (b) too much of it is made difficult to access or follow on the ASCE web site by interested parties and the public; and (c) the credentials, knowledge base, and biases of those participating in the ASCE 7 process are clouded and opaque; and finally (d) this process disclaims any accountability or responsibility for the use of this (unfortunately, errata-riddled) document.

So, to protect public safety . . .

"PAY NO ATTENTION TO THAT MAN BEHIND THE CURTAIN!"

http://www.youtube.com/watch?v=YWyCCJ6B2WE

S107-12

Final Action: AS AM AMPC____ D

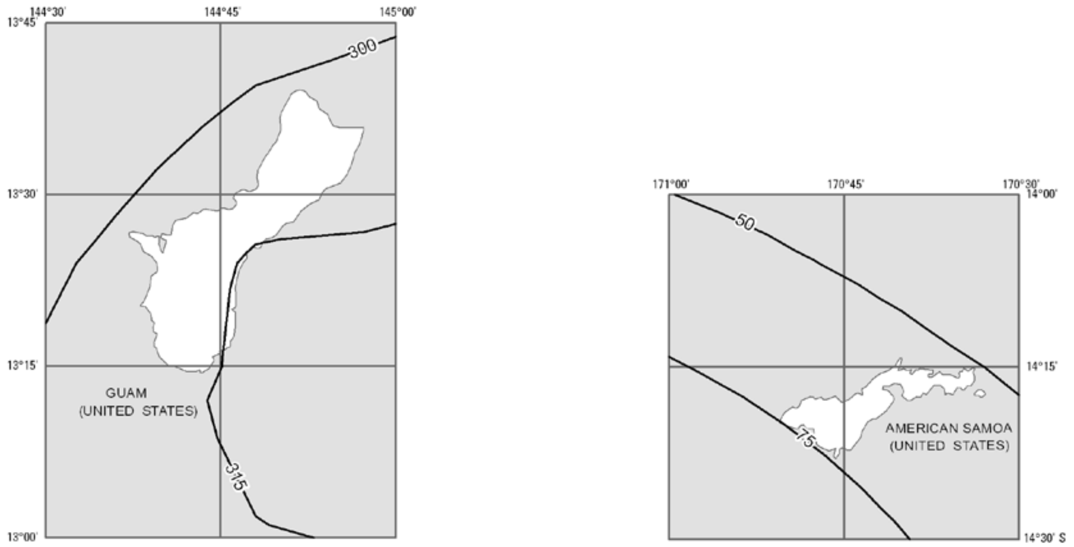
S109-12
1613.3.1

Proposed Change as Submitted

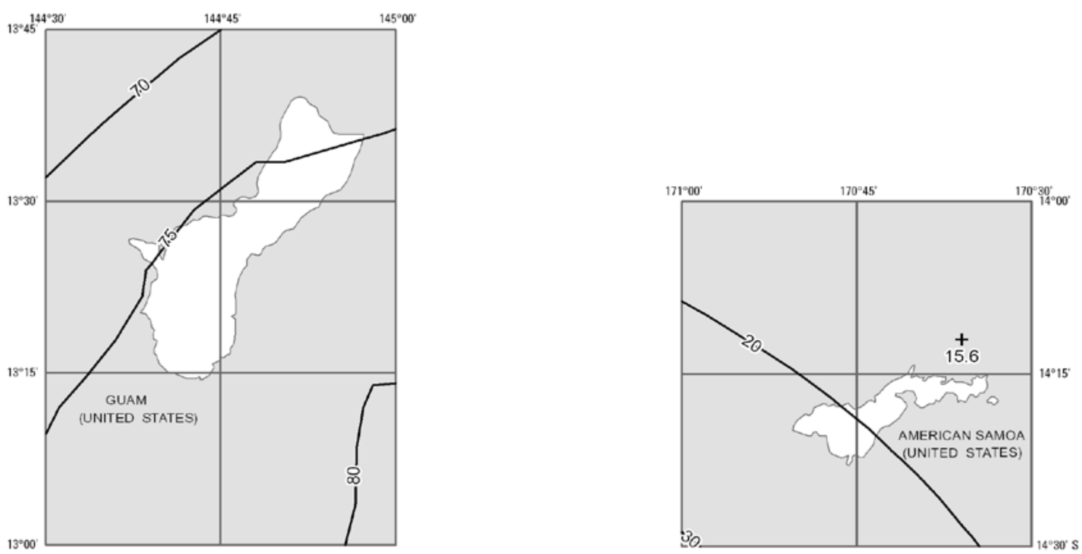
Proponent: Nicolas Luco, US Geological Survey (USGS), representing National Earthquake Hazards Reduction Program (nluco@usgs.gov), Michael Mahoney, Federal Emergency Management Agency (FEMA), representing National Earthquake Hazards Reduction Program

Revise as follows:

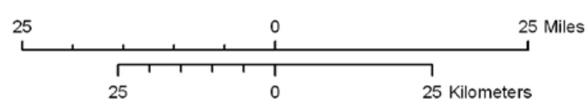
1613.3.1 Mapped acceleration parameters. The parameters S_S and S_1 shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.3.1(1) through 1613.3.1(~~6~~7) Where S_1 is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned *Seismic Design Category* A~~. The parameters Ss and S1 shall be, respectively, 1.5 and 0.6 for Guam and 1.0 and 0.4 for American Samoa.~~



0.2-Second Spectral Response Acceleration (5% of Critical Damping)



1.0-Second Spectral Response Acceleration (5% of Critical Damping)



Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion Response Accelerations for Guam and American Samoa of 0.2-Second Spectral Response Acceleration (5% of Critical Damping), Site Class B

FIGURE 1613.3.1(7) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR GUAM AND AMERICAN SAMOA OF 0.2- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

Reason: The US Geological Survey (USGS) has the responsibility under the National Earthquake Hazards Reduction Program to develop and maintain seismic hazard maps that are the basis of the Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion maps in the nation's model building codes. As part of that responsibility, the USGS recently developed seismic hazard and MCE_R ground motion maps for Guam and American Samoa, using the same methodology as for the conterminous US, Hawaii, Alaska, and Puerto Rico and the US Virgin Islands. The MCE_R ground motion maps developed are being proposed as an addition to the existing maps in Figure 1613.3.1.

Cost Impact: The code change proposal will increase or decrease the cost of construction, depending on the geographic location.

1613.3.1-S-LUCO-MAHONEY.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee supports the addition of the ground motion maps for Guam and American Samoa. Their disapproval is in accordance with the proponent testimony that the maps still need work.

Assembly Action: **None**

Individual Consideration Agenda

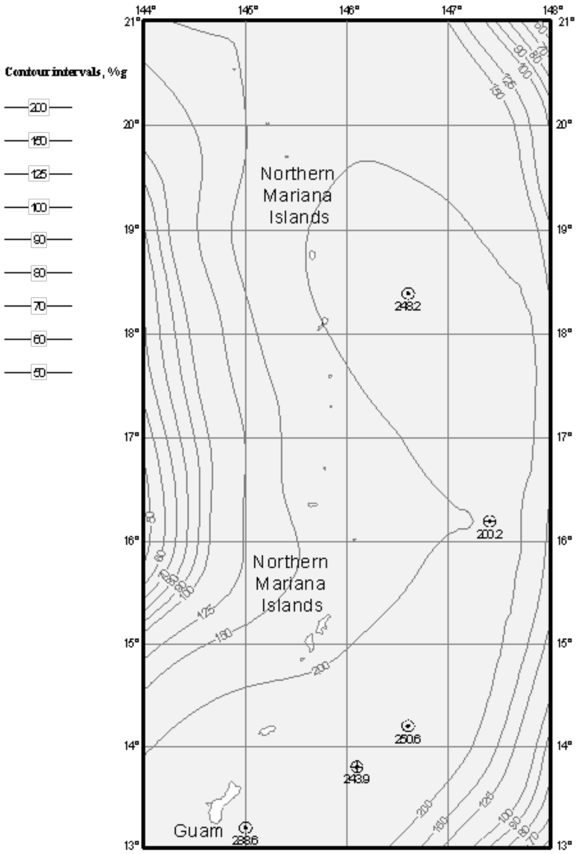
This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

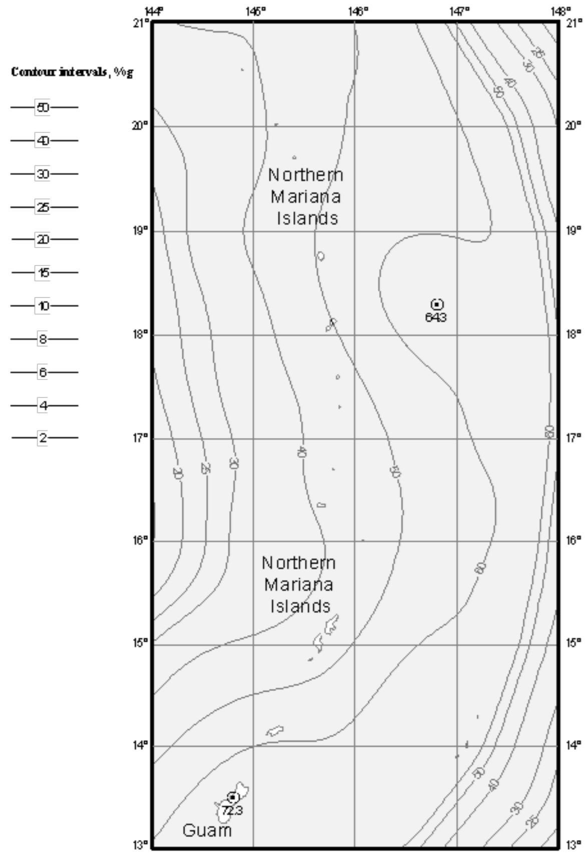
Nicolas Luco, U.S. Geological Survey (USGS), representing National Earthquake Hazards Reduction Program (NEHRP) and Michael Mahoney, Federal Emergency Management Agency, representing National Earthquake Hazards Reduction Program (NEHRP), request Approval as Modified by this Public Comment.

Replace the proposal as follows:

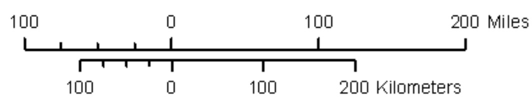
1613.3.1 Mapped acceleration parameters. The parameters S_S and S_1 shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.3.1(1) through 1613.3.1(~~7~~ 8) Where S_1 is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned *Seismic Design Category* A.~~ The parameters Ss and S1 shall be, respectively, 1.5 and 0.6 for Guam and 1.0 and 0.4 for American Samoa.~~



0.2 Second Spectral Response Acceleration
(5% of Critical Damping)



1.0 Second Spectral Response Acceleration
(5% of Critical Damping)



Explanation

Contours of spectral response acceleration expressed as a percent of gravity.

—10—

—10—

Point values of spectral response acceleration expressed as a percent of gravity.

200.2 Local minimum

250.6 Local maximum

243.9 Saddle point

DISCUSSION

Maps prepared by United States Geological Survey (USGS) in collaboration with the Federal Emergency Management Agency (FEMA)-funded Building Seismic Safety Council (BSSC). The basis is explained in commentary prepared by BSSC and in the references.

Ground motion values contoured on these maps incorporate:

- a target risk of structural collapse equal to 1% in 50 years based upon a generic structural fragility
- a factor of 1.1 and 1.3 for 0.2 and 1.0 sec, respectively, to adjust from a geometric mean to the maximum response regardless of direction
- deterministic upper limits imposed near large, active faults, which are taken as 1.8 times the estimated median response to the characteristic earthquake for the fault (1.8 is used to represent the 84th percentile response), but not less than 150% and 60% g for 0.2 and 1.0 sec, respectively.

As such, the values are different from those on the uniform-hazard 2012 USGS National Seismic Hazard Maps for Guam and the Northern Mariana Islands posted at http://earthquake.usgs.gov/hazmaps.

Larger, more detailed versions of these maps are not provided because it is recommended that the corresponding USGS web tool (http://earthquake.usgs.gov/designmaps) be used to determine the mapped value for a specified location.

REFERENCES

Building Seismic Safety Council, 2009, NEHRP Recommended Seismic Provisions for New Buildings and Other Structures: FEMA P-750/2009 Edition, Federal Emergency Management Agency, Washington, DC.

Huang, Yin-Nan, Whittaker, A.S., and Luco, Nicolas, 2008, Maximum spectral demands in the near-fault region, Earthquake Spectra, Volume 24, Issue 1, pp. 319-341.

Luco, Nicolas, Ellingwood, B.R., Hamburger, R.O., Hooper, J.D., Kimball, J.K., and Kircher, C.A., 2007, Risk-Targeted versus Current Seismic Design Maps for the Conterminous United States, Structural Engineers Association of California 2007 Convention Proceedings, pp. 163-175.

Mueller, C.S., Haller, K.M., Luco, Nicolas, Petersen, M.D., and Frankel, A.D., 2012, Seismic Hazard Assessment for Guam and the Northern Mariana Islands: U.S. Geological Survey Open-File Report 2012–1015.

Figure 1613.3.1(7) Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion Response Accelerations for Guam and the Northern Mariana Islands of 0.2- and 1-Second Spectral Response Acceleration (5% of Critical Damping), Site Class B

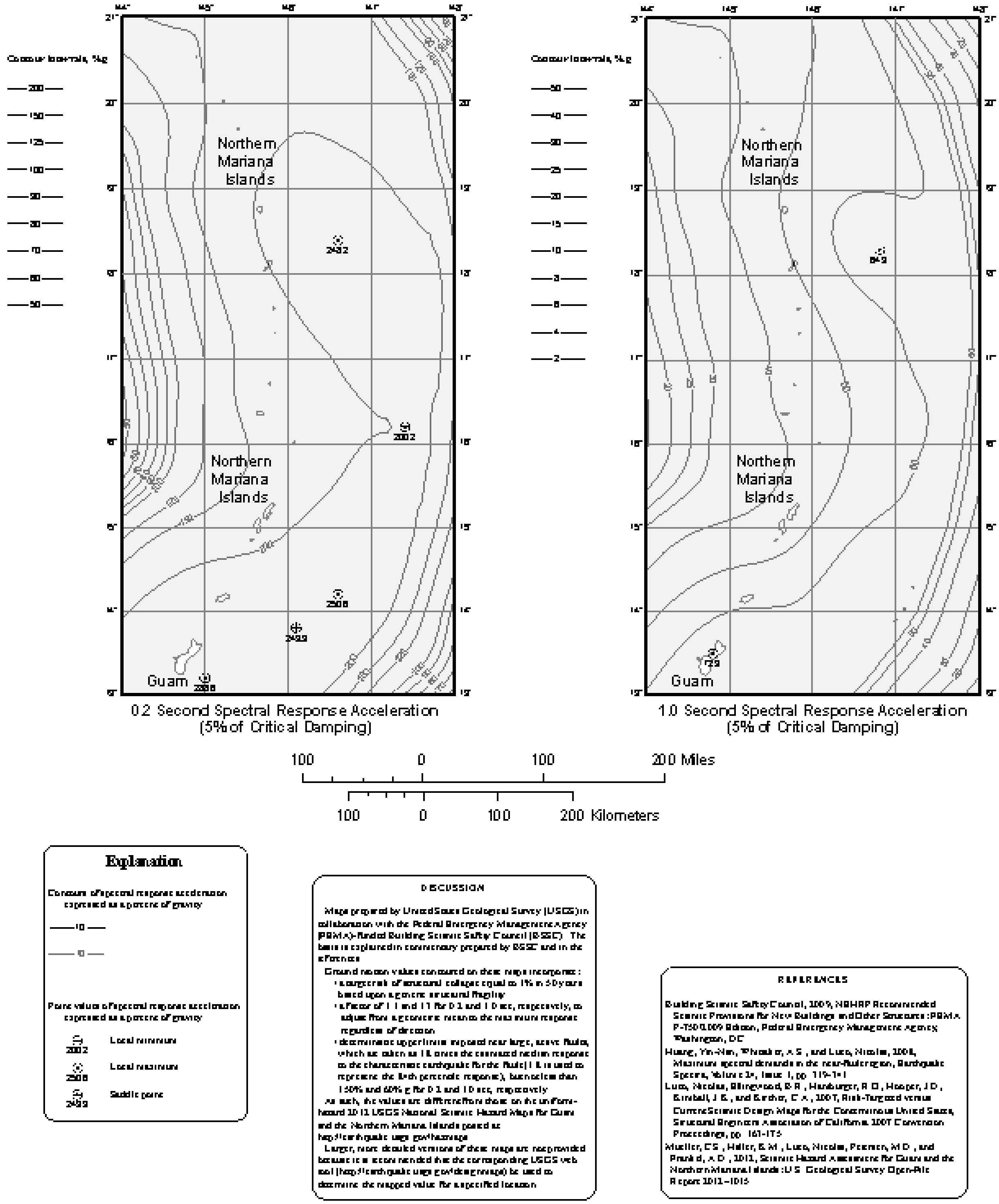


Figure 1613.3.1(7) Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion Response Accelerations for Guam and the Northern Mariana Islands of 0.2- and 1-Second Spectral Response Acceleration (5% of Critical Damping), Site Class B

<u>FIGURE 1613.3.1(7) Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion Response Accelerations for Guam and the Northern Mariana Islands 0f 0.2- and 1-Second Spectral Response Acceleration (5% of Critical Damping), Site Class B</u>

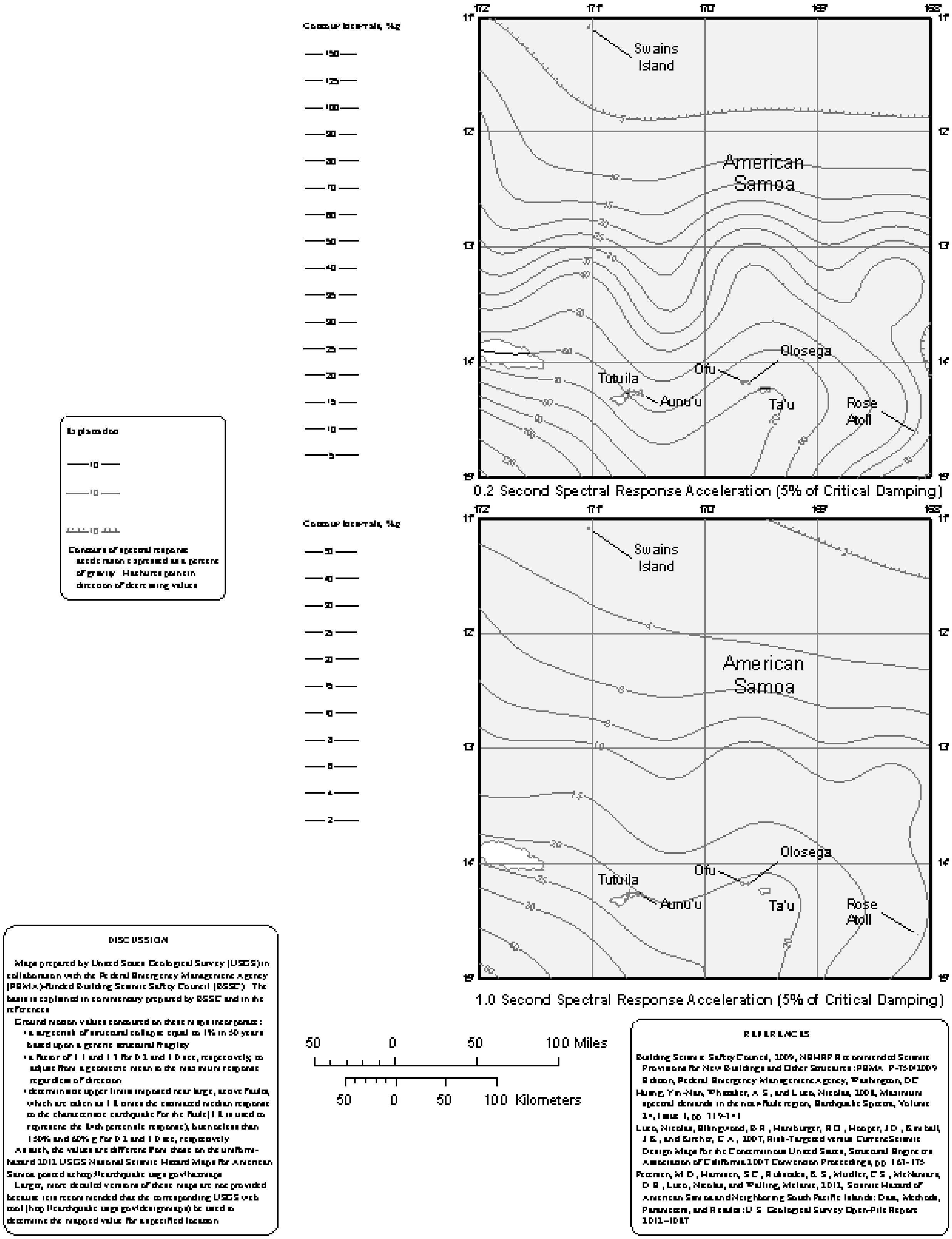


Figure 1613.3.1(8) Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion Response Accelerations for American Samoa of 0.2- and 1-Second Spectral Response Acceleration (5% of Critical Damping), Site Class B

<u>**Figure 1613.3.1(8) Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion Response Accelerations for American Samoa of 0.2- and 1-Second Spectral Response Acceleration (5% of Critical Damping), Site Class B**</u>

Commenter's Reason: The 2012 ICC Public Hearing Results explain that "the [code development] committee supports the addition of ground motion maps for Guam and American Samoa." As we testified at the hearing, however, at that time the proposed maps still needed work. Since then, the USGS has finalized the maps, via further internal and external review, including a public review workshop. Now, in this public comment, we provide the final maps. With respect to the previously proposed maps, the final values herein are roughly 10% smaller for Guam and 0-15% larger for American Samoa, reflecting relatively minor changes. Before the Final Action Hearing (more specifically, by October 10, 2012), these final maps (which now include the Northern Mariana Islands with Guam) will also have been balloted by the Building Seismic Safety Council (BSSC) Provisions Update Committee.

As stated in the proposal, "the US Geological Survey (USGS) has the responsibility under the National Earthquake Hazards Reduction Program to develop and maintain seismic hazard maps that are the basis of the Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion maps in the nation's model building codes. As part of that responsibility, the USGS has recently developed seismic hazard and MCE_R ground motion maps for Guam and American Samoa, using the same methodology as for the conterminous US, Hawaii, Alaska, and Puerto Rico and the US Virgin Islands. The MCE_R ground motion maps developed are being proposed as an addition to the existing maps in Figure 1613.3.1."

In comparing the proposed MCE_R ground motion maps (as modified herein) to the geographically-constant ground motion values stipulated in the 2012 IBC, it is important to bear in mind that the latter values are not based on seismic hazard analyses. According to the commentary of the 1997 *NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures* (FEMA 303), the values in the 2012 IBC are merely conversions, via rough approximations, from values on the 1994 *NEHRP Recommended Provisions* maps that had been in use for nearly 20 years. As such, they do not take into account the 1993 Guam earthquake that was the largest ever recorded in the region and caused considerable damage, the 2009 earthquake near American Samoa that caused a tsunami, nor the 2008 "Next Generation Attenuation (NGA)" and another 2006 empirical ground motion prediction equations that can be used for both Guam and American Samoa. This and other such information is directly used in the seismic hazard analyses that are the basis for the proposed MCE_R ground motion maps, as documented in the USGS Open-File Reports referenced on the maps. This same type of information is already the basis for the MCE_R ground motions maps for the conterminous US, Hawaii, Alaska, and Puerto Rico and the US Virgin Islands that are in the 2012 IBC.

S109-12

Final Action: AS AM AMPC____ D

S110-12

Figures 1613.3.1(1) (New), 1613.3.1(2) (New), 1613.3.1(3) (New), 1613.3.1(4) (New), 1613.3.1(5) (New), 1613.3.1(6) (New)

<u>Proposed Change as Submitted</u>

Proponent: James Bela, Oregon Earthquake Awareness, representing self

Delete and substitute as follows:

~~FIGURE 1613.3.1(1)~~
~~RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCER) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 0.2-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B~~

~~FIGURE 1613.3.1(2)~~
~~RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCER) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B~~

~~FIGURE 1613.3.1(3)~~
~~RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCER) GROUND MOTION RESPONSE ACCELERATIONS FOR HAWAII OF 0.2- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B~~

~~FIGURE 1613.3.1(4)~~
~~RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCER) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 0.2-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS~~

~~FIGURE 1613.3.1(5)~~
~~RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCER) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 1.0-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B~~

~~FIGURE 1613.3.1(6)~~
~~RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCER) GROUND MOTION RESPONSE ACCELERATIONS FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS OF 0.2- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5%OF CRITICAL DAMPING), SITE CLASS B~~

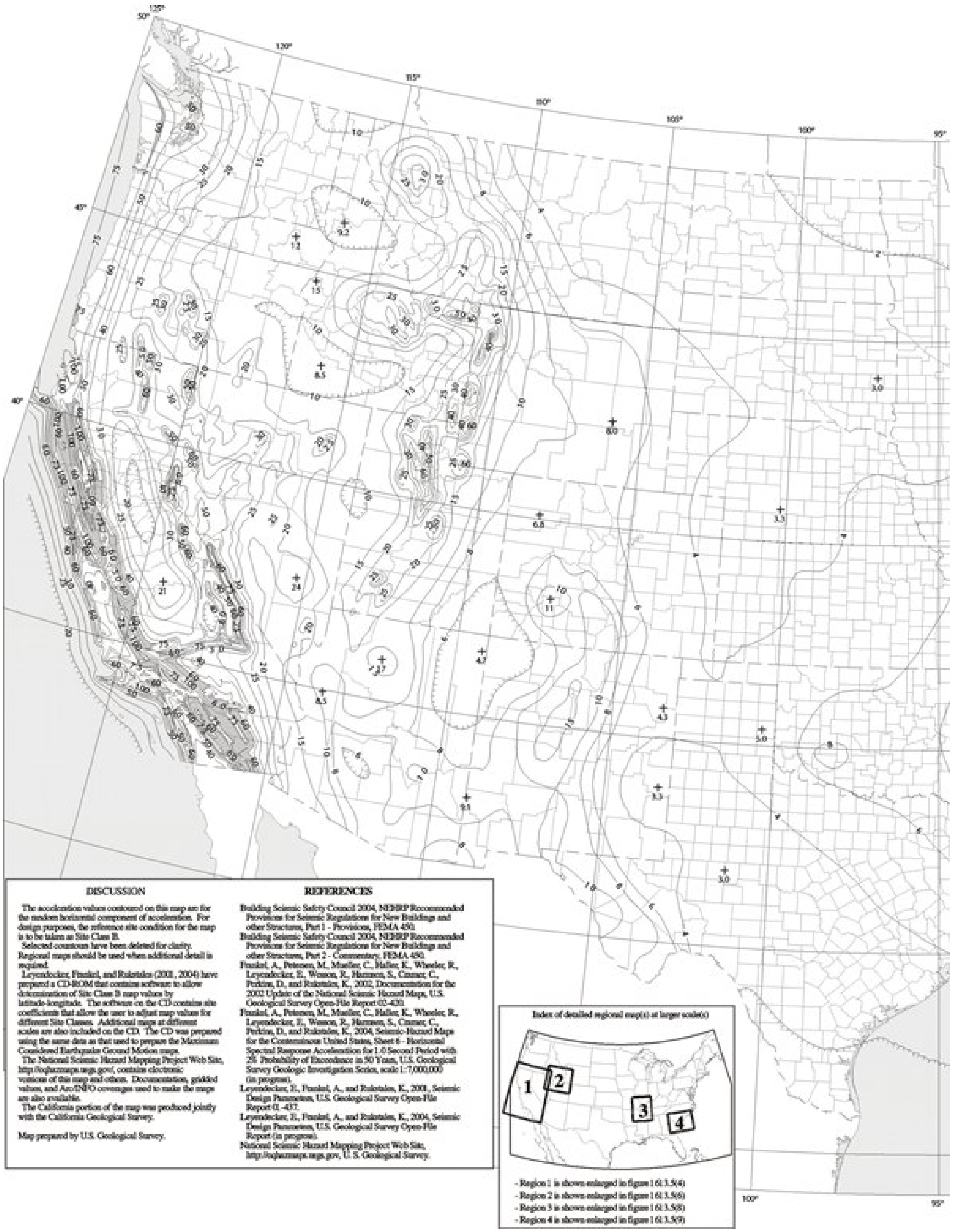


FIGURE 1613.3.1(1)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 0.2-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

FIGURE 1613.3.1(1) - continued
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 0.2-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

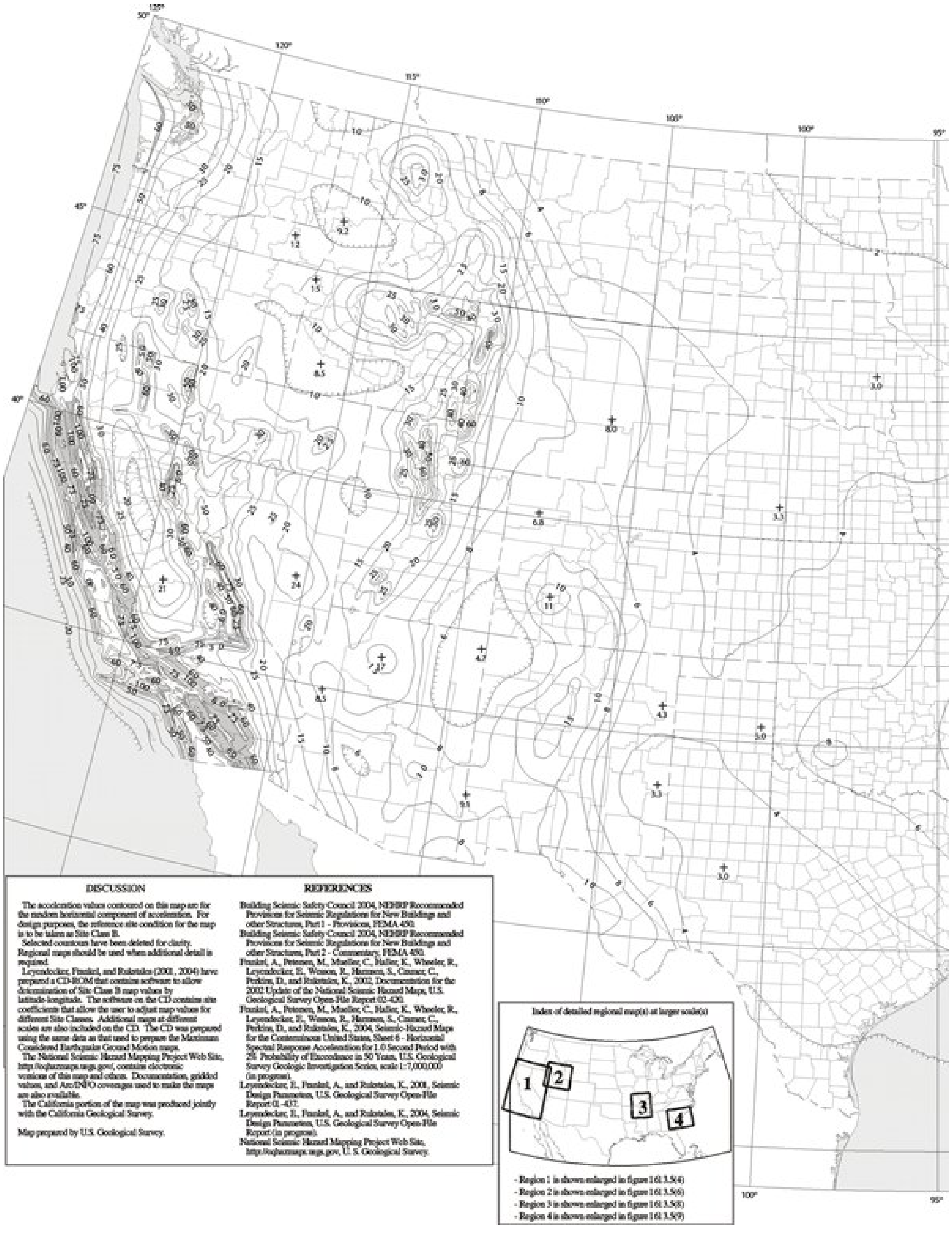


FIGURE 1613.3.1(2)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

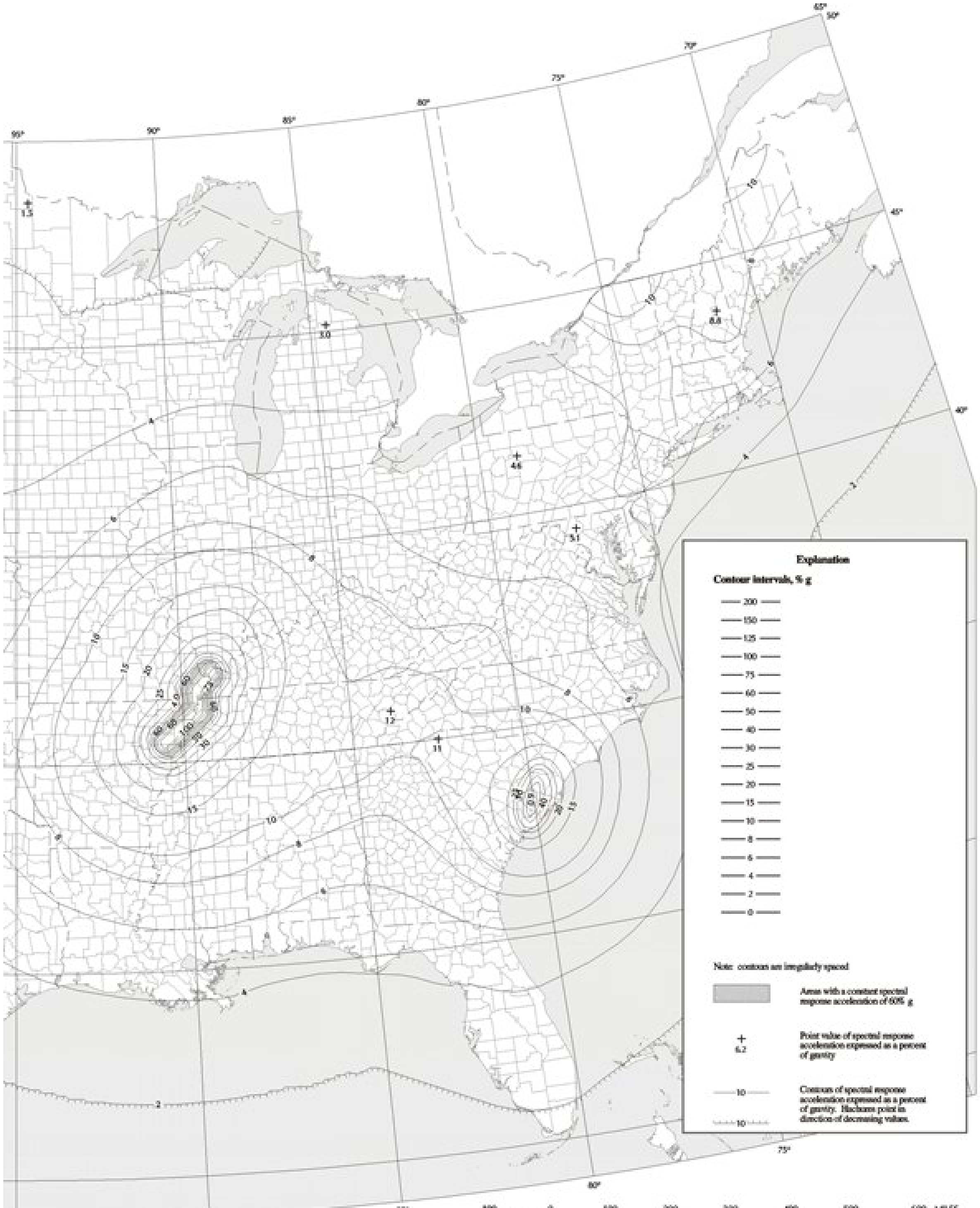
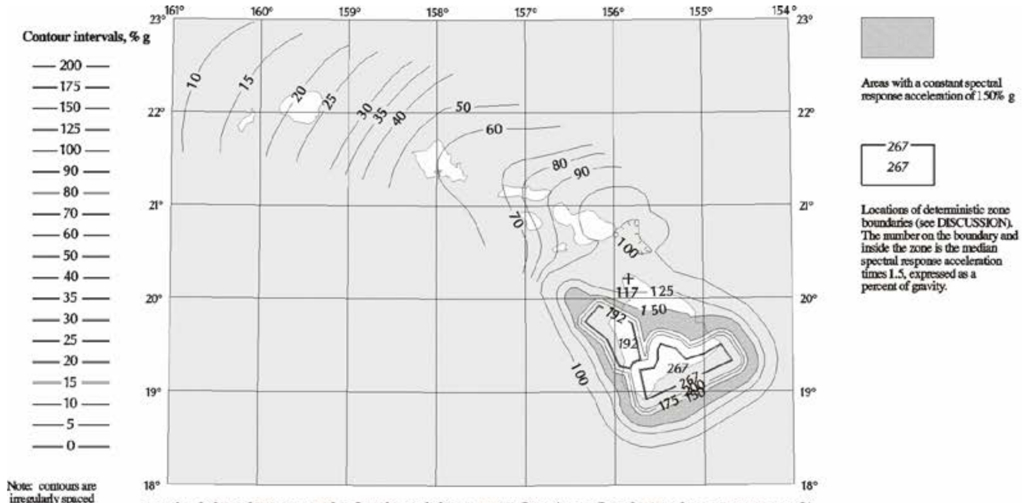
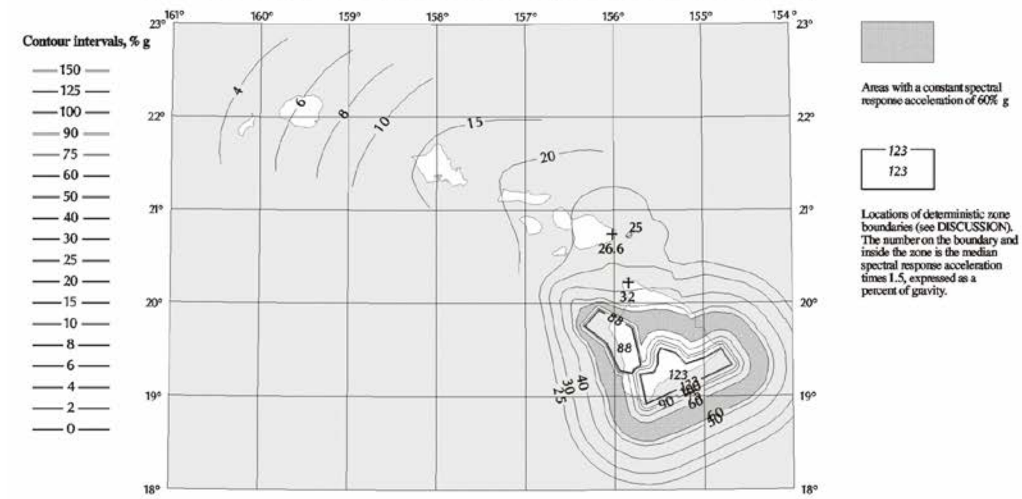


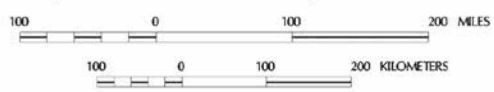
FIGURE 1613.3.1(2) - continued
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



Explanation

+ 6.2	Point value of spectral response acceleration expressed as a percent of gravity
10 / 10	Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.

DISCUSSION

The acceleration values contoured on this map are for the random horizontal component of acceleration. For design purposes, the reference site condition for the map is to be taken as Site Class B.

The two areas shown as zone boundaries are the projection to the earth's surface of horizontal rupture planes at 9 km depth. Spectral accelerations are constant within the boundaries of the zones. The number on the boundary and inside the zone is the median spectral response acceleration times 1.5.

Leyendecker, Frankel, and Rukstales (2001, 2004) have prepared a CD-ROM that contains software to allow determination of Site Class B map values by latitude-longitude. The software on the CD contains site coefficients that allow the user to adjust map values for different Site Classes. Additional maps at different scales are also included on the CD. The CD was prepared using the same data as that used to prepare the Maximum Considered Earthquake Ground Motion maps.

The National Seismic Hazard Mapping Project Web Site, http://eqhazmaps.usgs.gov, contains electronic versions of this map and others. Documentation, gridded values, and Arc/INFO coverages used to make the maps are also available.

Map prepared by U.S. Geological Survey.

REFERENCES

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 1 - Provisions, FEMA 450.

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 2 - Commentary, FEMA 450.

Klein, F., Frankel, A., Mueller, C., Wesson, R. and Okubo, P., 2001, Seismic hazard in Hawaii: high rate of large earthquakes and probabilistic ground-motion maps, Bull. Seism. Soc. Am., v. 91, pp. 479-498.

Klein, F., Frankel, A., Mueller, C., Wesson, R. and Okubo, P., 1998, Seismic-Hazard Maps for Hawaii, Sheet 2 - 2% Probability of Exceedance in 50 Years for Peak Horizontal Acceleration and Horizontal Spectral Response Acceleration for 0.2, 0.3, and 1.0 Second Periods U.S. Geological Survey Geologic Investigation Series I-2724, scale 1:2,000,000.

Leyendecker, E., Frankel, A., and Rukstales, K., 2001, Seismic Design Parameters, U.S. Geological Survey Open-File Report 01-437.

Leyendecker, E., Frankel, A., and Rukstales, K., 2004, Seismic Design Parameters, U.S. Geological Survey Open-File Report (in progress).

National Seismic Hazard Mapping Project Web Site, http://eqhazmaps.usgs.gov, U. S. Geological Survey.

FIGURE 1613.3.1(3)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION RESPONSE ACCELERATIONS FOR HAWAII OF 0.2- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

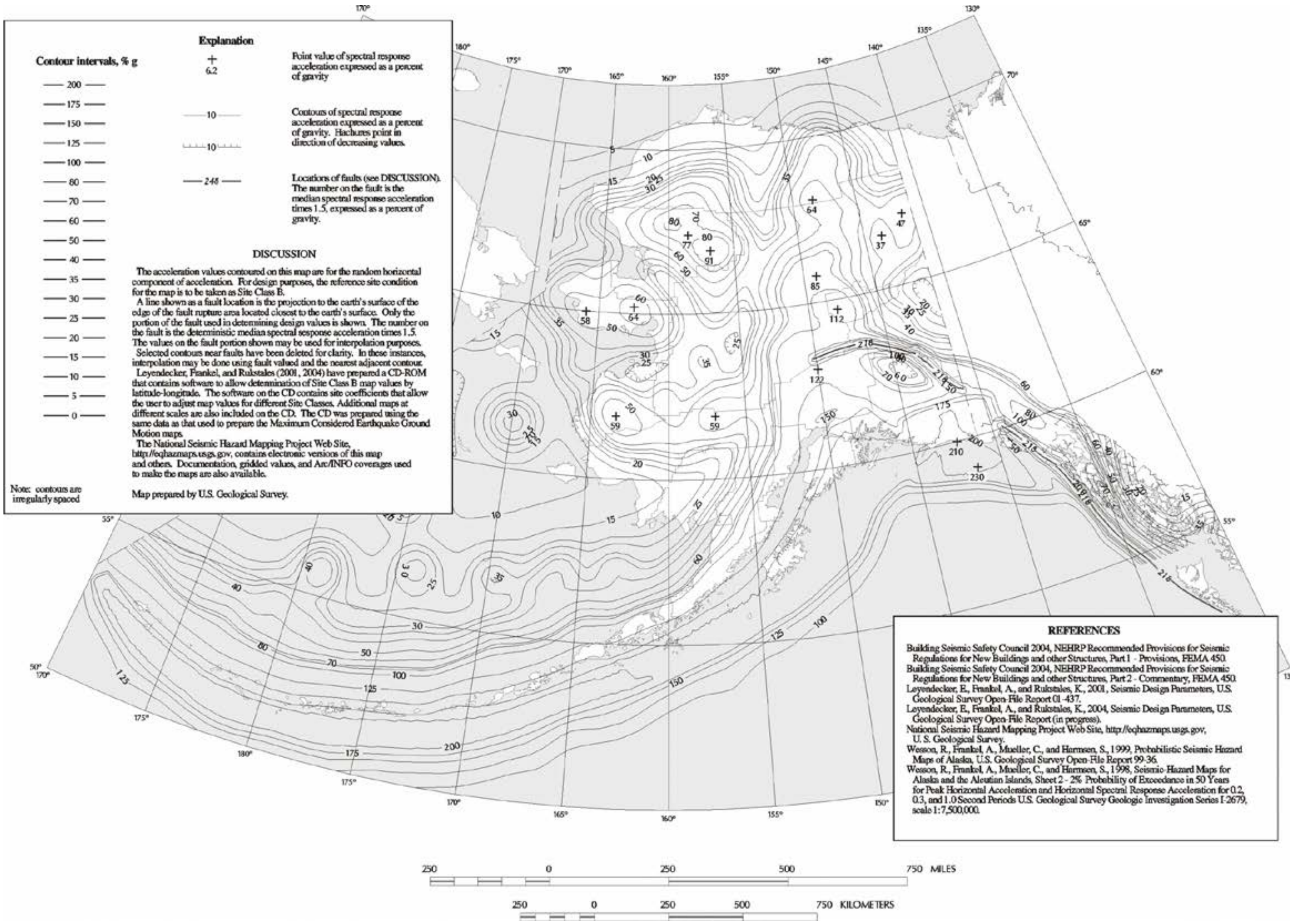


FIGURE 1613.3.1(4)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 0.2-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

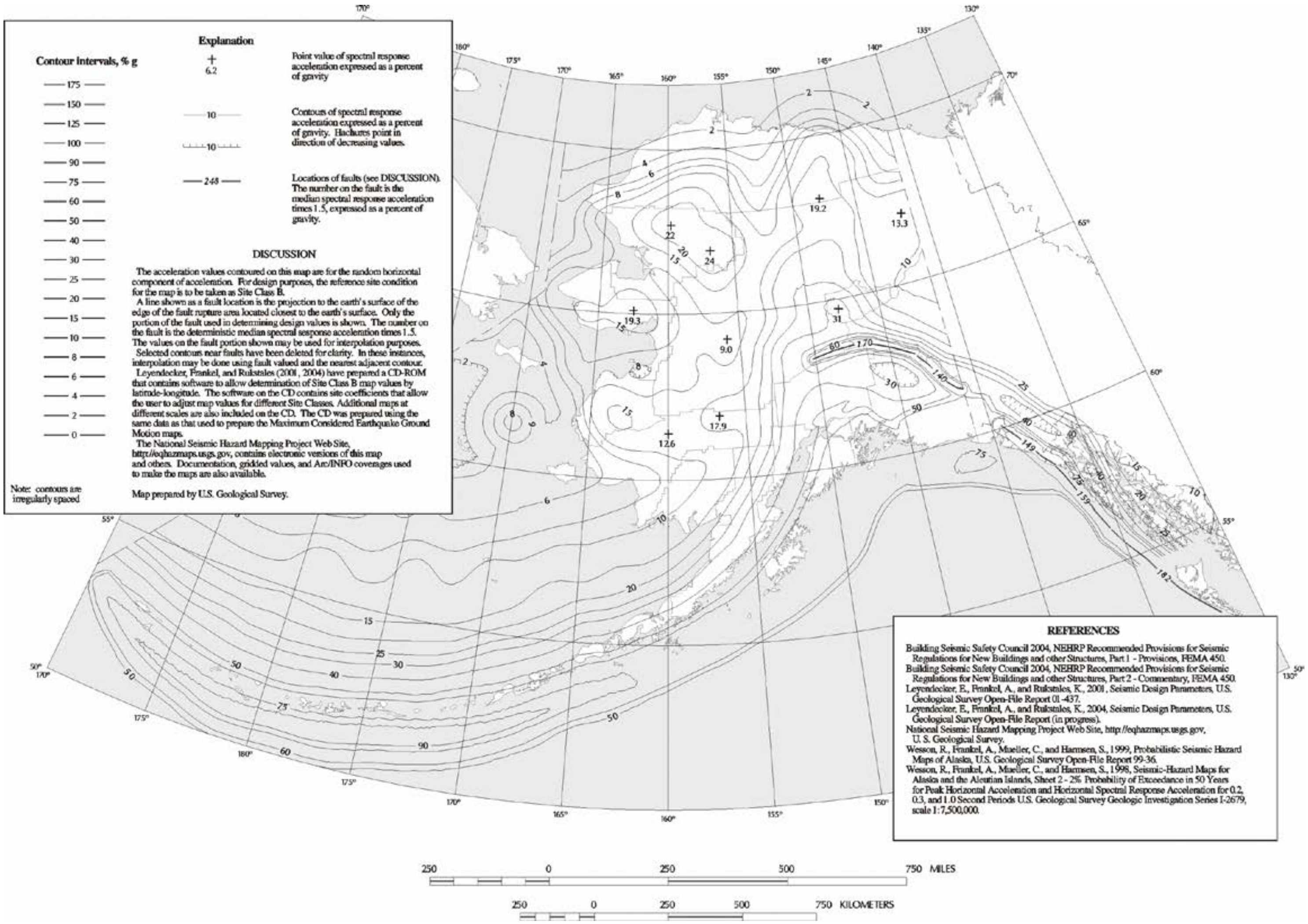


FIGURE 1613.3.1(5)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 1.0-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

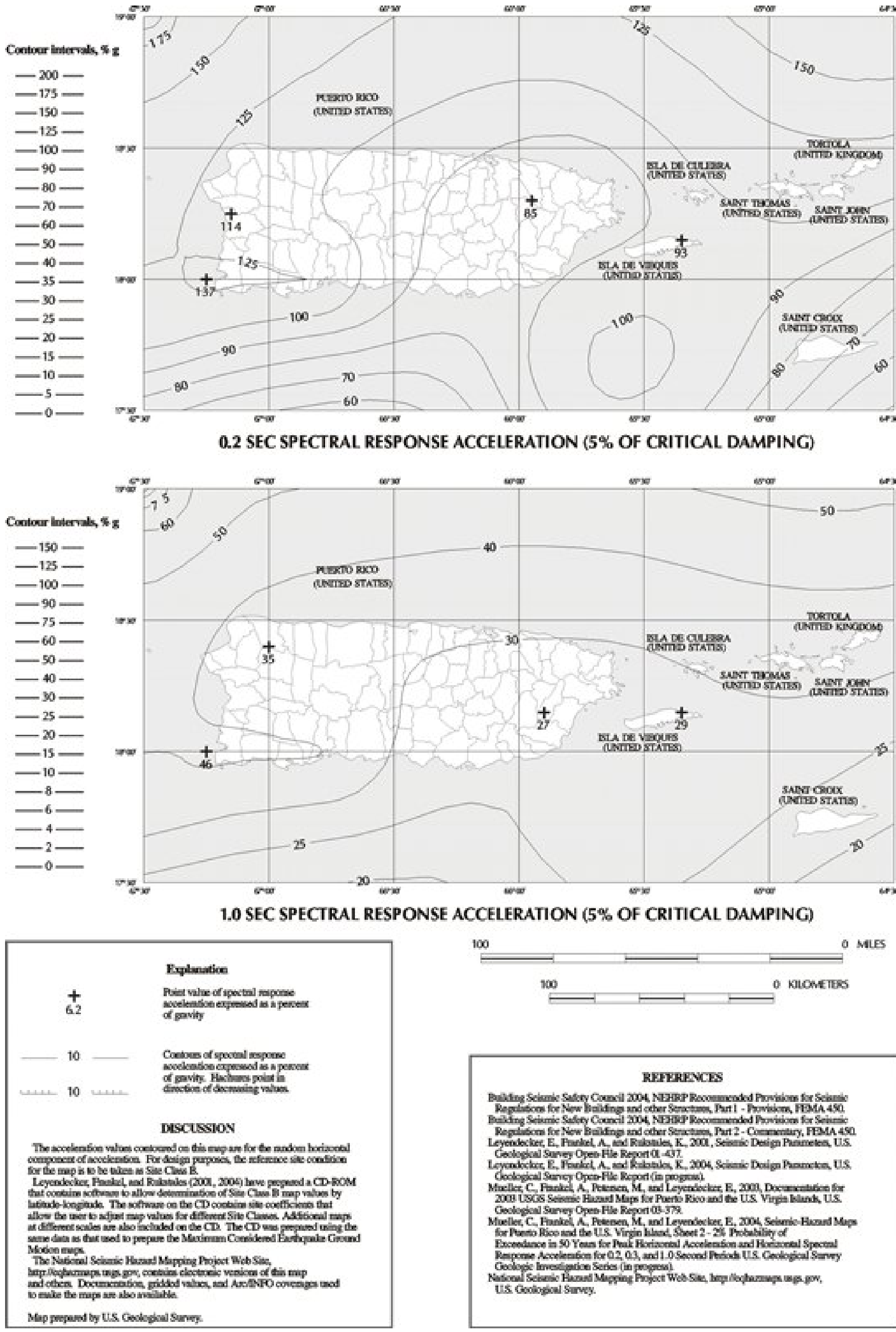


FIGURE 1613.3.1(6)
MAXIMUM CONSIDERED EARTHQUAKE (MCE) GROUND MOTION RESPONSE ACCELERATIONS FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS OF 0.2- AND 1-SECOND SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

Reason: (1) Constantly changing the USGS National Seismic Hazard Maps' "ground motion response accelerations contours" is **destabilizing** to design practice, plan review requirements, and code enforcement provisions, because such changes are:

(a) creating **yo-yo earthquake design standards** – "high" one code cycle and "low" the next; or vice-versa; making it, as a result,

ever more difficult to develop, practice and apply "professional engineering judgment" in the design process.
(b) creating serious and perplexing problems for addressing seismic hazards for **existing buildings** – which must then **"benchmark"** to a specific year and to a specific version (year & edition) of seismic hazard map (for any specific public policy mandate/requirements for earthquake retrofit/mitigation ordinances or measures. These required "benchmark" seismic hazard maps will then be different (sometimes a lot different) from the current (and ever-changing and ever-evolving) USGS National Seismic Hazard Maps. This is, and will continue to be, a big source of confusion.

(2) RISK-TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS contours in the IBC 2012 / ASCE 7-10 are sometimes **30% lower** than previous map values of just a decade ago:

(a) the recent 08-23-2011 M 5.8 Mineral VA (Cuckoo) earthquake had 30% lower design values (with these new maps) than a decade ago – making the earthquake's epicentral region **Seismic Design Category A-B**; yet the **actual intensity of earthquake ground shaking** experienced there was the "stated intensity" that could be expected for the IBC/ASCE 7-10 designation **SDC D!**.(Bela 2011)
(b) when the seismic hazard maps **depict such low hazard ground motion response accelerations** and their corresponding **low** Seismic Design Categories, they both foster and create the "circumstances" for **"comfortable inaction;"** and, unfortunately, this feeling of "comfortable inaction" easily transfers to the arena of public policy.
(c) The condition of "comfortable inaction" (due to perceived low hazard - depicted on the seismic hazard map) was cited as perhaps the main culprit in Christ Church, New Zealand's lack of adequate preparedness during its recent hammering by a "pair" of earthquakes – which killed around 200 people in unsafe **"Killer Buildings."**.
(3) The basic underlying methodology for preparing the USGS National Seismic Hazard Maps (and their derivative so-called Risk-Targeted Maximum Considered Earthquake (MCE_R) Ground Motion Response Accelerations contours); i.e., probabilistic seismic hazard assessment (or psha) is fatally **"flawed"** – due to systemic "errors" in the applied mathematics which both create and define it. And it is, unfortunately, these same flawed "mathematics" that are prescribing how these psha-determined ground motion contours are ultimately derived, computed . . . and then finally codified.
(4) Errors in its methodology aside, the basic problems, difficulties and really insurmountable obstacles to performing a psha seismic hazard assessment *(Mualchin, 2010; Bela and Mualchin 2011)* have **never** actually been "solved." And they still remain unsolved! These problems involve data-driven earth-science requirements for a knowledge and understanding of:

(a) fault slip rates;
(b) frequency of occurrence of earthquakes (and their known magnitudes); and
(c) earthquake source mechanisms – specifically, (i) the style of faulting: and (ii) the hypocentral depth (or where exactly the earthquake rupture process begins).

(5) The psha methodology is easily "manipulated," particularly in the sense that: (i) selecting the probabilistic hazard level is a totally **arbitrary** process; and (ii) changing the hazard level (higher hazard or lower hazard) gives a completely different ground motion response acceleration contour – and consequently, then, different code requirements!
(6) These very real and insurmountable problems with psha's methodology have been swept away by its proponents: by convoluted (and mostly unintelligible) efforts and preoccupations with "logic trees," "quantifying uncertainties," etc. These efforts proceed busily ahead; but, meanwhile, they are "neglecting baseline principles" (of "what" the earthquake can do to you – and "how" it can do it – and the maximum Magnitude it could be). All that mathematical busywork, logic-tree accounting, and so-called "expert opinion" built a the "better model" (or -- so the proponents believe). Unfortunately, that "better model" then:

(a) has become **"substituted"** for "reality" by its creators;
(b) has dismissed criticisms of it -- by claiming (itself) to be "best available science;" and
(c) has become ultimately so **"complicated" --** that not even its proponents now can logically and successfully explain how it came to be (Hamburger et. al., 2010; Bela, 2011); nor can they effectively explain how to apply it to the real world of earthquake engineering, public safety, and socioeconomic issues of community resiliency.

(7) The ground motion accelerations, and their probabilities for exceeding them, are combined and co-mingled in such a way that the actual sources (or **earthquake magnitudes**, **frequency content of earthquake ground motions**, and **duration** of strong ground shaking) are treated more-or-less equally—and they are most certainly not!
(8) The **"Maximum Credible Earthquake" (MCE)** or "Maximum Capable Earthquake" or "Maximum Possible Earthquake" (within ¼ unit of Magnitude, M) is never explicitly stated. And it's really "Magnitude, Magnitude, Magnitude!" (and for the same reasons previously stated in (4)) – that has everything to do with building performance (damage and repair costs) and, more importantly, public safety and community resilience.
(9) R-Factors, or Response Modification Factors, that are used in design become **less reliable** in ascertaining/predicting the **"end result"** (or the building's actual performance in an earthquake). And, **"an earthquake"** really needs to explicitly consider the full suite of earthquake possibilities that the regional tectonics forewarn us can occur (including MCE = Maximum Credible Earthquake, or Maximum Possible Earthquake). "R-Factors" have become less reliable primarily because:
(a) quite a lot of the "ductility" or building "toughness" that the code relies upon to: (i) ride out the earthquake (by bending, not breaking, and absorbing energy); and (ii) remain standing (without killing the occupants) -- is due to "over-strength;" and.
(b) when the code design "strength" is systematically diminished (weakened) or reduced (over several-to-many iterations of seismic hazard mapping --by lowering (yo-yo effect) the "numerator" quantity in the design strength

equation; then when dividing this numerator (now smaller number) by the same “large” number (R-Factor in denominator) – we have now “lost” perhaps a good portion of our “over-strength” – that was implicit in selecting the weights of the various R-Factors in the first place!

Basically, with RISK-TARGETED (MCE_R) , the code is now dividing an ever-decreasing and now smaller number (perhaps by 30%) by the same “large” number (R-Factor denominator) -- with the result that the buildings' performances and outcomes are really now much less certain . . . and also now much more problematical.

(10) The psha methodology has been shown in dramatic and tragic fashion to be not only “misleading”, but also deadly, in the last decade or so of the “Eleven of the World's Deadliest Earthquakes.” (Panza et. al. 2011, Table 1) In example after example, and all across the globe (where now more than 700, 000 people have perished); the psha-methodology “prescribed” seismic hazard: was determined to be either low or very low – but was “disproved” in these many cases by earthquakes that were “surprises” from what psha had determined could be expected. In too many of these deadly “surprises”, the actual intensities of ground shaking experienced were greater by factors of 2X to 4X – than what psha had predicted. (Bela 2010; Bela and Mualchin, 2011;

Kossobokov and Nekrasova, 2010;)

It is clear that this is an unsafe situation (to general public) that must **not** continue; but it does continue for some of these following main reasons:

(a) the psha methodology is “anonymous,” so when there is clear evidence (> 700,000 casualties) that it is “not working;” no one is accountable for its: (i) external failures (mass casualties); and/or (ii) internal failures (very real errors in its “applied mathematics” derivations).
(b) the psha methodology has a hierarchial and powerful elite behind its influence and continued use.
(c) the psha methodology has a pedigree of high sounding terms (like “quantifying uncertainty,” “logic-tree”, “expert opinion,” “best science,” etc.) -- all purporting to increase the method's **“precision.”** But the end result, as these Eleven Deadliest Earthquakes” have shown us, is, unfortunately, still too **“inaccurate”** and “too deadly” for protecting the public safety. And in this regard, it is clearly missing its target!

BIBLIOGRAPHY

Bela, J. (2011). Take Me Home . . . Seismic Loads: commentary on the results of lowering the USGS National Seismic Hazard Maps (response accelerations) values by 30%; prior to the 23 August 2011 Mineral (Cuckoo) VA M 5.8 earthquake, 2 p.
Bela, J. (2010). Table A – Fatal Evidence Global Earthquake Occurrence: since the GSHAP terminated, seismic reality was testing the prediction given by Global Seismic Hazard Maps, 3 p.
Bela, J. and L. Mualchin (2011). Keys to Public Safety & Disaster Reduction in view of Earthquakes and Hurricanes, EERI Annual Meeting Poster Session, San Diego, CA, 2 p.
Kossobokov, V.G. and A.K. Nekrasova (2010). Global Seismic Hazard Program Maps are Misleading, Abstract U 13A – 0020 Poster presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
http://www.agu.org/meetings/fm10/fm10-sessions/fm10_U13A.html

Mualchin, L. (2010) History of Modern Earthquake Hazard Mapping and Assessment in California Using a Deterministic or Scenario Approach, Pure and Applied Geophysics Volume 168, Numbers 3-4, 383-407, DOI: 10.1007/s00024-010-0121-1
[From the issue entitled "Special Issue: Advanced Seismic Hazard Assessment. Part II: Regional Seismic Hazard and Seismic Microzonation Case Studies"]
http://www.springerlink.com/content/p301955r53nk5xl2/

Panza, G.F.; Irikura, K.; Kouteva-Guentcheva, M.; Peresan, A.; Wang, Z.; Saragoni, R. (Eds.) (2011). Advanced Seismic Hazard Assessment, 320 p.
http://www.springer.com/earth+sciences+and+geography/book/978-3-0348-0091-4

Table 1 List of the top eleven deadliest earthquakes occurred during the period 2000-2011 and the corresponding intensity differences (∆I) among the observed values and those predicted by the Global Seismic Hazard Assessment Program, or GSHAP.

Allesandro Martelli, Paolo Clemente, Massimo Forni, Giuliano F. Panza,
Antonello Salvatori (2011).

RECENT DEVELOPMENT AND APPLICATION OF SEISMIC ISOLATION AND ENERGY DISSIPATION SYSTEMS, IN PARTICULAR IN ITALY, CONDITIONS FOR THEIR CORRECT USE AND RECOMMENTATIONS FOR CODE IMPROVEMENTS, in 12TH WORLD CONFERENCE ON SEISMIC ISOLATION, ENERGY DISSIPATION AND ACTIVE CONTROL OF STRUCTURES Sept. 20-23, 2011 Sochi-city, Russia

Cost Impact: The code change proposal will not increase the cost of construction.

F1613-S-BELA.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Retaining the current risk-targeted ground motion maps for seismic design is preferred. The best available technology ought to be used and it would be wrong to ignore what's been developed and vetted for twenty years.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

James Bela, Oregon Earthquake Awareness, representing self, requests Approval as Submitted.

Commenter's Reason: The Committee Action for Disapproval incorrectly: (a) substitutes the committee's so-called "preference" for "retaining the current risk-targeted ground motion maps for seismic design" without stating specific and defensible objections against the Proposed Change S110-12, which simply restored what already previously was "OK" in the IBC Structural Building Code; (b) misunderstands and misconstrues the fact that so-called "current risk-targeted ground motion maps" are, to the contrary, not the best available technology; and (c) most incorrectly asserts that these current risk-targeted ground motion maps have "been developed and vetted for twenty years."

Regarding (c) above, these current risk-targeted ground motion maps for seismic design have only first appeared in the 2012 Edition IBC Structural building code. And so they most assuredly and categorically have in no way whatsoever been "vetted for twenty years." To the contrary, in reality they were first approved by the Structural Code Committee (despite opposing testimony); at a time when they actually had not even been vetted within the ASCE 7 balloting and voting process, much less even published in a printed format (ASCE 7-10).

The best available technology for seismic hazard assessment and its derivative product: seismic design procedures and requirements – is Deterministic Seismic Hazard Assessment (DSHA and neoDSHA or NDSHA); not what historically has been dominant (and later imposed) since the 1977 National Earthquake Hazards Reduction Program (NEHRP). Under NEHRP, the U.S. Geological Survey (one of the four main NEHRP agencies) pursued exclusively an "applied mathematics" model for depicting seismic hazards, known as Probabilistic Seismic Hazard Assessment, or PSHA. In effect, the USGS substituted a "mathematical model" (something which could not be directly observed – the traditional criterion for scientific fact) for "scientific fact."

These new risk-targeted ground motion maps sometimes reduce seismic design requirements by as much as 30% from previous code requirements, notably within western Oregon (with its location and hazard within the Pacific Northwest defined by the potential for giant Magnitude 9 subduction zone earthquakes and tsunamis). This "yo-yoing" of seismic design requirements between adjacent IBC code editions has to stop! And saying NO! to this latest offending and irritating iteration (risk-targeted ground motion maps or MCE_R) is the necessary place to call a halt.

I believe it is true to say: The complexity and convoluted methodologies behind these ever-evolving USGS driven seismic hazard maps have long since exceeded the abilities of (a) code committees to fully comprehend their derivations and usefulness in the seismic design process; (b) of practicing structural engineers to hone and apply judgment in producing better and safer buildings in support of both resilient buildings and resilient regional and community economies; and (c) sadly, even exceeded the abilities of those same individuals who continue to promote and reformat ever more complexity into a flawed seismic hazard model.

The data show that designing for what is "probable" does not protect public safety from what is "possible." The most recently deadly examples of this fact have been Haiti (2010), New Zealand (2010 and 2011) http://www.youtube.com/watch?v=dazS3LhTHo , and Japan (2011). And even the quite recent 23 August 2011 M 5.8 Central Virginia earthquake near Washington D.C. demonstrated the inadequacies and public safety liabilities of depicting seismic hazard using PSHA instead of DSHA methodologies

TAKE ME HOME . . . *SEISMIC LOADS!*

I haven't seen anything regarding Site Class, for Mineral or Louisa VA, as well as the estimated epicentral region of Central Virginia's Piedmont? Cuckoo seems to be the closest built environment to the epicenter (with still an uncertainty: horizontal +/- 2.3 km (1.4 miles); depth +/- 3.1 km (1.9 miles)). No one has officially designated this as the CUCKOO Earthquake. But read below and see if, perhaps, that term might be better reserved for USGS seismic hazard mapping and U.S. Building Code requirements in both the Central Virginia Seismic Zone and in other known and active seismic zones throughout the Central and Eastern U.S. (CEUS)?

Also, the MMI intensity of earthquake ground shaking (VII - VIII at the estimated epicentral location) was more correctly indicative of SDC D. [http://www.nibs.org/client/assets/files/bssc/P749/P-749_Chapter5.pdf]
Since 2000, the USGS Seismic Hazard Maps have continued to lower the hazard [SDS = S_{DS} design earthquake spectral response accelerations:
$\mathbf{S_S}$ = 0.31g (1997) (2000); 0.26g (2003); 0.22g (2009)

SCB: S_{DS} = 0.21g (1997) (2000); 0.17g (2003); 0.15g (2009).
SCC: S_{DS} = 0.25g (1997) (2000); 0.20g (2003); 0.17g (2009).

SCD: S_{DS} = 0.32g (1997) (2000); 0.27g (2003); 0.23g (2009).],
making building code earthquake provisions less safe regarding both public safety and economic well-being.

These numbers translate to about a 30% decline in design strength (from a low number to an even lower number) in just the last decade! (for the S_{DS} "Design Earthquake Spectral Response Acceleration Parameter"). A 33% increase in design strength used to be the difference between Seismic Zone 3 and Seismic Zone 4 requirements!
For Site Class B, this now makes the epicentral region of this M 5.8 Virginia (Cuckoo) earthquake Seismic Design Category A (SDC A) - the same as Florida and Michigan (which have no active seismic zones or geologic evidence of mountain building).
http://www.dmme.virginia.gov/DMR3/Va_5.8_earthquake.shtml

This "minor" earthquake now seems to be amongst the most widely felt earthquakes in U.S. history.
(i.e., "ever!") -- "Felt strongly in much of central Virginia and southern Maryland. Felt throughout the eastern US from central Georgia to central Maine and west to Detroit, Michigan and Chicago, Illinois. Felt in many parts of southeastern Canada from Montreal to Windsor." Source USGS
Clearly we are no longer in Florida, Michigan . . . or even in Kansas any more!
Too many (a) unsafe conditions and (b) brittle-failure-mode susceptible building products are allowed in the low SDC's A, B, and C - and it defies both logic, engineering judgment, common sense, as well as the professional responsibility of our combined professions. I doubt if any of the brick veneer that separated during this M 5.8 Virginia earthquake would have even been required to be adequately attached for earthquake (lateral force) resistance in these SDC's of A,B and C?

Remember: "The buck stops shear!"

West Virginia, Mountain Mama . . . Take Me Home . . . Seismic Loads!" . . . . because
http://www.youtube.com/watch?v=oN86d0CdgHQ

"We have nothing to fear but veneer itself!"

"NATURE, TO BE COMMANDED, MUST BE OBEYED"

-- Francis Bacon

The huge and tragic losses in recent years from very large and even giant earthquakes and tsunamis . . . compels us to incorporate code requirements for greater public safety measures: measures that would more realistically both anticipate and deal with "what is possible;" not just with what is probable.

When buildings cannot withstand strong earthquake shaking, insufficient code requirements are simply leaving it "up-to-chance" . . . whether people live or die, and many of us who have witnessed the evolving weakening of earthquake design requirements now more than ever believe this is both not only improper but also entirely unreasonable for a civilized society.

When hazards are minimized, greater risks are made to seem somehow "acceptable." And with that we have become lulled into a false sense about of our earthquake security. Furthermore, in too many of these cases, we have been left with only "comfortable inaction" -- as our only preparation and defense against what so many earthquake professionals assured us were only rare or very unlikely events.

It is now clear, having witnessed so many recent and tragic occurrences, that public safety from future earthquakes and other so-called "extreme events" must be protected by more realistically assessing and designing for "what is possible," and not just for what is probable.

This proposed code change paves the way for: (a) performing seismic hazard assessment with the traditional, simpler and more realistic deterministic seismic hazard assessment dsha methodology, which fully considers the complete range of earthquake magnitudes that may be generated on any active earthquake fault -- up to and including the largest possible size event, which always is the most impactful to modern society;

(b) insuring that engineering design loads and building standards for all critical facilities and buildings can adequately withstand all these so-defined seismic hazards; and

(c) communicating fully (in clear and understandable language) such seismic hazards and seismic risks (including so-called "operational short term warnings") to government, stakeholders, and particularly to the public; so that not only personal safety but also community resilience shall be more reliably protected.

"Reading maketh a full man; conference a ready man; [week-long code hearings an exhausted man]; and writing an exact man." [Correctly considering the potential from all "possible" earthquakes, makes a safe man] -- Francis Bacon

So, to protect public safety . . . let's use our brains!

"PAY NO ATTENTION TO THAT MAN BEHIND THE CURTAIN!"

http://www.youtube.com/watch?v=fO9EU0w3CrY&featured=related

S110-12
Final Action: AS AM AMPC____ D

S111-12
1613.5 (New), 1613.5.1 (New)

Proposed Change as Submitted

Proponent: Kelly Cobeen, representing self; Dana Deke Smith and Steve Winkel, Building Seismic Safety Council, representing FEMA/Code Resource Support Committee (dsmith@nibs.org) (swinkel@preview-group.com)

Add new text as follows:

1613.5 Amendments to ASCE 7. The provisions of Section 1613.5 shall be permitted as an amendment to the relevant provisions of ASCE 7.

1613.5.1 Transfer of anchorage forces into diaphragm. Modify ASCE 7 Section 12.11.2.2.1 as follows:

12.11.2.2.1 Transfer of anchorage forces into diaphragm. Diaphragms shall be provided with continuous ties or struts between diaphragm chords to distribute these anchorages forces into the diaphragms. Diaphragm connections shall be positive, mechanical, or welded. Added chords are permitted to be used to form subdiaphragms to transmit the anchorage forces to the main continuous cross-ties. The maximum length-to-width ratio of a wood, wood structural panel, or untopped steel deck sheathed structural subdiaphragm that serves as part of the continuous tie system shall be 2.5 to 1. Connections and anchorages capable of resisting the prescribed forces shall be provided between the diaphragm and the attached components. Connections shall extend into the diaphragm a sufficient distance to develop the force transferred into the diaphragm.

Reason: The subdiaphragm aspect ratio is indicated in this proposal as only applying to wood sheathed diaphragms, wood structural panel sheathed diaphragms, and untopped metal deck diaphragm. When limitation of subdiaphragms was first submitted as a proposed change to the 1997 UBC by Kariotis [code change proposal 1631.2.8-95-1 K.A.S.E.] in the form of an allowable shear limitation, the reason focused on tilt-up buildings with nailed diaphragms and contemporary designs not meeting the intent of provisions written after observed poor performance in the 1973 Sylmar Earthquake. When approved for inclusion in the 1997 UBC [code change proposal 16-96-2 SEAOC/ Seismology] the approved wording for the aspect ratio limitation specifically applied only to wood structural subdiaphragms. In the process of being included in the IBC and ASCE 7, the wording designating wood subdiaphragms was dropped, making the requirement applicable to all subdiaphragms. This code change proposes to reintroduce the limit to wood subdiaphragms because they are the original system of concerns and observed poor performance, and include untopped steel deck diaphragms due to the similarities in construction and perceived structural behavior. This aspect ratio limit is not perceived to be necessary for good performance for other diaphragm types; once this aspect ratio limit is removed for concrete, composite deck, and other diaphragm types, other diaphragm limitations within the referenced material standards will govern design.

Cost Impact: The code change proposal will not increase the cost of construction and may reduce cost for some structural systems.

1613.5.1-S-COBEEN-SMITH-WINKEL.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change corrects a mistake by amending the ASCE 7 provision for diaphragm anchorage forces. This clarifies that the subdiaphragm aspect ratio limit applies only to specific types of diaphragms.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Daniel J. Walker, P.E., Thomas Associates, Inc., representing Metal Building Manufacturers Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1613.5.1 Transfer of anchorage forces into diaphragm. Modify ASCE 7 Section 12.11.2.2.1 as follows:

12.11.2.2.1 Transfer of anchorage forces into diaphragm. Diaphragms shall be provided with continuous ties or struts between diaphragm chords to distribute these anchorages forces into the diaphragms. Diaphragm connections shall be positive, mechanical, or welded. Added chords are permitted to be used to form subdiaphragms to transmit the anchorage forces to the main continuous cross-ties. The maximum length-to-width ratio of a wood or~~,~~ wood structural panel~~, or untopped steel deck~~ sheathed structural subdiaphragm that serves as part of the continuous tie system shall be 2.5 to 1. Connections and anchorages capable of resisting the prescribed forces shall be provided between the diaphragm and the attached components. Connections shall extend into the diaphragm a sufficient distance to develop the force transferred into the diaphragm.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: We were surprised to see the untopped steel deck included with this proposed requirement that was based on wood diaphragm performance observations and only addressed wood diaphragms in the 1997 UBC as stated in the original reason statement. As the reason stated, untopped steel decks were included in the proposal "due to similarities in construction and perceived structural behavior". Other than these construction types being lightweight, the link between their behavior is not very strong. We think this is not well supported, and that a new requirement shouldn't be based on a perception only.

S111-12

Final Action:	AS	AM	AMPC____	D

S114-12
1703.1, 1703.1.1, 1703.3

Proposed Change as Submitted

Proponent: Phillip Brazil, P.E., S.E., Reid Middleton, Inc., representing Washington Association of Building Officials, Technical Code Development Committee (pbrazil@reidmiddleton.com)

Revise as follows:

1703.1 Approved agency. An *approved agency* shall provide all information as necessary for the *building official* to determine that the agency meets the applicable requirements specified in Sections 1703.1.1 through 1703.1.4.

1703.1.1 Independence. An *approved agency* shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose to the *building official* and the *registered design professional in responsible charge* possible conflicts of interest so that objectivity can be confirmed.

1703.3 ~~Approved~~ Record of approval. For any material, appliance, equipment, system or method of construction that has been *approved*, a record of such approval, including the conditions and limitations of the approval, shall be kept on file in the *building official's* office and shall be ~~open to~~ available for public ~~inspection~~ review at appropriate times.

Reason: Section 1703.1 requires approved agencies to provide the information necessary for the building official to verify that the agency meets the applicable requirements but these requirements are not identified. The proposal specifies the sections containing the requirements.

Section 1703.1.1 requires approved agencies to disclose possible conflicts of interest so that objectivity can be confirmed but the recipient of the disclosure is not identified. The proposal specifies the building official and the registered design professional in responsible charge as the recipients.

Section 1703.3 is clarifies the requirement of the building official to provide access to the public for records of approval.

Cost Impact: The code change proposal will not increase the cost of construction.

1703.1-S-BRAZIL.doc

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1703.1 Approved agency. An *approved agency* shall provide all information as necessary for the *building official* to determine that the agency meets the applicable requirements specified in Sections 1703.1.1 through ~~1703.1.4~~ 1703.1.3.

(Portions of proposal not shown are unchanged)

Committee Reason: The committee supports clarifying to whom an approved agency must disclose conflicts of interest and including the registered design professional in addition to the building official in a good idea. The floor modification corrects a section reference.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mark K. Gilligan, S.E., representing self, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1703.1 Approved agency. An *approved agency* shall provide all information as necessary for the *building official* to determine that the agency meets the applicable requirements specified in Sections 1703.1.1 ~~through 1703.1.3~~ 1703.1.4.

1703.1.1 Independence. An *approved agency* shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose to the *building official* ~~and the *registered design professional in responsible charge*~~ possible conflicts of interest so that objectivity can be confirmed.

1703.3 Record of approval. For any material, appliance, equipment, system or method of construction that has been *approved*, a record of such approval, including the conditions and limitations of the approval, shall be kept on file in the *building official's* office and shall be available for public review at appropriate times.

Commenter's Reason: Naming the design professional as a recipient of the information of potential conflicts of interest by the Approved Agency will change the design professional's scope of services with his client and increase the design professional's liability exposure. The Owner of the project who hires the Approved Agency is not required to be notified. This provision would make the design professional responsible for passing the information on to his client who is not listed. It is suggested that this provision would effectively create an obligation for the design professional to proactively inquiring whether the approved agency has any potential conflicts of interest to report so that the design professional could be assured that he had passed along the information to his client.

In the vast majority of situations the design professional has no contractual relationship with the approved agency and has no management responsibility with respect to the approved agency. The proposed provision would change this situation by placing the design professional between the approved agency and the Owner in a role where he has responsibility but no authority.

The design professional's right to rely on information provided by his/her Client or the Client's consultants or contractors is adequately covered by contract and existing case law. It is suggested that it is not the role of building codes to define the contractual relationship between the design professional and his client.

While the Building Official may have an interest in understanding potential conflicts of the agency, that it approved, it is not appropriate for the building code to change the contractual relationship between the design professional and his client. The building code should focus on the compliance of the project and not on how the Owner arranges to comply with the regulations. Thus reference to the registered design professional in responsible charge should be deleted from the proposed code change.

S114-12

Final Action: AS AM AMPC____ D

S118-12

1704.1, 1704.2.5.2, 1704.5 (New), 1705.12.3, 1910.5, 2207.5

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing Washington Association of Building Officials, Technical Code Development Committee (pbrazil@reidmiddleton.com)

Revise as follows:

1704.1 General. This section provides minimum requirements for special inspections, the statement of special inspections, contractor responsibility, submittals to the *building official* and structural observations.

1704.2.5.2 Fabricator approval. *Special inspections* required by Section 1705 are not required where the work is done on the premises of a fabricator registered and *approved* to perform such work without *special inspection*. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an *approved special inspection* agency. At completion of fabrication, the *approved* fabricator shall submit a *certificate of compliance* to the owner or the owner's authorized agent for submittal to the *building official* as specified in Section 1704.5 stating that the work was performed in accordance with the *approved construction documents*.

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* after review and acceptance by a *registered design professional* and prior to the construction or work being performed for each of the following:

1. *Certificates of compliance* for the fabrication of structural, load-bearing or lateral load-resisting members or assemblies on the premises of an *approved fabricator* in accordance with Section 1704.2.5.2
2. *Certificates of compliance* for the seismic qualification of nonstructural components, supports and attachments in accordance with Section 1705.12.3
3. *Certificates of compliance* for *designated seismic systems* in accordance with Section 1705.12.4
4. Reports of preconstruction tests for shotcrete in accordance with Section 1910.5
5. *Certificates of compliance* for open web steel joists and joist girders in accordance with Section 2207.5

(Renumber subsequent sections)

1705.12.3 Seismic certification of nonstructural components. The *registered design professional* shall specify on the construction documents the requirements for certification by analysis, testing or experience data for nonstructural components and designated seismic systems in accordance with Section 13.2 of ASCE 7, where such certification is required by Section 1705.12. *Certificates of compliance* shall be submitted to the *building official* as specified in Section 1704.5.

Revise as follows:

1910.5 Preconstruction tests. ~~When~~ Where preconstruction tests are required by ~~the *building official*~~ Section 1910.4, a test panel shall be shot, cured, cored or sawn, examined and tested prior to commencement of the project. The sample panel shall be representative of the project and simulate job conditions as closely as possible. The panel thickness and reinforcing shall reproduce the thickest and most congested area specified in the structural design. It shall be shot at the same angle, using the same nozzleman and with the same concrete mix design that will be used on the project. The equipment used in preconstruction testing shall be the same equipment used in the work requiring such testing, unless substitute equipment is *approved* by the *building official*. Reports of preconstruction tests shall be submitted to the *building official* as specified in Section 1704.5.

Revise as follows:

2207.5 Certification. At completion of manufacture, the steel joist manufacturer shall submit a *certificate of compliance* ~~in accordance with~~ to the owner or the owner's authorized agent for submittal to the *building official* as specified in Section ~~1704.2.5.2~~ 1704.5 stating that work was performed in accordance with *approved construction documents* and with SJI standard specifications.

Reason: The purpose for the proposal is to provide a new section (Section 1704.5) in the building code that comprehensively specifies the requirements for the submittal of reports and certificates related to construction that is subject to special inspections and tests required by Chapter 17 of the building code. Typically, these documents certify or otherwise verify that a material or product meets certain special requirements, or are alternatives to the general requirements, of the building code.

The items in new Section 1704.5 are typically references to provisions elsewhere in the building code or a referenced standard. The charging language of the new section specifies the requirements for submittal to the building official (e.g., by whom, after review and acceptance, and before the work begins) and the requirements apply equally to each listed submittal. The referenced provisions, however, contain additional requirements unique to each situation. The proposal modifies these provisions to be consistent with the submittal requirements in new Section 1704.5. For example, Item 2 requires submittal of the certificate of conformance "in accordance with Section 1705.12.3." Section 1705.12.3, in turn, requires submittal of the certificate of conformance "to the building official as specified in Section 1704.5." Similar language is found in Item 4 and corresponding Section 1910.5.

Item 1 is similar to Item 2 in that it requires submittal of the certificate of conformance "in accordance with Section 1704.2.5.2." Section 1704.2.5.2, however, requires submittal of the certificate of conformance to "the owner or the owner's authorized agent for submittal to the building official as specified in Section 1704.5...". This is because of the requirement in Section 1704.2.5.2 for submittal of the certificate of compliance by the approved fabricator and is done to avoid a conflict with new Section 1704.5. Similar language is found in Item 5 of new Section 1704.5 and corresponding Section 2207.5.

The charging statement in new Section 1704.5 states that the submittals are in addition to the submittal of reports of special inspections and tests because also listing them in the new section is not needed since this activity is already covered in Section 1704.2.4. It is also not advisable because the submittal of reports of special inspections and tests is the responsibility of approved agencies but the submittals listed in this new section are the responsibility of the owner or owner's authorized agent. Examples of reports of special inspections and tests submitted by approved agencies are: tests of concrete for strength, slump and air content (see Table 1705.3); tests of masonry units, grout and mortar (see Section 1705.4); and strength tests of shotcrete (see Table 1705.3).

Item 4 is included in new Section 1704.5 because the preconstruction tests required by Section 1910.4 are not also a requirement in Chapter 17 of the building code and requiring the submittal of test reports to the building official will enable the building official to verify, before construction begins, the validity of structural design assumptions based on the success of the preconstruction tests. Text requiring the submittal of the test reports to the building official is added to Section 1910.5 in conjunction with Item 4.

For Items 2 and 3 of new Section 1704.5, a separate proposal places the provisions of Section 1705.12.3 into two subsections (Sections 1705.12.3 and 1705.12.4) to provide effective charging language for the corresponding provisions in ASCE 7-10. In that proposal, requirements for the submittal of certificates of compliance to the building official are added to each subsection. This proposal for a new Section 1704.5 also adds a similar requirement to Section 1705.12.3 but the only purpose for doing so is to specify Section 1704.5. Should both proposals be approved by the ICC membership, our intent is that Section 1705.12.3 reads: "Certificates of compliance for the seismic qualification shall be submitted to the building official as specified in Section 1704.5;" and Section 1705.12.4 reads: "Certificates of compliance documenting that the requirements are met shall be submitted to the building official as specified in Section 1704.5."

Note that separate proposals:

1. Transfer the requirements of Section 1705.12.1 to new Section 1704.5;
2. Add additional requirements for submittals that are related to structural steel ;
3. Correlate the language in Section 1704.2.5 with the definition of "fabricated item" in Section 202;
4. Add additional requirements for submittals that are related to the welding of concrete reinforcement and anchor bolts;
5. Add additional requirements for submittals that are related to masonry;
6. Change "the owner" to "the owner or the owner's authorized agent";
7. Add a new Section 107.1.1 that correlates with this proposal; and
8. Add "responsible" before "registered design professional".

Cost Impact: The code change proposal will not increase the cost of construction.

1704.1 #1-S-BRAZIL.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels the compilation of required submittals is a good idea, but there apparent confusion over the proposed wording. There's concern with requiring these before the start of construction could delay the construction process. There is also some concern with contractual issues being introduced into the code as well as with the registered design professional's acceptance of submittals.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, P.E., S.E., representing self, and Lee Kranz, City of Bellevue, representing Washington Association of Building Officials, Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* ~~after review and acceptance by a *registered design professional* and prior to the construction or work being performed~~ for each of the following:

1. *Certificates of compliance* for the fabrication of structural, load-bearing or lateral load-resisting members or assemblies on the premises of a registered and *approved fabricator* in accordance with Section 1704.2.5.2
2. *Certificates of compliance* for the seismic qualification of nonstructural components, supports and attachments in accordance with Section 1705.12.3
3. *Certificates of compliance* for *designated seismic systems* in accordance with Section 1705.12.4
4. Reports of preconstruction tests for shotcrete in accordance with Section 1910.5
5. *Certificates of compliance* for open web steel joists and joist girders in accordance with Section 2207.5

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: In response to the Committee Reason and the testimony at the Dallas Code Development Hearing, the language for review and acceptance by a registered design professional and submittal prior to the construction or work being performed is deleted.

Note that separate proposals:

a. Change "the owner" to "the owner or the owner's authorized agent" throughout the IBC (S90-12-AS); and
b. Place the provisions of Section 1705.12.3 into two subsections (1705.12.3 and 1705.12.4) to provide effective charging language for the corresponding provisions in ASCE 7-10 (S129-12-AS).

S118-12

Final Action: AS AM AMPC____ D

S121-12
1704.2, 1704.2.1, 1704.2.4

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing Washington Association of Building Officials, Technical Code Development Committee (pbrazil@reidmiddleton.com)

Revise as follows:

1704.2 Special inspections. Where application is made for construction as described in this section, the owner or the *registered design professional in responsible charge* acting as the owner's agent shall employ one or more *approved agencies* to ~~perform~~ provide inspections during construction on the types of work listed under Section 1705 and identify them to the *building official*. These inspections are in addition to the inspections identified in Section 110.

Exceptions:

1. *Special inspections* are not required for construction of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. Unless otherwise required by the *building official*, *special inspections* are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.
3. Special inspections are not required for portions of structures designed and constructed in accordance with the cold-formed steel light-frame construction provisions of Section 2211.7 or the conventional light-frame construction provisions of Section 2308.

1704.2.1 Special inspector qualifications. Prior to the start of the construction, **t**he ~~special inspector~~ *approved agencies* shall provide written documentation to the building official demonstrating ~~his or her~~ the competence and relevant experience or training of the *special inspectors* who will perform the *special inspections* and tests during construction. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of *special inspection* activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code. The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as the *approved agency* and their personnel are permitted to act as the special inspector for the work designed by them, provided they qualify as special inspectors.

1704.2.4 Report requirement. ~~Special inspectors~~ *Approved agencies* shall keep records of inspections. The ~~special inspector~~ *approved agency* shall furnish inspection reports to the *building official*, and to the *registered design professional in responsible charge*. Reports shall indicate that work inspected was or was not completed in conformance to *approved construction documents*. Discrepancies shall be brought to the immediate attention of the contractor for correction. If they are not corrected, the discrepancies shall be brought to the attention of the *building official* and to the *registered design professional in responsible charge* prior to the completion of that phase of the work. A final report documenting required *special inspections* and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon prior to the start of work by the applicant and the *building official*.

Reason: Section 1704.2 requires the owner or owner's agent to employ approved agencies to perform special inspections and tests required by Section 1705. The act of an owner or owner's agent to employ an approved agency for this purpose, however, is a private matter (typically contractual) and not an appropriate subject for a building code that requires compliance with its provisions. The proposal revises the language to require the owner or owner's agent to identify to the building official the approved agencies who will provide the special inspections and tests required by Section 1705 that will be performed by special inspectors and others (e.g., testing lab personnel) employed or retained by the approved agency.

Section 1704.2.1 requires special inspectors to provide documentation of their qualifications to the building official but it does not specify when this is required to occur. Being a subsection of Section 1704.2, Section 1704.2.1 also does not specify the relationship between the special inspector providing documentation of qualifications and the owner or owner's agent employing an approved agency. Special inspectors are employed or retained by an approved agency to perform special inspections (see definition of "special inspector" in Section 202). The proposal revises the language to require the approved agency to provide to the building official prior to the start of construction documentation of the qualifications for the special inspectors who will perform the special inspections and tests during construction.

An example of written documentation demonstrating the competence and relevant experience of an approved agency would be evidence of accreditation as an approved agency by the International Accreditation Service (IAS), Inc. The requirements for obtaining and maintaining such accreditation from the IAS are in the Accreditation Criteria for Special inspection Agencies, AC291. Notable provisions in AC291 are definitions, many of which are from 2012 IBC Section 202 (Section 2); information required to be submitted by the agency for accreditation (Section 3); requirements for inspection reports issued by the agency, including compliance with the reporting requirements of IBC Chapter 17 (Section 4); requirements for training, supervision and monitoring of special inspectors (Section 5); and minimum qualifications of special inspectors for specific classes of construction, including those in 2012 IBC Section 1705 (Section 6).

Section 1704.2.4 requires special inspectors to keep records of inspections and furnish inspection reports to the building official and the registered design professional in responsible charge. Special inspectors do generate records of their actions but these are typically kept for submittal by the approved agency that employs or retains them. Section 1704.2.4 is changed to require approved agencies to keep records of special inspections and tests and to submit the reports to the building official and the registered design professional in responsible charge.

Note that separate proposals also revise Section 1704.2 to:

1. Distinguish between special inspections and tests by approved agencies and inspections by the building official;
2. Clarify that the application is made to the building official as specified in Section 105 ; and
3. Update references to "approved agency" throughout the building code, including instances of "special inspection agency".

Cost Impact: The code change proposal will not increase the cost of construction.

1704.2 #2-S-BRAZIL.doc

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

1704.2 Special inspections. Where application is made for construction as described in this section, the owner or the *registered design professional in responsible charge* acting as the owner's agent shall employ one or more *approved agencies* to provide inspections during construction on the types of work listed under Section 1705 and identify ~~them~~ the inspections to the *building official*. These inspections are in addition to the inspections identified in Section 110.

Exceptions:

1. *Special inspections* are not required for construction of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. Unless otherwise required by the *building official*, *special inspections* are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.
3. Special inspections are not required for portions of structures designed and constructed in accordance with the cold-formed steel light-frame construction provisions of Section 2211.7 or the conventional light-frame construction provisions of Section 2308.

(Portions of proposal not shown are unchanged)

Committee Reason: This code clarifies when the documentation of special inspector qualification must be submitted to the building official. It also clears up who keeps the inspection records and furnishes them to the building official. The modification makes it clear that the inspections are to be identified.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, P.E., S.E., representing self; and Lee Kranz, City of Bellevue, representing Washington Association of Building Officials, Technical Code Development Committee, request Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1704.2 Special Inspections. Where application is made for construction as described in this section, the owner or the *registered design professional in responsible charge* acting as the owner's agent shall employ one or more *approved agencies* to provide inspections during construction on the types of work listed under Section 1705 and identify the ~~inspections~~ approved agencies to the *building official*. These inspections are in addition to the inspections specified in Section 110.

Exceptions:

1. *Special inspections* are not required for construction of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. Unless otherwise required by the *building official*, *special inspections* are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.
3. Special inspections are not required for portions of structures designed and constructed in accordance with the cold-formed steel light-frame construction provisions of Section 2211.7 or the conventional light-frame construction provisions of Section 2308

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The purpose for the public comments is to correct an inadvertent error in the approved proposal. In the originally submitted proposal, "them" meant the approved agencies, not the inspections. This was also noted in the first paragraph of the reason statement. The public comment makes the necessary adjustment to the language.

S121-12
Final Action: AS AM AMPC____ D

S123-12
1704.2.5, 1704.2.5.1, 1704.2.5.2, 1705.10 (New)

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing self (pbrazil@reidmiddleton.com)

Revise as follows:

1704.2.5 Special inspection of ~~fabricators~~ fabricated items. Where fabrication of structural load-bearing members and assemblies is being ~~performed~~ conducted on the premises of a fabricator's shop, *special inspections* of the fabricated items shall be ~~required by this section and as required elsewhere in this code~~ performed during fabrication.

Exceptions:

1. ~~**Fabrication and implementation procedures.**~~ *Special inspections* during fabrication are not required where the special inspector ~~shall verify~~ verifies that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to *approved construction documents* and referenced standards. The special inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.

2. *Special inspections* ~~as required by Section 1704.2.5 shall~~ are not ~~be~~ required where the fabricator is registered and *approved* in accordance with Section 1704.2.5.2.

~~**1704.2.5.2**~~ **1704.2.5.1 Fabricator approval.** *Special inspections* ~~required by Section 1705~~ during fabrication are not required where the work is done on the premises of a fabricator registered and *approved* to perform such work without *special inspection*. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an *approved special inspection* agency. At completion of fabrication, the *approved* fabricator shall submit a *certificate of compliance* to the *building official* stating that the work was performed in accordance with the *approved construction documents*.

1705.10 Fabricated items. Special inspections of fabricated items shall be performed in accordance with Section 1704.2.5.

(Renumber subsequent sections)

Reason: Section 1704.2.5 requires special inspections to be performed for all structural load-bearing members and assemblies that are fabricated on the premises of a fabricator's shop (e.g., not at the construction site) as specified in the section and elsewhere in the building code. One example of this is the fabrication of metal-plate-connected wood trusses, which is subject to the special inspections required by Section 1704.2.5. Special inspections of the installation of the trusses at the construction site is not required except for trusses spanning 60 feet or greater (Section 1705.5.2).

A second example is the fabrication of precast, prestressed, concrete members (e.g., hollow-core slabs), which is also subject to the special inspections required by Section 1704.2.5 as well as those of Section 1705.3 for concrete construction. Note that Item 9 of Table 1705.3 specifies inspection of prestressed concrete.

Section 1704.2.5 requires special inspections of the fabricated items. Section 1704.2.5.1 specifies duties of the special inspector but these duties are not directly related to special inspections of the fabricated items. Instead, the specified duties are typical of what is conducted by an approved agency for the accreditation of a fabricator by a nationally recognized accreditation service such as the International Accreditation Service. Based on Section 1704.2.5, these duties are required in addition to special inspections of the fabricated items that are required elsewhere in the building code, such as for precast, prestressed, concrete members.

The proposal modifies the provisions in Section 1704.2.5 by requiring special inspections of fabricated items during fabrication. Section 1704.2.5.1 is changed to an exception making it an alternative to the basic requirement for special inspection in Section 1704.2.5.

The other changes in the proposal are made to clarify the language. Section 1705.10 is added because Section 1704.2.5 requires special inspections except where the work is done on the premises of an approved fabricator (Section 1704.2.5.2) and should be included in Section 1705, which specifies required special inspection and tests.

The current provisions in Section 1704.2.5.2 (renumbered to Section 1704.2.5.1 are an acknowledgement that there are fabricators who (1) fabricate products or assemblies with sufficient quality and through the application of documented procedures (e.g., quality management systems), and (2) and are recognized for this through certification, accreditation or qualification by a national recognized organization providing such services, that they should be exempt from further requirements for special inspection of fabrication. Examples are:

1. The certification program of steel fabricators and erectors by the American Institute of Steel Construction (AISC), which is audited by the Quality Management Company;
2. The accreditation of the fabrication inspection programs for reinforced concrete and precast/prestressed concrete, structural steel and wood wall panels by the International Accreditation Service (IAS) (see AC157, AC172 and AC196, respectively, for accreditation criteria);
3. The accreditation of the inspection programs for manufacturers of metal building systems by the International Accreditation Service (IAS) (see AC472 for accreditation criteria); and
4. Qualification of prefabricated items such as prefabricated wood shear panels, cold-formed, pin-connected open-web trusses with wood chords and tubular or angular steel webs, and steel lateral-force-resisting vertical assemblies, as alternatives to applicable requirements in the IBC or other codes by the ICC Evaluation Service (ICC-ES) (see AC130, AC306 and AC322, respectively, for acceptance criteria).
5. The certification of structural and architectural concrete products by the Precast, Prestressed Concrete Institute (PCI).
6. The certification of precast concrete products by the National Precast Concrete Association (NPCA).

Note that separate proposals:

1. Revise Section 1704.2.5.2 to specify that the approved fabricator is required to submit the certificate of compliance to the owner or the owner's authorized agent in conjunction with the requirement in proposed Section 1704.5 for submittal of the certificate to the building official;
2. Revise Sections 1704.2.5 and 1704.2.5.1 for consistency with and to correlate with the definition of "fabricated item" in Section 202; and
3. Revise Section 1704.2.5.2 and other sections to update references to "approved agency" throughout the building code.

Cost Impact: The code change proposal will not increase the cost of construction.

1704.2.5 #1-S-BRAZIL.doc

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: This code change properly identifies conditions under which special inspections of fabricators are required.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Philip Brazil, P.E., S.E., representing self; and Lee Kranz, City of Bellevue, representing Washington Association of Building Officials, Technical Code Development Committee; and Constadino (Gus) Sirakis, PE, representing New York City Department of Buildings, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.2.5 Special inspection of fabricated items. Where fabrication of structural load-bearing members and assemblies is being conducted on the premises of a fabricator's shop, *special inspections* of the fabricated items shall be performed during fabrication.

Exceptions:

1. *Special inspections* during fabrication are not required where the ~~special inspector verifies that the~~ fabricator maintains <u>*approved*</u> detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to *approved construction documents* and referenced standards. ~~The special inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.~~ <u>Approval shall be based upon review of fabrication and quality control procedures and periodic inspection of fabrication practices by the building official.</u>

2. *Special inspections* are not required where the fabricator is registered and *approved* in accordance with Section 1704.2.5.2.

1704.2.5.1 Fabricator approval. *Special inspections* during fabrication are not required where the work is done on the premises of a fabricator registered and *approved* to perform such work without *special inspection*. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an *approved special inspection* agency. At completion of fabrication, the *approved* fabricator shall submit a *certificate of compliance* to the *building official* stating that the work was performed in accordance with the *approved construction documents*.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The purpose for the public comment is to clarify that the exemption from required special inspections in Exception #1 is permitted only when approved by the building official. The language is revised to require the fabricator to maintain *approved* detailed fabrication and quality control procedures and *approved* is defined in IBC Section 202 as "acceptable to the *building official* or authority having jurisdiction." The added language for approval to be based upon review of fabrication and quality control procedures and periodic inspection by the building official is for consistency with language in Section 1704.2.5.1 for similar actions by the approved agency.

Note that separate proposals:

a. Revise Section 1704.2.5.2 and other sections to update references to "approved agency" throughout the building code (e.g., change from "approved special inspection agency" to "approved agency," S117-12-AM); and
b. Revise Sections 1704.2.5 and 1704.2.5.1 for consistency with and to correlate with the definition of "fabricated item" in Section 202 (e.g., change from "referenced standards" to "this code," S124-12-AS).

Public Comment 2:

Bonnie E. Manley, American Iron and Steel Institute, representing American Institute of Steel Construction, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.2.5 Special inspection of fabricated items. Where fabrication of structural load-bearing members and assemblies is being conducted on the premises of a fabricator's shop, *special inspections* of the fabricated items shall be performed during fabrication.

Exceptions:

1. *Special inspections* as specified by Section 1705, excluding Sections 1705.10, 1705.11, and 1705.12, during fabrication are not required where the special inspector verifies that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to *approved construction documents* and referenced standards. The special inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.

2. *Special inspections* as specified by Section 1705, excluding Sections 1705.10, 1705.11, and 1705.12, are not required where the fabricator is registered and *approved* in accordance with Section 1704.2.5.1~~2~~.

1704.2.5.1 Fabricator approval. *Special inspections* during fabrication as specified by Section 1705, excluding Sections 1705.10, 1705.11, and 1705.12, are not required where the work is done on the premises of a fabricator registered and *approved* to perform such work without *special inspection*. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an *approved special inspection* agency. At completion of fabrication, the *approved* fabricator shall submit a *certificate of compliance* to the *building official* stating that the work was performed in accordance with the *approved construction documents*.

1705.10 Fabricated items. Special inspections of fabricated items shall be performed in accordance with Section 1704.2.5.

Commenter's Reason: This public comment builds upon the approved changes in Proposal S123-12 by reintroducing the primary modification recommended in Proposal 126-12. That proposal was disapproved by the ICC Structural Code Committee because the "Action taken on S123-12 was preferred" – hence, this public comment, which folds the changes recommended in Proposal S126-12 in on top of the changes approved in Proposal S123-12. Specifically, this comment corrects the unintended consequences of modifications made by Proposal S116-09/10, effective with IBC 2012. That proposal reorganized Chapter 17 and combined all special inspections and tests into Section 1705, including requirements for additional special inspection and testing for wind resistance and seismic resistance. Previously, special inspections for wind resistance and seismic resistance were not permitted to be waived from special inspections under the approved fabricators provisions, as demonstrated by the modifications successfully made under Proposal S109-07/08 for the 2009 IBC. Proposal S109–07/08 added the specific reference to Section 1704 into 1704.2.2, with the reason stated as follows:

"This modification attempts to clarify exactly which inspections are permitted to be waived when work is done by a registered and approved fabricator. As written now, it could be interpreted to mean that the special inspections for seismic resistance required by Section 1707.2 could be waived. This is not appropriate and needs to be corrected."

We believe that the community inadvertently took a step back in the 2012 IBC with the success of Proposal S116-09/10 and remain committed to the belief that special inspections identified for seismic and wind resistance should not be waived even for approved fabricators. The systems addressed by these special inspections are critical to the performance of the building in a wind or seismic event and therefore warrant the higher level of attention.

S123-12

Final Action: AS AM AMPC____ D

S128-12
1704.3.1

Proposed Change as Submitted

Proponent: Stephen Kerr, S.E., Josephson Werdowatz and Associates, representing Structural Engineers Association of California (SEAOC) (skerr@jwa-se.com)

Revise as follows:

1704.3.1 Content of statement of special inspections. The statement of special inspections shall identify the following:

1. The materials, systems, components and work required to have *special inspection* or testing by the *building official* or by the *registered design professional* responsible for each portion of the work.
2. The type and extent of each *special inspection*.
3. The type and extent of each test.
4. Additional requirements for *special inspection* or testing for seismic or wind resistance as specified in Sections 1705.10, 1705.11 and 1705.12.
5. For each type of *special inspection*, ~~identification as to~~ whether it will be continuous *special inspection*, ~~or~~ periodic *special inspection*, or performed at a frequency in accordance with the notation used in the reference standard where the inspections are defined.

Reason: The quality assurance requirements of AISC 360 and AISC 341, which are referenced as the standard for special inspections and testing for structural steel, do not describe the frequency of the inspections as "periodic" or "continuous." Rather, detailed inspection tasks are defined, and the level of effort for each task is described by the terms "Observe" and "Perform". This proposal accommodates this alternate approach to the frequency of special inspection.

Cost Impact: The code change proposal will not increase the cost of construction.

1704.3.1-S-KERR.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee prefers that special inspections be referred to strictly as continuous or periodic. There is no requirement to add wording frequencies according to reference standards.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Stephen Kerr, representing Structural Engineers Association of California, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.3.1 Content of statement of special inspections. The statement of special inspections shall identify the following:

1. The materials, systems, components and work required to have *special inspection* or testing by the *building official* or by the *registered design professional* responsible for each portion of the work.

2. The type and extent of each *special inspection*.
3. The type and extent of each test.
4. Additional requirements for *special inspection* or testing for seismic or wind resistance as specified in Sections 1705.10, 1705.11 and 1705.12.
5. For each type of *special inspection*, <u>identification as to</u> whether it will be continuous special inspection, periodic special inspection, or performed ~~at a frequency~~ in accordance with the notation used in the reference standard where the inspections are defined.

Commenter's Reason: The quality assurance requirements of AISC 360 and AISC 341, which are referenced as the standard for special inspections and testing for structural steel, do not describe the frequency of the inspections as "periodic" or "continuous." Rather, detailed inspection tasks are defined, and the level of effort for each task is described by the terms "Observe" and "Perform". Whereas inspection frequency "periodic or continuous" is time dependent, interval to "observe or perform" is project dependent based on design. Neither the building official nor the design professional of record can control the work of the contractor or that of the special inspector, except to identify the critical elements which need special inspection. This proposal accommodates this alternate approach to the frequency of special inspection in accordance with the commentary on section N of AISC 360.

S128-12

Final Action: AS AM AMPC____ D

S133-12
1704.5 (New), Chapter 35 (New)

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing self (pbrazil@reidmiddleton.com)

Add new text as follows:

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* after review and acceptance by a *registered design professional* and prior to the construction or work being performed for each of the following:

1. Welding procedure specifications in accordance with Section 6.1.2 of AWS D1.4 for the welding of concrete reinforcement other than by fillet welds.
2. Test reports for Grade 55 anchor bolts verifying compliance with Supplementary Requirement S1 of ASTM F 1554 for weldability.
3. Test reports for Grade A and B anchor bolts verifying compliance with Supplementary Requirement S1 of ASTM A 307 for weldability.

Add new standard to Chapter 35 as follows:

ASTM

F1554-07a Standard Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength

Reason: This proposal is a continuation of a separate proposal that adds a new Section 1704.5 specifying submittals to the building official. This proposal adds three items to those in the separate proposal and the charging language in new Section 1704.5 is identical in both proposals.

Item 1 is added to new Section 1704.5 because Section 6.1.2 of AWS D1.4 requires qualification testing for the welding procedure specifications (WPS) of all types of welded joints that include reinforcing bars except for those consisting of fillet welds, which are deemed to be prequalified and, thus, exempt from testing. Section 6.1.2.3 of the standard requires the WPS to be made available to those authorized to examine them. The requirement for availability means that welding procedure specifications are available for submittal to the building official. Requiring their submittal to the building official will enable the building official to verify whether the welded joints are adequately designed to meet applicable requirements. Note that the 1998 edition of AWS D1.4 is a referenced standard of the 2012 IBC (see Chapter 35) but the 2011 edition is the current edition.

Item 2 is added to new Section 1704.5 because Grade 55 anchor bolts complying with ASTM F 1554-07a are not suitable for welding but weldable steel is possible, provided the material for the bolts meets Supplementary Requirement S1 of the standard. In ASTM F 1554-07a, Section 4.2 classifies Grade 55 anchor bolts complying with Supplementary Requirement S1 as weldable, Section 5.1 requires orders for anchor bolts to include required test reports (Section 5.1.13), and Section 17.1 requires the purchaser to be furnished with a test report that includes the carbon equivalent in accordance with Supplementary Requirement S1 (Section 17.1.1). The requirement that the purchaser be furnished with the test reports means that they are available for submittal to the building official. Requiring their submittal to the building official will enable the building official to verify whether the anchor bolts meet the applicable requirements for weldability.

Grade 36 bolts complying with ASTM F 1554-07a are weldable because of the limits on carbon in Table 1 ("Chemical Requirements for Grade 36") of the standard, which are 0.26%-0.28% by heat analysis and 0.29%-0.31% by product analysis depending on the bolt diameter. Grade 55 anchor bolts not complying with Supplementary Requirement S1 are not weldable because of the lack of limits on carbon in Table 2 ("Chemical Requirements for Grades 55 and 105") of the standard. In Supplementary Requirement S1, Section S1.2 assumes that suitable welding procedures for the steel being welded and the intended service will be selected, Section S1.5.1 specifies limits on carbon of 0.30% by heat analysis and 0.33% by product analysis, Section S1.5.2 requires an analysis of the carbon equivalent (CE) verifying that limits on CE are met (0.45% for alloy and low-alloy steel and 0.40% for carbon steel), and Section S1.6 requires the anchor bolts to be designated by a white paint mark on the side of the bar to be encased in concrete.

Of the ASTM standards applicable to other commonly used anchor bolts, Table 2 ("Chemical Requirements") of ASTM A 36 for carbon steel shapes, plates and bars of structural quality limits carbon in bars to 0.26%-0.29% depending on nominal diameter; and Table 1 ("Chemical Requirements for Grades A and B Bolts and Studs") of ASTM A 307 for carbon steel bolts and studs limits carbon in Grade A and B bolts and studs to 0.29% by heat analysis and 0.33% by product analysis. ASTM A 307 Grade C bolts and studs are specified as having properties complying with ASTM A 36 (Section 1.1). The effect of these provisions is that anchor bolts with properties complying with ASTM A 36 (e.g., ASTM A 307, Grade C) are weldable but anchor bolts complying with ASTM A 307, Grade A or B, may not be weldable and the standard specifies additional requirements (Section 1.5) to ensure weldability

(Supplementary Requirement S1) that are similar to those in ASTM F 1554-07a. Item 3 is added to new Section 1704.5 because of this.

Note that separate proposals:

1. Transfer the requirements of Section 1705.12.1 to new Section 1704.5 ;
2. Add additional requirements for submittals that are related to structural steel;
3. Add additional requirements for submittals that are related to masonry ; and
4. Add a new Section 107.1.1 that correlates with this proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1704.5 (NEW) #1-S-BRAZIL.doc

Public Hearing Results

Note: For staff analysis of the content of ASTM F 1554 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: Disapproved

Committee Reason: Disapproval is consistent with the committee's action on S118-12. There's concern that requiring these submittals before the start of construction could delay the construction process.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, P.E., S.E., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* ~~after review and acceptance by a *registered design professional* and prior to the construction or work being performed~~ for each of the following:

1. Welding procedure specifications in accordance with ~~Section 6.1.2 of~~ AWS D1.4 for the welding of concrete reinforcement other than by fillet welds.
2. Test reports for Grade 55 anchor bolts verifying compliance with Supplementary Requirement S1 of ASTM F 1554 for weldability.
3. Test reports for Grade A and B anchor bolts verifying compliance with Supplementary Requirement S1 of ASTM A 307 for weldability.

(Portions or proposal not shown remain unchanged)

Commenter's Reason: In response to the Committee Reason and the testimony at the Dallas Code Development Hearing, the language for review and acceptance by a registered design professional and submittal prior to the construction or work being performed is deleted from the charging text. Also, the section reference in Item #1 is deleted to eliminate the need to correlate the standard with the IBC in the future. The language in Item #1 is sufficiently descriptive to make the section reference unnecessary.

Note that a separate proposal changes "the owner" to "the owner or the owner's authorized agent" throughout the IBC (S90-12-AS).

S133-12

Final Action: AS AM AMPC____ D

S134-12
1704.5 (New), Chapter 35 (New)

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, representing self (pbrazil@reidmiddleton.com)

Add new text as follows:

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* after review and acceptance by a *registered design professional* and prior to the construction or work being performed for each of the following:

1. Test reports verifying compliance with Supplementary Requirement S30 of ASTM A6 for W-shaped and WT-shaped elements of structural steel with flange thicknesses of 1-1/2 inches (38 mm) or greater that are required to have a Charpy V-notch toughness as specified in Section A3.3 of AISC 341;
2. Test reports verifying compliance with Supplementary Requirement S5 of ASTM A6 for structural steel plates of 2 inches (51 mm) in thickness or greater that are required to have a Charpy V-notch toughness as specified in Section A3.3 of AISC 341;
3. *Certificates of compliance* for verification that welds at elements of structural steel and their connections that are in the *seismic force-resisting system* are made with filler metal having a Charpy V-notch toughness as specified in Section A3.3a of AISC 341;
4. *Certificates of compliance* for verification that demand critical welds are made with filler metal having a Charpy V-notch toughness as specified in Section A3.3b of AISC 341;
5. Test reports verifying compliance with Supplementary Requirement S30 of ASTM A6 for hot-rolled shapes of structural steel with flange thicknesses greater than 2 inches (51 mm) that are required to have a Charpy V-notch toughness as specified in Section A3.1c of AISC 360;
6. *Certificates of compliance* for the fabrication of steel buckling-restrained braces on the premises of an *approved fabricator* in accordance with Section 1704.2.5.2.

Add new standard to Chapter 35 as follows:

ASTM

A 6-11 Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling

Reason: This proposal is a continuation of a separate proposal that adds a new Section 1704.5 specifying submittals to the building official. This proposal adds six items to those in the separate proposal and the charging language in new Section 1704.5 is identical in both proposals. The parenthetic references to AISC 341-05 below are provided for reference and correspond to the referenced provisions of AISC 341-10. Similarly, there are parenthetic references to AISC 360-05 that correspond to the referenced provisions of AISC 360-10.

Items 1 and 2 are added to new Section 1704.5 because of the requirements in Section A3.3 of AISC 341-10 (Section 6.3 of AISC 341-05) for minimum Charpy V-notch (CVN) toughness in (1) hot rolled shapes of structural steel with flange thicknesses of 1-1/2 inches or greater, and (2) structural steel plates 2 inches in thickness or greater and meeting the condition specified therein, where they are elements of the seismic force-resisting system in structures within the scope of AISC 341. However, there are no provisions in AISC 341-10 (or AISC 341-05) for verification by the building official (authority having jurisdiction) that the requirements are met.

The condition specified in Section A3.3 of AISC 341-10 for steel plates is that Charpy V-notch (CVN) toughness is limited for (1) members built up from plate, (2) connection plates where inelastic strain under seismic loading is expected, and (3) the steel core of buckling-restrained braces. Note that there is apparently an error in Section A3.3 of AISC 341-10 for hot-rolled shapes in that the minimum flange thickness is specified as 1/2 inch (38 mm) but, given the stated thickness in millimeters, 1-1/2 inches is intended.

Section A3.3 of AISC 341-10 (Section 6.3 of AISC 341-05) requires the structural steel to comply with Section A3.1c of AISC 360-10 (Section A3.1c of AISC 360-05). For hot rolled shapes of structural steel with flange thicknesses greater than 2 inches and meeting the conditions specified therein, Section A3.1c of AISC 360-10 requires the construction documents (structural design documents) to specify that such shapes shall be supplied with CVN impact test results in accordance with ASTM A6, Supplementary

Requirement S30. Assuming that it is not the intent for the shapes to supply the test results, it is assumed that the intent is for tests in accordance with ASTM A6, Supplementary Requirement S30 to be conducted on the shapes.

Section A3.3 of AISC 341-10 also requires the structural steel to be tested for CVN toughness as specified in ASTM A6, Supplementary Requirement S30, for hot-rolled shapes and in accordance with ASTM A 673 for steel plate. This has the effect of modifying the requirement in Section A3.1c of AISC 360-10 to lower the threshold for CVN impact testing of hot-rolled shapes of structural steel to those with flange thicknesses of 1-1/2 inches or greater and to also require CVN impact testing for structural steel plates that are 2 inches in thickness or greater. The requirement for test results means that test reports are available for submittal to the building official. Requiring their submittal to the building official will enable the building official to verify whether the structural steel meets the applicable requirements for CVN toughness.

In ASTM A 6-11, Section 1.8 indicates that the supplementary requirements therein are for use where additional testing or restrictions are required by the purchaser in the purchase order, Section 14.1 requires test reports for each heat supplied, and Section 14.1.6 requires the test reports to report the results of tests required by the purchase order. As for Section A3.1c of AISC 360-10 (discussed above), the requirement for test reports means that they are available for submittal to the building official, and requiring their submittal to the building official will enable the building official to verify whether the structural steel meets the applicable requirements for CVN toughness.

Supplementary Requirement S5 of ASTM A 6-11 requires CVN impact tests to be conducted in accordance with ASTM A 673 (Section S5.1). Supplementary Requirement S30 of ASTM A 6-11 requires CVN impact tests to be conducted in accordance with ASTM A 673 using specimens taken from the alternate core location (Section S30.1). This means that the supplementary requirements are identical in that both require impact testing in accordance with ASTM A 673 to determine CVN toughness except that Supplementary Requirement S30 imposes an additional condition on the testing, which is to take specimens from the alternate core location. Section A3.3 of AISC 341-10 references ASTM A 673 for steel plate but the proposal references Supplementary Requirement S5 of ASTM A 6-11 for consistency with the reference to Supplementary Requirement S30 of ASTM A 6-11 for hot-rolled shapes of structural steel.

Item 1 is limited in scope to W-shaped and WT-shaped structural members because the requirement in Section A3.3 of AISC 341-10 (Section 6.3 of AISC 341-05) for minimum CVN toughness is limited to hot-rolled shapes of structural steel with flange thicknesses of 1-1/2 inches or greater, which occur only in W-shaped and WT-shaped elements of structural steel. Section 3.1.2 of ASTM A 6-11 defines “shapes” as including “W” shapes, “HP” shapes, “S” shapes, “M” shapes, “C” shapes, “MC” shapes and “L” shapes. Of these shapes, the *AISC Steel Construction Manual* (thirteenth edition) only lists W-shaped and WT-shaped elements of structural steel with flange thicknesses of 1-1/2 inches or greater (Tables 1-1 and 1-8). Note that the *Manual* also does not list any “MT” shapes or “ST” shapes with flange thicknesses of 1-1/2 inches or greater.

The provisions in Section A3.3 of AISC 341-10 (Section 6.3 of AISC 341-05) and Section A3.1c of AISC 360-10 (Section A3.1c of AISC 360-05) are limited to hot-rolled shapes of structural steel but are not limited by type of shape. In Items 1 and 2 of this proposal, however, the requirement for submittal of test reports is limited by type of shape but is not limited to hot-rolled shapes of structural steel. The type of shape is limited to eliminate extraneous shapes for which the requirement for submittal does not apply. Limiting the requirement for submittal to shapes that are hot-rolled is not included because “hot-rolled” is a manufacturing process and is not relevant to the requirement for submittal. The “hot-rolled” limit is also not included for consistency with ASTM A 6-11 whose scope specifies the standard as applying to “rolled structural steel bars, plates, shapes and sheet piling” (Section 1.1).

Section A3.3 of AISC 341-10 and Section A3.1c of AISC 360-10 do specify hot-rolled shapes and the same is true of Section 6.3 of AISC 341-05 and Section A3.1c of AISC 360-05. None of these standards, however, define “hot-rolled” nor, to my knowledge, does any referenced standard of the 2012 IBC or any other standard referenced in the AISC standards listed above.

Items 3 and 4 are added to new Section 1704.5 because of the requirements in Sections A4.4a and A4.4b of AISC 341-10 (Sections 7.3a and 7.3b of AISC 341-05) for minimum CVN toughness of welds that are used in elements of structural steel and their connections that are in the seismic force-resisting system of structures within the scope of AISC 341. AISC 341-05 directly specifies the requirements. AISC 341-10 indirectly specifies them by referencing the requirements in Section (Clause) 6.3 of AWS D1.8. As for Items 1 and 2 of the proposal (discussed above), there are no provisions in AISC 341-10 (or AISC 341-05) for verification by the building official (authority having jurisdiction) that the requirements are met.

Section (Clause) 6.3 of AWS D1.8 (2009 edition) contains requirements for filler and weld metal of welds, including demand critical welds, that are within the scope of the standard. Among those requirements, Sections 6.3.1 and 6.3.5 specify mechanical properties for filler metals, including minimum CVN toughness, of welds and demand critical welds, respectively, which are listed in corresponding Tables 6.1 and 6.2. Note that AWS D1.8 is not a referenced standard of the 2012 IBC.

Section (Clause) 6.1.1 of AWS D1.8 requires welding procedure specifications to be prequalified, or to be qualified by testing in accordance with applicable AWS D1.1 requirements. Note that Section 1.1 of AWS D1.8 (1) establishes the applicability of AWS D1.8 as supplementing AWS D1.1 and (2) states that the provisions in AWS D1.1 apply to the welds governed by the provisions AWS D1.1 except where modified in AWS D1.8.

Section (Clause) 4.0 of AWS D1.1 (2008 edition) contains requirements for qualification testing of welding procedure specifications (WPS’s). Section 3.1, however, exempts prequalified welding procedure specifications from requirements for qualification testing. A WPS is required to meet the provisions of Chapter 3 of AWS D1.1 in order to be prequalified. However, there are no provisions in Chapter 3 for minimum CVN toughness. Section 4.1.1.3 requires CVN tests to be included in the WPS qualification where required by the construction (contract) documents. Section 1.4.1(5) requires the Engineer to specify in the construction (contract) documents the CVN toughness criteria for weld metal (and base metal). Where notch toughness of welds used in elements of structural steel or their connections (welded joints) is required, Section 2.2.2 requires the Engineer to specify in the construction (contract) documents the minimum absorbed energy and corresponding test temperature for the filler metal (e.g., prequalified) or to specify that the WPS shall be qualified by CVN tests.

The effect of these provisions in AWS D1.1 is that the standard specifies CVN impact testing for qualification of welded joints to meet specified requirements for minimum CVN toughness. The standard does not prevent a prequalified WPS from being qualified to meet requirements for minimum CVN toughness but verification is only possible through review of the WPS. Section 3.1 of the standard requires all prequalified welding procedure specifications to be written. This requirement means that prequalified welding procedure specifications are available for submittal to the building official. Where there are requirements for minimum CVN toughness, requiring the submittal of welding procedure specifications or equivalent documents (see below) to the building official will enable the building official to verify whether the welded joints meet the applicable requirements for CVN toughness.

Given the discussion above on the provisions in AWS D1.8 and D1.1, it would appear that the submittal of welding procedure specifications is needed to verify CVN toughness where required by Section A4.4a or A4.4b of AISC 341-10. AISC 341-10, however, presents another approach. Section J2 contains requirements for documents to be submitted or made available to the engineer of record. Section J2.1 requires the submittal of welding procedure specifications (Item 1); certificates of conformance from the manufacturer for electrodes, fluxes and shielding gases (Item 2); and, for demand critical welds, applicable manufacturer's certifications that the filler metal meets supplemental notch toughness requirements (Item 3). Given these requirements and for consistency with Section 1704.2.5.2 and other sections of the 2012 IBC, the submittal of certificates of compliance instead of welding procedure specifications is specified in Items 3 and 4. Note that Section J2 does not specify that the documents required to be submitted or made available to the engineer of record are also required to be submitted or made available to the authority having jurisdiction (building official).

Item 5 is added to new Section 1704.5 because of the requirement in Section A3.1c of AISC 360-10 (Section A3.1c of AISC 360-05) for minimum Charpy V-notch (CVN) toughness of heavy structural steel shapes (e.g., with flange thicknesses greater than 2 inches) and meeting several conditions specified therein. Section A3.1c requires the construction documents (structural design documents) to specify that such shapes shall be supplied with CVN impact test results in accordance with ASTM A6, Supplementary Requirement S30. The requirement for test results means that test reports are available for submittal to the building official. Requiring their submittal to the building official will enable the building official to verify whether the structural steel meets applicable requirements for CVN toughness.

Item 6 is added to new Section 1704.5 to enable the building official to verify that fabrication of the steel buckling-restrained braces, where it is conducted at a location other than the construction site, was performed in accordance with the building code, its referenced standards (e.g., AISC 341) and the approved construction documents. Otherwise, special inspection at the fabricator's shop should be conducted (see IBC Section 1704.2.5).

Note that separate proposals:

1. Transfer the requirements of Section 1705.12.1 to new Section 1704.5;
2. Add additional requirements for submittals that are related to the welding of concrete reinforcement and anchor bolts;
3. Add additional requirements for submittals that are related to masonry; and
4. Add a new Section 107.1.1 that correlates with this proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

1704.5 (NEW) #2-S-BRAZIL.doc

Public Hearing Results

Note: For staff analysis of the content of ASTM A 6 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: Disapproved

Committee Reason: Disapproval is consistent with the committee's action on S118-12 and S133-12. There's concern that requiring these submittals before the start of construction could delay the construction process.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, P.E., S.E., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* ~~after review and acceptance by a *registered design professional* and prior to the construction or work being performed~~ for each of the following:

1. Test reports verifying compliance with Supplementary Requirement S30 of ASTM A6 for ~~W-shaped and WT-shaped elements~~ hot-rolled shapes of structural steel with flange thicknesses of 1-1/2 inches (38 mm) or greater that are required to have a Charpy V-notch toughness as specified in ~~Section A3.3 of~~ AISC 341;

2. Test reports verifying compliance with Supplementary Requirement S5 of ASTM A6 for structural steel plates of 2 inches (51 mm) in thickness or greater that are required to have a Charpy V-notch toughness as specified in ~~Section A3.3 of~~ AISC 341;
3. *Certificates of compliance* for verification that welds at elements of structural steel and their connections that are in the *seismic force-resisting system* are made with filler metal having a Charpy V-notch toughness as specified in ~~Section A3.3a of~~ AISC 341;
4. *Certificates of compliance* for verification that demand critical welds are made with filler metal having a Charpy V-notch toughness as specified in ~~Section A3.3b of~~ AISC 341;
5. Test reports verifying compliance with Supplementary Requirement S30 of ASTM A6 for hot-rolled shapes of structural steel with flange thicknesses greater than 2 inches (51 mm) that are required to have a Charpy V-notch toughness as specified in ~~Section A3.1c of~~ AISC 360;
6. *Certificates of compliance* for the fabrication of steel buckling-restrained braces on the premises of an *approved fabricator* in accordance with Section 1704.2.5.2.

(Portions of proposal not shown remains unchanged)

Commenter's Reason: In response to the Committee Reason and the testimony at the Dallas Code Development Hearing, the language for review and acceptance by a registered design professional and submittal prior to the construction or work being performed is deleted from the charging text. Also, the section references in the items are deleted to eliminate the need to correlate the standards with the IBC in the future. The language in each item is sufficiently descriptive to make the section reference unnecessary.

In Item #1, "W-shaped and WT-shaped" is changed to "hot-rolled" for consistency with Item #5 and with the corresponding sections in the standards (Section A3.3 of AISC 341-10 and Section A3.1c of AISC 360-10).

The section references in Items #3 and #4 of the original proposal were incorrect but are being deleted in the public comment. They should have been Sections A3.4a and A3.4b, respectively.

Note that a separate proposal changes "the owner" to "the owner or the owner's authorized agent" throughout the IBC (S90-12-AS).

S134-12

Final Action: AS AM AMPC____ D

S135-12
1704.5 (New)

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing self (pbrazil@reidmiddleton.com)

Add new text as follows:

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* after review and acceptance by a *registered design professional* and prior to the construction or work being performed for each of the following:

1. Reports of preconstruction tests for masonry where the prism test method of Section 2105.2.2 is used to determine the *compressive strength of masonry* in accordance with Section 1.19.3 of TMS 402/ACI 530/ASCE 5.
2. Reports of preconstruction tests of grout where the unit strength method of Section 2105.2.2 is used to determine the *compressive strength of masonry* in accordance with Section 1.19.3 of TMS 402/ACI 530/ASCE 5.

Reason: This proposal is a continuation of a separate proposal that adds a new Section 1704.5 specifying submittals to the building official. This proposal adds two items to those in the separate proposal and the charging language in new Section 1704.5 is identical in both proposals.

The items are added to new Section 1704.5 because Section 1.19.3 of TMS 402/ACI 530/ASCE 5 requires compliance with a Level C quality assurance program for engineered masonry in structures classified as Risk Category IV. Table 1.19.3 for Level C quality assurance requires the verification of the specified compressive strength of masonry, f_m, prior to construction. Section 1.19.6.2 requires the compressive strength of masonry to be determined in accordance with TMS 602/ACI 530.1/ASCE 6. Article 1.4.B.1 of TMS 602/ACI 530.1/ASCE 6 requires the determination to be done by the unit strength method or the prism test method. Determination by the prism test method is, therefore, not required but when it is chosen for the verification of f_m prior to construction it requires testing of compressive strength in accordance with ASTM C 1314 (Article 1.4.B.3), which becomes a preconstruction test. Item 1 is added because of this. When the unit strength method is chosen for the same purpose, the grout is required to be tested for compressive strength in accordance with ASTM C 1019 (Article 1.4.B.2b (3b), which also becomes a preconstruction test. Item 2 is added because of this. In each case, requiring the submittal of test reports to the building official will enable the building official to verify, before construction begins, the validity of structural design assumptions based on the success of the preconstruction tests.

Neither TMS 402/ACI 530/ASCE 5 nor TMS 602/ACI 530.1/ASCE 6 specifies submittals to applicable regulatory officials (e.g., building official or authority having jurisdiction). In TMS 402/ACI 530/ASCE 5, Section 1.19.4 requires the quality assurance program to set forth the procedures for reporting and review, and Item 1 in Tables 1.19.2 (Level B Quality Assurance) and 1.19.3 (Level C Quality Assurance) specifies verification of compliance with the approved submittals ("approved" is not defined in Section 1.6, Definitions). In TMS 602/ACI 530.1/ASCE 6, (1) Section 1.5.A specifies that written acceptance of submittals be obtained prior to use of the materials or methods requiring acceptance; (2) Section 1.5.B specifies the submittals; (3) Section 1.2 defines "acceptable/accepted" as being done by the architect/engineer and "architect/engineer" as the individual or firm that issues, or administers the work under, the drawings and specifications ("approved" is not defined); and (4) Sections 1.6.A and 1.6.B specify the services and duties of testing agencies and inspection agencies, respectively, including requirements for the owner to retain the agencies and the agencies to report results and submit final reports to the architect/engineer and contractor.

Note that separate proposals:

1. Transfer the requirements of Section 1705.12.1 to new Section 1704.5 ;
2. Add additional requirements for submittals that are related to structural steel ;
3. Add additional requirements for submittals that are related to the welding of concrete reinforcement and anchor bolts and
4. Add a new Section 107.1.1 that correlates with this proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

1704.5 (NEW) #3-S-BRAZIL.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Disapproval is consistent with the committee's action on S118-12, 133-12 and 134-12. There's concern that requiring these submittals before the start of construction could delay the construction process.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, P.E., S.E., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* ~~after review and acceptance by a *registered design professional* and prior to the construction or work being performed~~ for each of the following:

~~1.~~ Reports of preconstruction tests ~~for masonry where the prism test method of Section 2105.2.2 is~~ in accordance with Section 1.19.3 of TMS 402/ACI 530/ASCE 5 used to determine the *compressive strength of masonry* ~~in accordance with Section 1.19.3 of TMS 402/ACI 530/ASCE 5~~.

~~2. Reports of preconstruction tests of grout where the unit strength method of Section 2105.2.2 is used to determine the *compressive strength of masonry* in accordance with Section 1.19.3 of TMS 402/ACI 530/ASCE 5.~~

Commenter's Reason: In response to the Committee Reason and the testimony at the Dallas Code Development Hearing, the language for review and acceptance by a registered design professional and submittal prior to the construction or work being performed is deleted from the charging text. Also, the section references in the items are deleted to eliminate the need to correlate the standards with the IBC in the future. The language in each item is sufficiently descriptive to make the section reference unnecessary.

The public comment also consolidates the items from the original proposal into a single item. The instances where preconstruction testing is used to determine compressive strength of masonry may involve masonry prisms, the masonry units and grout, or only the masonry units. This depends upon the type of masonry, the design methodology and whether the unit strength method or the prism test method is selected.

The reference to Section 1.19.3 of TMS 402/ACI 530/ASCE 5 is retained rather than replacing it with language sufficiently descriptive to make the section reference unnecessary. Section 1.19.3 of TMS 402/ACI 530/ASCE 5 is applicable to Level C quality assurance programs for masonry in structures assigned to Risk Category IV and designed in accordance with chapters of TMS 402/ACI 530/ASCE 5 other than Chapter 5, 6 or 7, which is too cumbersome.

Note that a separate proposal changes "the owner" to "the owner or the owner's authorized agent" throughout the IBC (S90-12-AS).

S135-12

Final Action: AS AM AMPC____ D

S136-12
1704.5 (New), 1705.3.1, 1705.12.1

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing Washington Association of Building Officials, Technical Code Development Committee (pbrazil@reidmiddleton.com)

Revise as follows:

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* after review and acceptance by a *registered design professional* and prior to the construction or work being performed for each of the following:

1. Reports of material properties verifying compliance with the requirements of AWS D1.4 for weldability as specified in Section 3.5.2 of ACI 318 for reinforcing bars in concrete complying with a standard other than ASTM A 706 that are to be welded; and
2. Reports of mill tests in accordance with Section 21.1.5.2 of ACI 318 for reinforcing bars complying with ASTM A 615 and used to resist earthquake-induced flexural or axial forces in the special moment frames, special structural walls, or coupling beams connecting special structural walls, of *seismic force-resisting systems* in *structures* assigned to *Seismic Design Category* B, C, D, E or F.

1705.3.1 Materials. In the absence of sufficient data or documentation providing evidence of conformance to quality standards for materials in Chapter 3 of ACI 318, the building official shall require testing of materials in accordance with the appropriate standards and criteria for the material in Chapter 3 of ACI 318. ~~Weldability of reinforcement, except that which conforms to ASTM A 706, shall be determined in accordance with the requirements of Section 3.5.2 of ACI 318.~~

~~**1705.12.1 Concrete reinforcement.** Where reinforcement complying with ASTM A 615 is used to resist earthquake induced flexural and axial forces in special moment frames, special structural walls and coupling beams connecting special structural walls, in structures assigned to *Seismic Design Category* B, C, D, E or F, the reinforcement shall comply with Section 21.1.5.2 of ACI 318. Certified mill test reports shall be provided for each shipment of such reinforcement. Where reinforcement complying with ASTM A 615 is to be welded, chemical tests shall be performed to determine weldability in accordance with Section 3.5.2 of ACI 318.~~

Reason: This proposal is a continuation of a separate proposal that adds a new Section 1704.5 specifying submittals to the building official. This proposal adds two items to those in the separate proposal and the charging language in new Section 1704.5 is identical in both proposals.

The requirement in Section 1705.12.1 to provide certified mill test reports for reinforcement in special moment frames, special structural walls and coupling beams is relocated to Item 2 of new Section 1704.5 because the subject of Section 1705.12 is testing and qualification for seismic resistance but there is no testing specified in Section 1705.12.1. The submittal of certified mill test reports is specified but there is no corresponding requirement in ACI 318-11 that the reports be certified or that the act of submittal amounts to a "qualification." Also ACI 318 has consistently specified "mill tests" since the alternative to reinforcement complying with ASTM A 706 first appeared in the 1983 edition. The limitation in Section 1705.12.1 to reinforcement complying with ASTM A 615 is retained in Item 2 for consistency with the same limitation in the referenced section of ACI 318-11 (Section 21.1.5.2).

Relocating the requirement in Section 1705.12.1 to Item 2 of new Section 1704.5 has an additional benefit that is provided by the charging language in the new section. Section 1705.12.1 requires mill test reports to be provided with each shipment of reinforcement but that does not ensure the reports will be available to the owner, design team, construction team or building official. New Section 1704.5, however, requires the owner or authorized agent to submit the reports to the building official after review and acceptance by a registered design professional and prior to the construction or work begin performed. Also, the current requirement in Section 1705.12.1 that the reports be provided for each shipment means that they are available for submittal to the building official.

The charging language in Section 21.1.5.2 of ACI 318-11 specifies deformed reinforcement but Item 2 specifies reinforcing bars for consistency with (1) the basic requirement in Section 21.1.5.2 for compliance with ASTM A 706, which is limited in scope to "deformed and plain low-alloy steel bars…for concrete reinforcement" (Section 1.1), and (2) the alternative of compliance with ASTM

A 615, which is limited in scope to “deformed and plain carbon steel bars for concrete reinforcement,” provided the special requirements of Section 21.1.5.2 are also met.

The source document for some of the language in Section 1705.12.1 is the *NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures* (Section 3.4.1.2 of FEMA 368 and Section 2.4.1.2 of FEMA 450-1).

In Item 1 of new Section 1704.5, the requirement in the last sentence of Section 1705.1.2.1 for chemical tests of reinforcement complying with ASTM A 615 that is to be welded is replaced with a requirement to submit reports of material properties for reinforcing bars complying with a standard other than ASTM A 706 that verify compliance with the requirements of AWS D1.4 for weldability. These changes correct several errors. First, the current language in Section 1705.1.2.1 is limited in scope to Seismic Design Categories B through F by that section, and to Seismic Design Categories C through F by the charging language in Section 1705.12 (Item 1), but verification of weldability is not a seismic issue. Verifying weldability is important for concrete reinforcement designed to resist all load effects, not merely seismic load effects.

Second, the current language in Section 1705.1.2.1 requires chemical tests of reinforcement be performed to determine weldability in accordance with Section 3.5.2 of ACI 318 but Section 3.5.2 of ACI 318 does not require chemical tests to be performed. Instead, it requires the ASTM specification to be supplemented by specifying a “report of material properties.”

Third, Section 1705.12.1 requires the chemical tests for reinforcement complying with ASTM A 615 but Section 3.5.2 of ACI 318 specifies the report of material properties for reinforcement complying with a standard other than ASTM A 706. In ACI 318-11, specified standards other than ASTM A 615 and A 706 include A 955, A 996 and A 1035 (see Section 3.5.3.1).

Fourth, Section 1705.12.1 specifies concrete reinforcement but Section 3.5.2 of ACI 318 specifies reinforcing bars, which is done to exclude other types of concrete reinforcement such as plain reinforcement, headed shear studs, structural steel, steel pipe and steel tubing. Refer to Section 3.5, and the definition of “reinforcement” in Section 2.2, in ACI 318-11 for further information.

The language in Item 1 of new Section 1704.5 is consistent with the provisions in Section 3.5.2 of ACI 318 as discussed above. Section 3.5.2 of ACI 318 has consistently specified (1) a report of material properties, (2) a standard other than ASTM A 706 and (3) reinforcing bars, ever since the section first appeared in the 1977 edition. Section 3.5.2 also requires the applicable ASTM specifications for reinforcing bars to be “supplemented to require a report of material properties necessary to conform to the requirements in AWS D1.4.” The requirement means that reports of material properties are available for submittal to the building official. Requiring their submittal to the building official will enable the building official to verify whether the reinforcing bars meet the applicable requirements for weldability.

For Items 1 and 2, neither ACI 318-11 nor ACI 301 (“Specifications for Structural Concrete,” not an IBC referenced standard) specifies submittals to applicable regulatory officials (e.g., building official or authority having jurisdiction). In ACI 318, (1) Section 1.2.2 specifies the filing of calculations pertinent to the design with the contract documents when required by the building official, (2) Section 1.3.1 specifies inspection as required by the legally adopted general building code, and (3) Sections 1.3.2 through 1.3.4 specify requirements for the keeping and retention of inspection records, but (4) reports of mill tests and material properties are not included. In ACI 301-05, (1) Section 1.5.1 specifies that submittals required by the standard be submitted for review and acceptance; (2) Section 1.2 defines “submitted” as being provided to the architect/engineer for review **or** acceptance and “architect/engineer” as the individual or firm that issues the project drawings and specifications **or** administers the work under the contract documents (“approved” is not defined); (3) Section 1.5.2 specifies reporting by the testing agency of test results to the owner, architect/engineer and contractor; and (4) Section 1.6.2 specifies requirements for testing agencies, including acceptance by the architect/engineer before performing any work.

Note that Section 1.3.4 of AWS D1.4-98 requires the calculation of carbon equivalent for all reinforcing bars, including those complying with ASTM A 706. If mill test reports are not available to enable the calculation, chemical analysis is permitted to be performed. If the chemical composition is not known, special preheat temperatures are required (see Section 1.3.4.3).

Also, the likely source document for the current requirement to perform chemical tests, the *NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures* (Section 3.4.1.3 of FEMA 368 and Section 2.4.1.3 of FEMA 450-1) did not require chemical tests to be performed. It required verification “that chemical tests have been performed to determine weldability in accordance with Section 3.5.2 of ACI 318.”

Note that separate proposals:

1. Add additional requirements for submittals that are related to structural steel (Sxx-12/13);
2. Add additional requirements for submittals that are related to the welding of concrete reinforcement and anchor bolts (Sxx-12/13);
3. Add additional requirements for submittals that are related to masonry (Sxx-12/13); and
4. Add a new Section 107.1.1 that correlates with this proposal (Sxx-12/13).

Cost Impact: The code change proposal will not increase the cost of construction.

1704.5 (NEW) #4-S-BRAZIL.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This proposal would add inspection requirements that could delay the construction process.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, P.E., S.E. representing self; and Lee Kranz, City of Bellevue, representing Washington Association of Building Officials, Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1704.5 Submittals to the building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704.2.4, reports and certificates shall be submitted by the owner or the owner's authorized agent to the *building official* ~~after review and acceptance by a *registered design professional* and prior to the construction or work being performed~~ for each of the following:

1. Reports of material properties verifying compliance with the requirements of AWS D1.4 for weldability as specified in Section 3.5.2 of ACI 318 for reinforcing bars in concrete complying with a standard other than ASTM A 706 that are to be welded; and
2. Reports of mill tests in accordance with Section 21.1.5.2 of ACI 318 for reinforcing bars complying with ASTM A 615 and used to resist earthquake-induced flexural or axial forces in the special moment frames, special structural walls, or coupling beams connecting special structural walls, of *seismic force-resisting systems* in *structures* assigned to *Seismic Design Category* B, C, D, E or F.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: In response to the Committee Reason and the testimony at the Dallas Code Development Hearing, the language for review and acceptance by a registered design professional and submittal prior to the construction or work being performed is deleted from the charging text.

In contrast with the public comments on Proposals S133-12, S134-12 and S135-12, the section references in the items are not deleted to be consistent with the current language in IBC Sections 1705.3.1 and 1705.12.1, which specify the section references.

Note that a separate proposal changes "the owner" to "the owner or the owner's authorized agent" throughout the IBC (S90-12-AS).

S136-12

Final Action: AS AM AMPC____ D

S137-12
1704.5.1, 1705.11, 1705.11.7, 1905.1.8, 2209.1

<u>Proposed Change as Submitted</u>

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing Washington Association of Building Officials, Technical Code Development Committee (pbrazil@reidmiddleton.com)

Revise as follows:

1704.5.1 Structural observations for seismic resistance. Structural observations shall be provided for those structures assigned to *Seismic Design Category* D, E or F where one or more of the following conditions exist:

1. The structure is classified as *Risk Category* III or IV in accordance with Table 1604.5.
2. The height of the structure is greater than 75 feet (22 860 mm) above the base <u>as defined in Section 11.2 of ASCE 7</u>.
3. The structure is assigned to *Seismic Design Category* E, is classified as *Risk Category* I or II in Accordance with Table 1604.5, and is greater than two *stories above grade plane*.
4. When so designated by the *registered design professional* responsible for the structural design.
5. When such observation is specifically required by the *building official*.

1705.11 Special inspections for seismic resistance. *Special inspections* itemized in Sections 1705.11.1 through 1705.11.8, unless exempted by the exceptions of Section 1704.2, are required for the following:

1. The seismic force-resisting systems in structures assigned to *Seismic Design Category* C, D, E or F in accordance with Sections 1705.11.1 through 1705.11.3, as applicable.
2. Designated seismic systems in structures assigned to *Seismic Design Category* C, D, E or F in accordance with Section 1705.11.4.
3. Architectural, mechanical and electrical components in accordance with Sections 1705.11.5 and 1705.11.6.
4. Storage racks <u>as defined in Section 11.2 of ASCE 7 that are</u> in structures assigned to *Seismic Design Category* D, E or F in accordance with Section 1705.11.7.
5. Seismic isolation systems in accordance with Section 1705.11.8.

   Exception: Special inspections itemized in Sections 1705.11.1 through 1705.11.8 are not required for structures designed and constructed in accordance with one of the following:

   1. The structure consists of light-frame construction; the design spectral response acceleration at short periods, *SDS*, as determined in Section 1613.3.4, does not exceed 0.5; and the building height of the structure does not exceed 35 feet (10 668 mm).
   2. The seismic force-resisting system of the structure consists of reinforced masonry or reinforced concrete; the design spectral response acceleration at short periods, *SDS*, as determined in Section
      1613.3.4, does not exceed 0.5; and the building height of the structure does not exceed 25 feet (7620 mm).
   3. The structure is a detached one- or two-family dwelling not exceeding two *stories above grade plane* and does not have any of the following horizontal or vertical irregularities in accordance with Section 12.3 of ASCE 7:
      3.1. Torsional or extreme torsional irregularity.
      3.2. Nonparallel systems irregularity.
      3.3. Stiffness-soft story or stiffness-extreme soft story irregularity.

3.4. Discontinuity in lateral strength-weak story irregularity.

1705.11.7 Storage racks. Periodic *special inspection* is required during the anchorage of storage racks <u>as defined in Section 11.2 of ASCE 7 that are</u> 8 feet (2438 mm) or greater in height in structures assigned to *Seismic Design Category* D, E or F.

Revise as follows:

1905.1.8 ACI 318, Section 22.10. Delete ACI 318, Section 22.10, and replace with the following:

22.10 - Plain concrete in structures assigned to Seismic Design Category C, D, E or F.

22.10.1 - Structures assigned to Seismic Design Category C, D, E or F shall not have elements of structural plain concrete, except as follows:

(a) Structural plain concrete basement, foundation or other walls below the base <u>as defined in Section 11.2 of ASCE 7</u> are permitted in detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls. In dwellings assigned to Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall not be less than 71/2 inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 22.6.6.5.

(b) Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.

> ***Exception:** In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.*

(c) Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.

Exceptions:

1. *In Seismic Design Categories A, B and C, detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls, are permitted to have plain concrete footings without longitudinal reinforcement.*
2. *For foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.*
3. *Where a slab on ground is cast monolithically with the footing, one No. 5 bar is permitted to be located at either the top of the slab or bottom of the footing.*

Revise as follows:

2209.1 Storage racks. The design, testing and utilization of ~~industrial steel~~ storage racks <u>as defined in Section 11.2 of ASCE 7 and</u> made of cold-formed or hot-rolled steel structural members, shall be in accordance with RMI/ANSI MH 16.1. Where required by ASCE 7, the seismic design of storage racks shall be in accordance with the provisions of Section 15.5.3 of ASCE 7, except that the mapped acceleration parameters, S_s and S_1, shall be determined in accordance with Section 1613.3.1.

Reason: The purpose for the proposal is to clarify the meaning of "base" and "storage rack," which are defined in ASCE 7-10 but are not also defined in the building code. Both of these terms have meanings that necessitate knowing their definitions to fully understand the technical provisions related to them. Therefore, the proposal adds references to Section 11.2 of ASCE 7-10 for their definitions. The only instances of these terms in the 2012 IBC where they are directly related to their corresponding definitions in ASCE 7-10 are in this proposal.

For storage racks, adding a reference to the definition in ASCE 7-10 in Section 1705.11.7 also has the effect of narrowing the scope to those that are defined. Note that "storage rack" is defined in ASCE 7-10 as including "industrial pallet racks, moveable shelf racks and stacker racks made of cold-formed or hot-rolled structural members;" but excluding "other types of racks such as drive-in and drive-through racks, cantilever racks, portable racks or racks made of materials other than steel."

Cost Impact: The code change proposal will not increase the cost of construction.

1704.5.1-S-BRAZIL.doc

<u>Public Hearing Results</u>

Committee Action: Approved as Modified

Modify proposal as follows:

1704.5.1 Structural observations for seismic resistance. Structural observations shall be provided for those structures assigned to *Seismic Design Category* D, E or F where one or more of the following conditions exist:

1. The structure is classified as *Risk Category* III or IV in accordance with Table 1604.5.
2. The height of the structure is greater than 75 feet (22 860 mm) above the base as defined in ~~Section 11.2 of~~ ASCE 7.
3. The structure is assigned to *Seismic Design Category* E, is classified as *Risk Category* I or II in Accordance with Table 1604.5, and is greater than two *stories above grade plane*.
4. When so designated by the *registered design professional* responsible for the structural design.
5. When such observation is specifically required by the *building official*.

1705.11 Special inspections for seismic resistance. *Special inspections* itemized in Sections 1705.11.1 through 1705.11.8, unless exempted by the exceptions of Section 1704.2, are required for the following:

1. The seismic force-resisting systems in structures assigned to *Seismic Design Category* C, D, E or F in accordance with Sections 1705.11.1 through 1705.11.3, as applicable.
2. Designated seismic systems in structures assigned to *Seismic Design Category* C, D, E or F in accordance with Section 1705.11.4.
3. Architectural, mechanical and electrical components in accordance with Sections 1705.11.5 and 1705.11.6.
4. Storage racks as defined in ~~Section 11.2 of~~ ASCE 7 that are in structures assigned to *Seismic Design Category* D, E or F in accordance with Section 1705.11.7.
5. Seismic isolation systems in accordance with Section 1705.11.8.

   Exception: Special inspections itemized in Sections 1705.11.1 through 1705.11.8 are not required for structures designed and constructed in accordance with one of the following:

   1. The structure consists of light-frame construction; the design spectral response acceleration at short periods, *SDS*, as determined in Section 1613.3.4, does not exceed 0.5; and the building height of the structure does not exceed 35 feet (10 668 mm).
   2. The seismic force-resisting system of the structure consists of reinforced masonry or reinforced concrete; the design spectral response acceleration at short periods, *SDS*, as determined in Section 1613.3.4, does not exceed 0.5; and the building height of the structure does not exceed 25 feet (7620 mm).
   3. The structure is a detached one- or two-family dwelling not exceeding two *stories above grade plane* and does not have any of the following horizontal or vertical irregularities in accordance with Section 12.3 of ASCE 7:
      3.1. Torsional or extreme torsional irregularity.
      3.2. Nonparallel systems irregularity.
      3.3. Stiffness-soft story or stiffness-extreme soft story irregularity.
      3.4. Discontinuity in lateral strength-weak story irregularity.

1705.11.7 Storage racks. Periodic *special inspection* is required during the anchorage of storage racks as defined in ~~Section 11.2 of~~ ASCE 7 that are 8 feet (2438 mm) or greater in height in structures assigned to *Seismic Design Category* D, E or F.

1905.1.8 ACI 318, Section 22.10. Delete ACI 318, Section 22.10, and replace with the following:

22.10 - Plain concrete in structures assigned to Seismic Design Category C, D, E or F.

22.10.1 - Structures assigned to Seismic Design Category C, D, E or F shall not have elements of structural plain concrete, except as follows:

(a) Structural plain concrete basement, foundation or other walls below the base as defined in ~~Section 11.2 of~~ ASCE 7 are permitted in detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls. In dwellings assigned to Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall not be less than 71/2 inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 22.6.6.5.

(b) Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.

***Exception:** In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.*

(c) Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.

Exceptions:

1. *In Seismic Design Categories A, B and C, detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls, are permitted to have plain concrete footings without longitudinal reinforcement.*
2. *For foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.*
3. *Where a slab on ground is cast monolithically with the footing, one No. 5 bar is permitted to be located at either the top of the slab or bottom of the footing.*

2209.1 Storage racks. The design, testing and utilization of storage racks as defined in ~~Section 11.2~~ of ASCE 7 and made of cold-formed or hot-rolled steel structural members, shall be in accordance with RMI/ANSI MH 16.1. Where required by ASCE 7, the seismic design of storage racks shall be in accordance with the provisions of Section 15.5.3 of ASCE 7, except that the mapped acceleration parameters, S_s and S_1, shall be determined in accordance with Section 1613.3.1.

Committee Reason: This code change clarifies structural terms that rely on definitions in ASCE 7, The modification deletes the specific section references to make the code text easier to maintain.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bonnie E. Manley, American Iron and Steel Institute, representing Rack Manufacturers Institute, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

<u>**STORAGE RACKS:** Cold-formed or hot-rolled steel structural members which are formed into steel storage racks, including pallet storage racks, movable-shelf racks, rack-supported systems, and automated storage and retrieval systems (stacker racks), push-back racks, pallet-flow racks, case-flow racks, pick modules, and rack supported platforms. Other types of racks, such as drive-in or drive-through racks, cantilever racks, portable racks, or racks made of materials other than steel, are not considered storage racks for the purpose of this code.</u>

1705.11 Special inspections for seismic resistance. *Special inspections* itemized in Sections 1705.11.1 through 1705.11.8, unless exempted by the exceptions of Section 1704.2, are required for the following:

1. The seismic force-resisting systems in structures assigned to *Seismic Design Category* C, D, E or F in accordance with Sections 1705.11.1 through 1705.11.3, as applicable.
2. Designated seismic systems in structures assigned to *Seismic Design Category* C, D, E or F in accordance with Section 1705.11.4.
3. Architectural, mechanical and electrical components in accordance with Sections 1705.11.5 and 1705.11.6.
4. <u>*Storage racks*</u> ~~Storage racks as defined in ASCE 7~~ that are in structures assigned to *Seismic Design Category* D, E or F in accordance with Section 1705.11.7.
5. Seismic isolation systems in accordance with Section 1705.11.8.

Exception: Special inspections itemized in Sections 1705.11.1 through 1705.11.8 are not required for structures designed and constructed in accordance with one of the following:

1. The structure consists of light-frame construction; the design spectral response acceleration at short periods, *SDS*, as determined in Section 1613.3.4, does not exceed 0.5; and the building height of the structure does not exceed 35 feet (10 668 mm).
2. The seismic force-resisting system of the structure consists of reinforced masonry or reinforced concrete; the design spectral response acceleration at short periods, *SDS*, as determined in Section 1613.3.4, does not exceed 0.5; and the building height of the structure does not exceed 25 feet (7620 mm).
3. The structure is a detached one- or two-family dwelling not exceeding two *stories above grade plane* and does not have any of the following horizontal or vertical irregularities in accordance with Section 12.3 of ASCE 7:
    3.1. Torsional or extreme torsional irregularity.
    3.2. Nonparallel systems irregularity.
    3.3. Stiffness-soft story or stiffness-extreme soft story irregularity.
    3.4. Discontinuity in lateral strength-weak story irregularity.

1705.11.7 Storage racks. Periodic *special inspection* is required during the anchorage of *storage racks* ~~storage racks as defined in ASCE 7~~ that are 8 feet (2438 mm) or greater in height in structures assigned to *Seismic Design Category* D, E or F.

2209.1 Storage racks. The design, testing and utilization of *storage racks* ~~storage racks as defined in ASCE 7 and~~ made of cold-formed or hot-rolled steel structural members, shall be in accordance with RMI/ANSI MH 16.1. Where required by ASCE 7, the seismic design of storage racks shall be in accordance with the provisions of Section 15.5.3 of ASCE 7, except that the mapped acceleration parameters, S_s and S_1, shall be determined in accordance with Section 1613.3.1.

Commenter's Reason: It doesn't make sense to send a user to ASCE 7 to find the definition for storage racks. Currently, ASCE 7-10 includes the following definition for storage racks:

> **STORAGE RACKS:** Include industrial pallet racks, moveable shelf racks, and stacker racks made of cold-formed or hot-rolled structural members. Does not include other types of racks such as drive-in and drive-through racks, cantilever racks, portable racks, or racks made of materials other than steel.

Originally, this ASCE 7 definition was sourced from the scope of the 2008 edition of RMI/ANSI MH 16.1. Proposal S243-12, which was approved as submitted, adopts the 2012 edition of RMI/ANSI MH 16.1, which states the following in the scope:

> **1.1 SCOPE**
> This Specification and companion Commentary (hereinafter referred to as the Specification) applies to industrial steel storage racks, movable-shelf racks, rack-supported systems and automated storage and retrieval systems (stacker racks) made of cold-formed or hot-rolled steel structural members. Such rack types also include push-back rack, pallet-flow rack, case-flow rack, pick modules, and rack-supported platforms. This Specification is intended to be applied to the design of the storage rack portion of any rack structure that acts as support for the exterior walls and roof, except as noted. It does not apply to other types of racks, such as drive-in or drive-through racks, cantilever racks, portable racks, or to racks made of material other than steel.

By approving Proposal S137-12, the ICC Structural Code Committee has indicated a desire to source a clear definition for storage racks. Rather than send the user outside of the IBC, our recommendation is to bring the most up-to-date definition into the IBC. Therefore, this public comment introduces a definition to Section 202 for storage racks, which is based upon the 2012 edition of RMI/ANSI MH 16.1, and deletes the references to ASCE 7 in Sections 1705.11(4), 1705.11.7 and 2209.1.

S137-12
Final Action: AS AM AMPC____ D

S145-12

1705.2.2, Table 1705.2.2, 1705.2.2.1.1, 1705.5, Table 1705.5 (New), 1705.10.1, 1705.10.2, 1705.11.2, 1705.11.3

Proposed Change as Submitted

Proponent: D. Kirk Harman, The Harman Group, representing The National Council of Structural Engineers Associations (NCSEA) Code Advisory Committee, Quality Assurance and Special Inspection Subcommittee.

Revise as follows:

1705.2.2 Steel construction other than structural steel. Special inspection for steel construction other than structural steel shall be in accordance with Table 1705.2.2 and this section.

Exceptions:

1. *Special inspection* of cold-formed steel light-frame construction for buildings and structures in Risk Category I shall not be required.
2. *Special inspection* of cold-formed steel light-frame construction for buildings and structures in Risk Category II that are 3 stories or less in height above grade plane and that are not included in Sections 1705.10 or 1705.11, shall not be required.

TABLE 1705.2.2
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]
1. Material verification of cold-formed steel deck and cold-formed steel light-frame construction:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	—	X	Applicable ASTM material standards
b. Manufacturer's certified test reports.	—	X	
2. Inspection of welding:			
a. Cold-formed steel deck and cold-formed steel light-frame construction:			
1) Floor and roof deck welds.	—	X	AWS D1.3
2) Cold-formed steel light-frame construction welds.	---	X	AWS D1.3
b. Reinforcing steel:			
1) Verification of weldability of reinforcing steel other than ASTM A 706.	—	X	AWS D1.4 ACI 318: Section 3.5.2

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]
2) Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X	—	
3) Shear reinforcement.	X	—	
4) Other reinforcing steel.	—	X	
3. Inspection of cold-formed steel light-frame construction including framing, shear walls, diaphragms and shear panels for conformance with the *approved construction documents:*			
a. Inspect member locations and sizes.		X	
b. Inspect bracing, strap bracing, drag strut and stiffener locations and sizes.		X	
c. Verify mechanical connectors including screws, powder actuated fasteners, bolts, anchor bolts, hold downs, anchors and other fastening components.		X	Applicable ASTM Standards
d. Inspect material thickness, grade and fastening of diaphragms, and sheathing for the lateral force resisting system.		X	
e. Inspect connections including plates and components; screw quantity, size and spacing; powder actuated fastener quantity size and location; bolt size and location; anchor bolt size, spacing and location; hold down size location and configuration; beam hangers and framing.		X	

For SI: 1 inch = 25.4 mm.

a. Where applicable, see also Section 1705.10 Special inspections for wind resistance and Section 1705.11, Special inspections for seismic resistance.

1705.2.2.1.1 Cold-formed steel. Welding inspection and welding inspector qualification for cold-formed steel floor and roof decks and cold-formed steel light-frame construction shall be in accordance with AWS D1.3.

1705.5 Wood construction. *Special inspections* of the fabrication process of prefabricated wood structural elements and assemblies shall be in accordance with Section 1704.2.5. *Special inspections* of site-built assemblies shall be in accordance with this section and Table 1705.5.

Exceptions:

1. *Special inspection* of wood construction for buildings and structures in Risk Category I shall not be required.
2. *Special inspection* of wood construction for buildings and structures in Risk Category II that are 3 stories or less in height above grade plane and that are not included in Sections 1705.10 or 1705.11 shall not be required.

TABLE 1705.5
REQUIRED VERIFICATION AND INSPECTION OF WOOD CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]
1. Inspection of wood construction including framing, shear walls, diaphragms and shear panels for conformance with the *approved construction documents:*			
a. Verify grade stamp on framing lumber, plywood and OSB.		X	
b. Inspect wood framing including layout, member sizes, blocking, bridging and bearing lengths.		X	
c. Verify mechanical connectors including screws, powder actuated fasteners, bolts, anchor bolts, hold downs, anchors and other fastening components.		X	Applicable ASTM Standards
d. Inspect diaphragms, shear walls and wood structural panel sheathing size and thickness; sizes of framing members at adjoining panel edges and nail or staple size and spacing.		X	

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]
e. Inspect wood connections including plates and components; nail quantity, size and spacing; bolt size and location; anchor bolt size, spacing and location; hold down size location and configuration; beam hangers and framing.		X	

a. Where applicable, see Section 1705.10, Special inspections for wind resistance and Section 1705.11, Special inspections for seismic resistance.

1705.10.1 Structural wood. Continuous special inspection is required during field gluing operations of elements of the main windforce-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the main windforce-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.

> **Exception:** For buildings and structures in Risk Category I or II that are 3 stories or less in height above grade plane, *special inspection* is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main wind-force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

1705.10.2 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the main windforce-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the main windforce-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

> **Exception:** For buildings and structures in Risk Category I or II and 3 stories or less in height above grade plane, *special inspection* is not required for cold- formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:
>
> 1. The sheathing is gypsum board or fiberboard.
> 2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

1705.11.2 Structural wood. Continuous special inspection is required during field gluing operations of elements of the seismic force-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the seismic force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, shear panels and hold-downs.

> **Exception:** For buildings and structures in Risk Category I or II and 3 stories or less in height above grade plane *special inspection* is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the seismic force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

1705.11.3 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the seismic force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the seismic force-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

Exception: For buildings and structures in Risk Category I or II and 3 stories or less in height above grade plane, s*pecial inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) o.c.

Reason: : NCSEA believes that light frame construction in wood and cold formed steel have become more commonly used for load bearing applications of significant height and in regions with moderate and high seismic and wind concerns. These types of construction should be subject to Special Inspections in a similar manner and to a comparable extent as other systems such as concrete, structural steel and masonry. There is a large group of buildings constructed with light frame construction that is not subject to the same requirements for Special Inspection as the same buildings constructed with structural steel, concrete or masonry. This proposal seeks to correct this deficiency in the Code.

This proposal provides requirements to be consistent across both wood and cold-formed steel systems to avoid any competitive advantage of one system over the other. This proposal will improve the consistency of special inspections across all of the major structural materials.

Exceptions are provided to limit the applicability of these provisions to exclude single and two family dwellings, small commercial, agricultural and buildings of lesser occupancies unless these minor structures are subject to the existing requirements of 1705.10 and 1705.11.

This proposal contains provisions addressing both wood frame and cold-formed steel light-frame construction together. This is an effort to address both systems in one change therefore avoiding any perception of one system having an advantage over the other regarding special inspection.

The proposed revisions to 1705.2 and 1705.5 improve the Special Inspection requirements for both wood and cold-formed steel light-frame construction in a manner consistent with Special Inspection requirements for structural steel, concrete and masonry.

The proposed revisions to 1705.10 and 1705.11 are to coordinate between the additional requirements for Special Inspections in high seismic and high wind conditions and the proposed provisions. The proposed changes to 1705.10 and 1705.11 do not reduce the requirements of these sections they only prevent the exceptions for these sections from conflicting with the new requirements. In addition, notes are added to the tables to refer to 1705.10 and 1705.11 for additional requirements.

There will be no increase in construction cost due to the increased Special Inspection that will take place. Currently structural engineers provide for these inspections in project specifications. However, individual requirements vary greatly and there is not a consistent level of requirements. Standardization of these requirements in the Code will reduce delays and added costs due to confusion created by varying specifications. The improved field quality assurance will improve safety and reduce field errors resulting in a savings in construction cost and schedule. The improved public safety and potential reduction in construction cost support adoption of this proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

1705.2.2-SHARMAN.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels that the proposed expansion of special inspections for light-frame construction was not sufficiently justified as noted in numerous objections raised during testimony in opposition to the proposal.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

D. Kirk Harman, The Harman Group representing, The National Council of Structural Engineers Associations (NCSEA) Code Advisory Committee, Quality Assurance and Special Inspection Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1705.5 Wood construction. *Special inspections* of the fabrication process of prefabricated wood structural elements and assemblies shall be in accordance with Section 1704.2.5. *Special inspections* of site-built assemblies shall be in accordance with this section ~~and Table 1705.5~~.

~~**Exceptions:**~~

1. ~~*Special inspection* of wood construction for buildings and structures in Risk Category I shall not be required.~~
2. ~~*Special inspection* of wood construction for buildings and structures in Risk Category II that are 3 stories or less in height above grade plane and that are not included in Sections 1705.10 or 1705.11 shall not be required.~~

~~**TABLE 1705.5**~~
~~**REQUIRED VERIFICATION AND INSPECTION OF WOOD CONSTRUCTION**~~

~~VERIFICATION AND INSPECTION~~	~~CONTINUOUS~~	~~PERIODIC~~	~~REFERENCED STANDARD~~ ~~a~~
~~1.Inspection of wood construction including framing, shear walls, diaphragms and shear panels for conformance with the *approved construction documents:*~~			
~~a.Verify grade stamp on framing lumber, plywood and OSB.~~		~~X~~	
~~b.Inspect wood framing including layout, member sizes, blocking, bridging and bearing lengths.~~		~~X~~	
~~c.Verify mechanical connectors including screws, powder actuated fasteners, bolts, anchor bolts, hold downs, anchors and other fastening components.~~		~~X~~	~~Applicable ASTM Standards~~
~~d.Inspect diaphragms, shear walls and wood structural panel sheathing size and thickness; sizes of framing members at adjoining panel edges and nail or staple size and spacing.~~		~~X~~	
~~e.Inspect wood connections including plates and components; nail quantity, size and spacing; bolt size and location; anchor bolt size, spacing and location; hold down size location and configuration; beam hangers and framing.~~		~~X~~	

~~a. Where applicable, see also Section 1705.10 Special inspections for wind resistance and Section 1705.11, Special inspections for seismic resistance.~~

1705.10.1 Structural wood. Continuous special inspection is required during field gluing operations of elements of the main windforce-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the main windforce-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.

Exception: ~~For buildings and structures in Risk Category I or II that are 3 stories or less in height above grade plane,~~ S*pecial inspection* is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main windforce-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

1705.10.2 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the main windforce-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the main windforce-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

Exception: For buildings and structures in Risk Category I ~~or II~~, or for buildings and structures in Risk Category II ~~and~~ that are 3 or less stories in height above grade plane, s*pecial inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

1705.11.2 Structural wood. Continuous special inspection is required during field gluing operations of elements of the seismic force-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the seismic force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, shear panels and hold-downs.

Exception~~: For buildings and structures in Risk Category I or II and 3 stories or less stories in height above grade plane~~ *Special inspection* is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the seismic force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

1705.11.3 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the seismic force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the seismic force-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

Exception: For buildings and structures in Risk Category I ~~or II~~ or for buildings and structures in Risk Category II ~~and~~ that are 3 or less stories in height above grade plane, s*pecial inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) o.c.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The proponent has submitted two Public Comments on this change in an attempt to address differing subject matter within a code section. NCSEA believes that light frame construction in wood and cold formed steel have become more commonly used for load bearing applications of significant height and in regions with moderate and high seismic and wind concerns. These types of construction should be subject to Special Inspections in a similar manner and to a comparable extent as other systems such as concrete, structural steel and masonry. There is a large group of buildings constructed with light frame construction that is not subject to the same requirements for Special Inspection as the same buildings constructed with structural steel, concrete or masonry. This proposal seeks to correct this deficiency in the Code.

The original proposal provided requirements to be consistent across both wood and cold-formed steel systems to avoid any competitive advantage of one system over the other. This proposal will improve the consistency of special inspections across all of the major structural materials. Opposition to the proposal was voice with regard to wood construction. This Public Comment has separated the two materials to be considered separately.

Exceptions are provided to limit the applicability of these provisions to exclude single and two family dwellings, small commercial, agricultural and buildings of lesser occupancies unless these minor structures are subject to the existing requirements of 1705.10 and 1705.11.

The proposed revisions improve the Special Inspection requirements for cold-formed steel light-frame construction in a manner consistent with Special Inspection requirements for structural steel, concrete and masonry.

The proposed revisions to 1705.10 and 1705.11 are to coordinate between the additional requirements for Special Inspections in high seismic and high wind conditions and the proposed provisions. The proposed changes to 1705.10 and 1705.11 do not reduce the requirements of these sections they only prevent the exceptions for these sections from conflicting with the new requirements. In addition, notes are added to the tables to refer to 1705.10 and 1705.11 for additional requirements.

There will be no increase in construction cost due to the increased Special Inspection that will take place. Currently structural engineers provide for these inspections in project specifications. However, individual requirements vary greatly and there is not a consistent level of requirements. Standardization of these requirements in the Code will reduce delays and added costs due to confusion created by varying specifications. The improved field quality assurance will improve safety and reduce field errors resulting in a savings in construction cost and schedule. The improved public safety and potential reduction in construction cost support adoption of this proposal.

The committee commented that insufficient justification was provided. The following table compares the Special Inspection requirements contained in the Code for a four story steel frame building, not in a high wind or high seismic condition, to the same building constructed using cold formed steel light frame construction. It demonstrates that there are forty five (45) different inspection tasks required for the structural steel building, none of which are required for the same building constructed with cold formed steel light frame.

Special Inspection Requirements Currently Contained in the Code

Special Inspection Tasks	Structural Steel	Cold Formed Steel Light Frame	Task Number
Review the material test reports	Required	Not Required	1
Submission of QA Reports	Required	Not Required	2
Inspection Tasks Prior to Welding			
Welding procedure specifications (WPSs) available	Required	Not Required	3
Manufacturer certifications for welding consumables available	Required	Not Required	4
Material identification (type/grade)	Required	Not Required	5
Welder identification system	Required	Not Required	6
Fit-up of welds (including joint geometry)			
Joint preparation	Required	Not Required	7
Dimensions and alignment	Required	Not Required	8
Cleanliness (condition of steel surfaces)	Required	Not Required	9
Tacking (tack weld quality and location)	Required	Not Required	10
Backing type and fit (if applicable)	Required	Not Required	11
Check welding equipment	Required	Not Required	12
Inspection Tasks During Welding			
Use of qualified welders	Required	Not Required	13
Control and handling of welding consumables			
Packaging	Required	Not Required	14
Exposure control	Required	Not Required	15
Environmental conditions			
Wind speed within limits	Required	Not Required	16
Precipitation and temperature	Required	Not Required	17
Welding Procedures Followed			
Settings on welding equipment	Required	Not Required	18
Technique	Required	Not Required	19
Selected welding materials	Required	Not Required	20
Inspection Tasks After Welding	Required	Not Required	21
Welds cleaned	Required	Not Required	22
Size, length and location of welds	Required	Not Required	23
Welds meet visual acceptance criteria	Required	Not Required	24
Crack prohibition	Required	Not Required	25
Repair activities	Required	Not Required	26
Document acceptance or rejection of welded joint or member	Required	Not Required	27
Inspection Tasks Prior to Fastening			
Manufacturer's certifications available for fastener materials	Required	Not Required	28
Fasteners marked in accordance with requirements	Required	Not Required	29
Proper fasteners selected for the joint detail	Required	Not Required	30
Proper fastening procedure selected for joint detail	Required	Not Required	31
Connecting elements, including the appropriate surface condition and hole preparation meet requirements.	Required	Not Required	32
Proper storage provided for fastener components	Required	Not Required	33
Inspection Tasks During Fastening			
Fastener assemblies, of suitable condition, placed in all locations and washers (if required) are positioned as required	Required	Not Required	34
Fastener installation technique	Required	Not Required	35
Inspection Tasks After Fastening			
Document acceptance or rejection of fastener connections	Required	Not Required	36
Inspection of Anchor Devices			

Compliance with Construction Documents	Required	Not Required	37
Diameter	Required	Not Required	38
Grade	Required	Not Required	39
Type Length of anchor	Required	Not Required	40
Depth of Embedment	Required	Not Required	41
Inspection of Steel Frame			
Braces	Required	Not Required	42
Stiffeners	Required	Not Required	43
Member Locations	Required	Not Required	44
Application of Joint Details at Each Connection	Required	Not Required	45

The above demonstrates the current level of Special Inspection required by the Code is seriously deficient for cold formed steel light frame construction when compared to structural steel. The same comparison can be made to concrete and masonry and the same conclusion will be reached.

It is unreasonable to expect the Building Official to undertake such exhaustive inspections. This level of inspection can only be achieved when incorporated into the Code requirements for Special Inspection. The safety of cold formed steel light frame buildings is in serious question when constructed without the requirements for inspections or Special Inspections contained in this proposal and comment.

We urge the Committee to approve Proposal S145 as modified by this Public Comment.

Public Comment 2:

D. Kirk Harman, The Harman Group representing, The National Council of Structural Engineers Associations (NCSEA) Code Advisory Committee, Quality Assurance and Special Inspection Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1705.2.2 Steel construction other than structural steel. Special inspection for steel construction other than structural steel shall be in accordance with Table 1705.2.2 and this section.

~~**Exceptions:**~~

1. ~~*Special inspection* of cold-formed steel light-frame construction for buildings and structures in Risk Category I shall not be required.~~
2. ~~*Special inspection* of cold-formed steel light-frame construction for buildings and structures in Risk Category II that are 3 stories or less in height above grade plane and that are not included in Sections 1705.10 or 1705.11, shall not be required.~~

TABLE 1705.2.2
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]
1. Material verification of cold-formed steel deck ~~and cold-formed steel light-frame construction:~~			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	—	X	Applicable ASTM material standards
b. Manufacturer's certified test reports.	—	X	
2. Inspection of welding:			
a. Cold-formed steel deck ~~and cold-formed steel light-frame construction:~~			
1) Floor and roof deck welds.	—	X	AWS D1.3
~~2) Cold-formed steel light-frame construction welds.~~	~~---~~	~~X~~	~~AWS D1.3~~
b. Reinforcing steel:			

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]
1) Verification of weldability of reinforcing steel other than ASTM A 706.	—	X	AWS D1.4 ACI 318: Section 3.5.2
2) Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X	—	
3) Shear reinforcement.	X	—	
4) Other reinforcing steel.	—	X	
~~3. Inspection of cold-formed steel light-frame construction including framing, shear walls, diaphragms and shear panels for conformance with the *approved construction documents:*~~			
~~f. Inspect member locations and sizes.~~		~~X~~	
~~g. Inspect bracing, strap bracing, drag strut and stiffener locations and sizes.~~		~~X~~	
~~h. Verify mechanical connectors including screws, powder actuated fasteners, bolts, anchor bolts, hold downs, anchors and other fastening components.~~		~~X~~	~~Applicable ASTM Standards~~
~~i. Inspect material thickness, grade and fastening of diaphragms, and sheathing for the lateral force resisting system.~~		~~X~~	
~~j. Inspect connections including plates and components; screw quantity, size and spacing; powder actuated fastener quantity size and location; bolt size and location; anchor bolt size, spacing and location; hold down size location and configuration; beam hangers and framing.~~		~~X~~	

For SI: 1 inch = 25.4 mm.

a. Where applicable, see also ~~Section 1705.10 Special inspections for wind resistance and~~ Section 1705.11, Special inspections for seismic resistance.

1705.2.2.1.1 Cold-formed steel. Welding inspection and welding inspector qualification for cold-formed steel floor and roof decks ~~and cold-formed steel light-frame construction~~ shall be in accordance with AWS D1.3.

1705.10.1 Structural wood. Continuous special inspection is required during field gluing operations of elements of the main windforce-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the main windforce-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.

Exception: For buildings and structures in Risk Category I, or for buildings and structures in Risk Category II that are 3 or less stories ~~or less~~ in height above grade plane, *special inspection* is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main wind-force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

1705.10.2 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the main windforce-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the main windforce-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

Exception: ~~For buildings and structures in Risk Category I or II and 3 stories or less in height above grade plane, S~~*Special inspection* is not required for cold- formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

1705.11.2 Structural wood. Continuous special inspection is required during field gluing operations of elements of the seismic force-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the seismic force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, shear panels and hold-downs.

Exception: For buildings and structures in Risk Category I, or for buildings and structures in Risk Category II ~~and~~ that are 3 ~~stories~~ or less stories in height above grade plane *special inspection* is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the seismic force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

1705.11.3 Cold-formed steel light-frame construction. Periodic special inspection is required during welding operations of elements of the seismic force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the seismic force-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

Exception: ~~For buildings and structures in Risk Category I or II and 3 stories or less in height above grade plane,~~ S*pecial inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) o.c.

Reason: The proponent has submitted two Public Comments on this change in an attempt to address differing subject matter within a code section. NCSEA believes that light frame construction in wood and cold formed steel have become more commonly used for load bearing applications of significant height and in regions with moderate and high seismic and wind concerns. These types of construction should be subject to Special Inspections in a similar manner and to a comparable extent as other systems such as concrete, structural steel and masonry. There is a large group of buildings constructed with light frame construction that is not subject to the same requirements for Special Inspection as the same buildings constructed with structural steel, concrete or masonry. This proposal seeks to correct this deficiency in the Code.

The original proposal provided requirements to be consistent across both wood and cold-formed steel systems to avoid any competitive advantage of one system over the other. This proposal would improve the consistency of special inspections across all of the major structural materials. Opposition to the proposal was voiced with regard to wood construction. This Public Comment has separated the two materials to be considered separately.

Exceptions are provided to limit the applicability of these provisions to exclude single and two family dwellings, small commercial, agricultural and buildings of lesser occupancies unless these minor structures are subject to the existing requirements of 1705.10 and 1705.11.

The proposed revisions improve the Special Inspection requirements for wood light-frame construction in a manner consistent with Special Inspection requirements for structural steel, concrete and masonry.

The proposed revisions to 1705.10 and 1705.11 are to coordinate between the additional requirements for Special Inspections in high seismic and high wind conditions and the proposed provisions. The proposed changes to 1705.10 and 1705.11 do not reduce the requirements of these sections they only prevent the exceptions for these sections from conflicting with the new requirements. In addition, notes are added to the tables to refer to 1705.10 and 1705.11 for additional requirements.

There will be no increase in construction cost due to the increased Special Inspection that will take place. Currently structural engineers provide for these inspections in project specifications. However, individual requirements vary greatly and there is not a consistent level of requirements. Standardization of these requirements in the Code will reduce delays and added costs due to confusion created by varying specifications. The improved field quality assurance will improve safety and reduce field errors resulting in a savings in construction cost and schedule. The improved public safety and potential reduction in construction cost support adoption of this proposal.

The committee commented that insufficient justification was provided. The following table compares the Special Inspection requirements contained in the Code for a four story commercial steel frame building, not in a high wind or high seismic condition, to the same building constructed using wood light frame construction. It demonstrates that there are twenty (20) different inspection tasks required for the structural steel building, none of which are required for the same building constructed with wood light frame.

<u>Special Inspection Requirements Currently Contained in the Code</u>

Special Inspection Tasks	**Structural Steel**	**Wood Light Frame**	**Task Number**
Review the material test reports	Required	Not Required	1
Submission of QA Reports	Required	Not Required	2
<u>Inspection Tasks Prior to Fastening</u>			
Manufacturer's certifications available for fastener materials	Required	Not Required	3
Fasteners marked in accordance with requirements	Required	Not Required	4
Proper fasteners selected for the joint detail	Required	Not Required	5
Proper fastening procedure selected for joint detail	Required	Not Required	6
Connecting elements, including the appropriate surface condition and hole preparation meet requirements.	Required	Not Required	7
Proper storage provided for fastener components	Required	Not Required	8
<u>Inspection Tasks During Fastening</u>			
Fastener assemblies, of suitable condition, placed in all locations and washers (if required) are positioned as required	Required	Not Required	9
Fastener installation technique	Required	Not Required	10
<u>Inspection Tasks After Fastening</u>			
Document acceptance or rejection of fastener connections	Required	Not Required	11
<u>Inspection of Anchor Devices</u>			
Compliance with Construction Documents	Required	Not Required	12
Diameter	Required	Not Required	13
Grade	Required	Not Required	14
Type Length of anchor	Required	Not Required	15
Depth of Embedment	Required	Not Required	16
<u>Inspection of Frame</u>			
Braces	Required	Not Required	17
Stiffeners	Required	Not Required	18
Member Locations	Required	Not Required	19
Application of Joint Details at Each Connection	Required	Not Required	20

The above demonstrates the current level of Special Inspection required by the Code is seriously deficient for wood light frame construction when compared to structural steel. The same comparison can be made to concrete and masonry and the same conclusion will be reached.

It is unreasonable to expect the Building Official to undertake such exhaustive inspections. This level of inspection can only be achieved when incorporated into the Code requirements for Special Inspection. The safety of wood light frame buildings over 3 stories in height is in serious question when constructed without the requirements for inspections or Special Inspections contained in this proposal and comment.

We urge the Committee to approve Proposal S145 as modified by this Public Comment.

S145-12

Final Action: AS AM AMPC____ D

S146-12
Table 1705.2.2

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing myself (pbrazil@reidmiddleton.com)

Revise as follows:

TABLE 1705.2.2
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]
1. Material verification of cold-formed steel deck:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	—	X	Applicable ASTM material standards
b. Manufacturers' certified test reports.	—	X	
2. Inspection of welding:	—	—	
a. Cold-formed steel deck			
1. Floor and roof deck welds		X	AWS D1.3
b. Reinforcing steel:			
1. Verification of weldability of reinforcing steel other than ASTM A 706.	—	X	AWS D1.4 ACI 318 Section 3.5.2
2. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X	—	
3. Shear reinforcement.	X	—	
4. Other reinforcing steel.	—	X	
3. Installation of open web steel joists and joist girders in accordance with the approved construction documents and steel joist placement plans		X	

For SI: 1 inch = 25.4 mm.
a. Where applicable, see also Section 1705.11, Special inspection for seismic resistance.

Reason: The purpose for this proposal is to require special inspections for the installation of open web steel joists and joist girders. Their structural design is sufficiently complex to warrant inspection from a person with the expertise of a special inspector who is approved by the building official as having the competence necessary to inspect the installation of the joists. Refer to the definitions of "special inspection" and "special inspector" for further information. Examples of the complexity of the structural design that warrant special inspection of the installation are the bearing seat attachments, field splices and bridging attachments.

The standard specifications for open web steel joists (SJI-K-2010 and SJI-LH/DLH-2010), joist girders (SJI-JG-2010) and composite steel joists (SJI-CJ-2010) by the Steel Joist Institute contain provisions for inspections but these are limited to inspections by the manufacturer before shipment to verify compliance and workmanship with the requirements of the specifications. Refer to Section 5.12 of SJI-K-2010, Section 104.13 of SJI-LH/DLH-2010, Section 1004.10 of SJI-JG-2010 and Section 104.13 of SJI-CJ-2010. The sections of the SJI standards noted above are also referenced in Section 4 of the codes of standard practice for steel joists and joist girders (no identifier) and composite steel joists (SJI-CJCOSP-2010). The identifiers cited above match those from the published documents but they are abbreviated in Chapter 35 of the 2012 IBC to K-10, LH/LDH-10, JG-10 and CJ-10, respectively; and are specified as SJI-K-1.1, SJI-LH/LDH-1.1, SJI-JG-1.1 and SJI-CJ-1.0, respectively, in Section 2207.1. Note that the codes of standard practice published by the Steel Joist Institute are not referenced standards of the 2012 IBC.

Cost Impact: The code change proposal will increase the cost of construction.

T1705.2.2 #1-S-BRAZIL.doc

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

TABLE 1705.2.2
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]
1. Material verification of cold-formed steel deck:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	—	X	Applicable ASTM material standards
b. Manufacturers' certified test reports.	—	X	
2. Inspection of welding:	—	—	
a. Cold-formed steel deck			
1. Floor and roof deck welds		X	AWS D1.3
b. Reinforcing steel:			
1. Verification of weldability of reinforcing steel other than ASTM A 706.	—	X	AWS D1.4 ACI 318 Section 3.5.2
2. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X	—	
3. Shear reinforcement.	X	—	
4. Other reinforcing steel.	—	X	
3. Installation of open web steel joists and joist girders ~~in accordance with the approved construction documents and steel joist placement plans~~		~~X~~	
a. End connections – welding or bolted		X	SJI – Standard Specification
b. Bridging – horizontal or diagonal		X	SJI – Standard Specification

For SI: 1 inch = 25.4 mm.
a. Where applicable, see also Section 1705.11, Special inspection for seismic resistance.

Committee Reason: The committee believes that the installation of joist and joist girders warrants special inspection. The modification provides specificity on these inspections and removed the reference to steel joist placement plans.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bonnie E. Manley, American Iron and Steel Institute, representing Steel Joist Institute, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1705.2.2 Open web steel joists and joist girders. Special inspections of open web steel joists and joist girders shall be in accordance with Table 1705.2.2

TABLE 1705.2.2 REQUIRED SPECIAL INSPECTIONS OF COLD-FORMED STEEL DECK, REINFORCING STEEL AND OPEN WEB STEEL JOISTS AND JOIST GIRDERS ~~VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL~~

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]
1. Material verification of cold-formed steel deck:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	—	X	Applicable ASTM material standards
b. Manufacturers' certified test reports.	—	X	
2. inspection of welding: a. Cold-formed steel deck:			
1) Floor and roof deck welds.	—	X	AWS D1.3
a. Reinforcing steel:			
1) Verification of weldability of reinforcing steel other than ASTM A 706.	—	X	AWS D1.4 or ACI 318: Section 3.5.2
2) Reinforcing steel-resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement.	X	—	
3) Shear reinforcement.	X	—	
4) Other reinforcing steel.	—	X	
3. Installation of open web steel joists and joist girders			
a. End connections – welded or bolted		X	**~~SJI – Standard Specification~~SJI specifications listed in Section 2207.1.**
b. Bridging – horizontal or diagonal		~~X~~	**~~SJI – Standard Specification~~**
1. Standard Bridging		X	**SJI specifications listed in Section 2207.1.**
2. Bridging that differs from the SJI specifications listed in Section 2207.1		X	

Commenter's Reason: The purpose of public comment is twofold. First, it fully charges the new special inspection requirements for open web steel joists and joist girders by adding a new Section 1705.2.2 and correctly identifying this type of construction in the title of Table 1705.2.2. Please note that Proposal S142-12 deletes the cold-formed steel deck provisions in Table 1705.2.2 and Proposal S144-12 deletes the reinforcing steel provisions in Table 1705.2.2. Both proposals were approved as submitted. Consequently, the change to the title is not intended to reintroduce these references, but rather to make sure that, when the dust settles, the title of Table 1705.2.2 correctly reads: "Required Special Inspections of Open Web Steel Joists and Joist Girders."

The second purpose of this public comment is to modify the text in Table 1705.2.2 to reflect the editorial changes successfully made in Proposal S240-12. That proposal, which was approved as modified, eliminated the generic reference to "SJI – Standard Specifications" in favor of the more accurate "SJI specifications listed in Section 2207.1". Proposal S240-12 also better clarified the difference between "standard bridging" and "bridging that differs from the SJI specifications listed in Section 2207.1". This language needs to be accurately reflected in this Table as well.

S146-12

Final Action: AS AM AMPC____ D

S150-12
1705.3

Proposed Change as Submitted

Proponent: Stephen Kerr, S.E., Josephson Werdowatz and Associates, representing Structural Engineers Association of California (SEAOC) (skerr@jwa-se.com)

Revise as follows:

1705.3 Concrete construction. The *special inspections* and verifications for concrete construction shall be as required by this section and Table 1705.3. The following exceptions shall not apply where Section 1705.10 or 1705.11 invoke *special inspections* or where special inspection of column anchor bolts for structural steel lateral force resisting frames is required by Section 1705.11.1.

Exception: *Special inspections* shall not be required for:

~~1. Isolated spread concrete footings of buildings three stories or less above *grade plane* that are fully supported on earth or rock.~~

~~2~~1. *Isolated spread concrete footings and* continuous concrete footings supporting walls of buildings three stories or less above *grade plane* that are fully supported on earth or rock and where any of the following conditions apply:

~~2.1.~~ 1.1 The footings support walls of light-frame construction;

~~2.2.~~ 1.2 The footings are designed in accordance with Table 1809.7; or

~~2.3.~~ 1.3 The structural design of the footing is based on a specified compressive strength, f'_c, no greater than 2,500 pounds per square inch (psi) (17.2 MPa), regardless of the compressive strength specified in the *construction documents* or used in the footing construction.

~~3~~2. Nonstructural concrete slabs supported directly on the ground, including prestressed slabs on grade, where the effective prestress in the concrete is less than 150 psi (1.03 MPa).

~~4~~3. Concrete foundation walls constructed in accordance with Table 1807.1.6.2.

~~5~~4. Concrete patios, driveways and sidewalks, on grade.

Reason: Special inspections for concrete include such items as proper mix, reinforcing steel, bolts installed in concrete, post-installed anchors, formwork, concrete placement, curing, etc. Under Exception 1, the building could be of any type (concrete, masonry, steel, light frame), utilize high-strength concrete, and have heavily-loaded "isolated" footings. This change proposal makes the exception for isolated spread footings subject to the same limitations as those for continuous footings.

Note also that there are no additional inspection requirements for concrete under 1705.10 (wind), 1705.11 (seismic) and 1705.12 (testing for seismic). Therefore, anchorage elements such as anchor bolts for holdowns or steel frames used in the lateral system would not require special inspection when used in conjunction with light-frame construction or at isolated footings. The proposed change ensures that, when special inspection for light-frame construction is required by Section 1705.10 or 1705.11, the placement of anchor bolts will require special inspection, and that the placement of anchor bolts for steel frames resisting seismic loads will also require special inspection.

Cost Impact: The code change proposal will increase the cost of construction.

1705.3-S-KERR.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposed revisions to special inspection of concrete construction have possibilities, but as written the proposal needs work. There is a preference for keeping the first exception for isolated footings. Also there's concern that the additional limitations would require concrete testing for some nonstructural slab on grade construction.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Stephen Ker S.E. - Structural Engineers Association of California and Philip Brazil, P.E., S.E., representing self, request Approval as Modified by this Public Comment.

Modify the proposal as follows:

1705.3 Concrete construction. The *special inspections* and verifications for concrete construction shall be as required by this section and Table 1705.3. ~~The following exceptions shall not apply where Section 1705.10 or 1705.11 invoke *special inspections* or where special inspection of column anchor bolts for structural steel lateral force resisting frames is required by Section 1705.11.1.~~

Exception: Special inspections shall not be required for:

1. ~~Isolated spread concrete footings and~~ Concrete footings supporting walls of buildings three stories or less above *grade plane* that are fully supported on earth or rock and ~~where any of the following conditions apply~~ <u>meet one of the following requirements</u>:
    1.1. The footings support walls of light-frame construction~~;~~
    1.2. The footings are designed in accordance with Table 1809.7~~; or~~
    1.3. The structural design of the footing is based on a specified compressive strength, f'_c, no greater than 2,500 pounds per square inch (psi) (17.2 Mpa), regardless of the compressive strength specified in the *construction documents* or used in the footing construction~~.~~
2. Nonstructural concrete slabs supported directly on the ground, including prestressed slabs on grade, where the effective prestress in the concrete is less than 150 psi (1.03 Mpa).
3. Concrete foundation walls constructed in accordance with Table 1807.1.6.2.
4. Concrete patios, driveways and sidewalks, on grade.

Commenter's Reason: Special inspections for concrete include such items as proper mix, reinforcing steel, bolts installed in concrete, post-installed anchors, formwork, concrete placement, curing, etc. Under the existing Exception 1, the building could be of any type (concrete, masonry, steel, light frame), utilize high-strength concrete, and have eccentrically or heavily-loaded "isolated" footings. This change proposal makes the exception for isolated spread footings subject to the same limitations as those for continuous footings.

S150-12
Final Action: AS AM AMPC____ D

S156-12

1705.10.1, 1705.10.1.1 (New), 1705.10.1.2 (New), 1705.10.1.3 (New), 1705.10.2, 1705.10.2.1 (New), 1705.10.2.2 (New), 1705.11.2, 1705.10.11.2.1 (New), 1705.10.11.2.2 (New), 1705.11.2.3 (New), 1705.11.3, 1705.11.3.1 (New), 1705.11.3.2 (New)

Proposed Change as Submitted

Proponent: Stephen Kerr, S.E., Structural Engineers Association of California (skerr@jwa-se.com)

Revise as follows:

1705.10.1 Structural wood. Special inspection for wood construction within the main windforce-resisting system shall be as required by this section. Special inspection for wood construction in accordance with this section shall also be provided where vertical elements of the main windforce-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls. ~~Continuous special inspection is required during field gluing operations of elements of the main windforce-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the main windforce-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, and hold-downs.~~

> ~~**Exception:** *Special inspection* is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main windforce-resisting system where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.~~

1705.10.1.1 Field gluing operations. Continuous special inspection is required during field gluing operations of wood elements of the main windforce-resisting system.

1705.10.1.2 Shear walls. Periodic special inspection shall be required for the sheathing fastening, and for other connections within the shear wall. Such connections shall include hold-down or tie-down connections, sill plate and sole plate anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.

> **Exception:** Special inspection for wood shear walls is not required where the sheathing is gypsum board or fiberboard or where the fastener spacing along shear wall sheathing edges is more than 4 inches (102 mm) on center,

1705.10.1.3 Horizontal diaphragms. Periodic special inspection shall be required for the sheathing fastening, diaphragm chord connections and splices, and collector connections and fastening.

> **Exception:** Special inspection for horizontal wood diaphragms is not required where the sheathing is gypsum board or fiberboard or where the least fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.

1705.10.2 Cold-formed steel light-frame construction. Special inspection for cold-formed light-frame construction within the main windforce-resisting system shall be as required by this section. Special inspection for cold-formed light-frame construction in accordance with this section shall be provided where vertical elements of the main windforce-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls. ~~Periodic special inspection is required during welding operations of elements of the main windforce-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the main windforce-resisting system, including shear walls, braces, diaphragms, collectors (drag struts), and hold-downs.~~

~~**Exception:** *Special inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:~~

1. ~~The sheathing is gypsum board or fiberboard.~~
2. ~~The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c).~~

1705.10.2.1 Shear walls and strap-braced walls. Periodic special inspection shall be required for the sheathing fastening, the welding or screw attachment of the strap bracing, and for other connections within the shear wall or strap-braced wall. Such connections shall include hold-down or tie-down connections, bottom track anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.

Exception: Special inspection for cold-formed light-frame shear walls is not required where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, and the fastener spacing along sheathing edges is more than 4 inches (102 mm) on center.

1705.10.2.2 Horizontal diaphragms. Periodic special inspection shall be required for the sheathing fastening, welding or screw attachment of diagonal strap bracing, diaphragm chord connections and splices, and collector connections and fastening.

Exception: Special inspection for cold-formed light-frame horizontal diaphragms is not required where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the framing, and the least fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.

1705.11.2 Structural wood. Special inspection for wood construction within the seismic force-resisting system shall be as required by this section. Special inspection for wood construction in accordance with this section shall be provided where vertical elements of the seismic force-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls.~~Continuous special inspection is required during field gluing operations of elements of the seismic force-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the seismic force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, shear panels and hold-downs.~~

~~**Exception:** *Special inspection* is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main seismic force-resisting system where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c).~~

1705.11.2.1 Field gluing operations. Continuous special inspection shall be required during field gluing operations of wood elements of the seismic force-resisting system.

1705.11.2.2 Shear walls. Periodic special inspection shall be required for the sheathing fastening, and for other connections within the shear wall. Such connections shall include hold-down or tie-down connections, sill plate and sole plate anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.

Exception: Special inspection for wood shear walls is not required where the sheathing is gypsum board or fiberboard or where fastener spacing along shear wall sheathing edges is more than 4 inches (102 mm) on center,

1705.11.2.3 Horizontal diaphragms. Periodic special inspection shall be required for the sheathing fastening, diaphragm chord connections and splices, and collector connections and fastening.

Exception: Special inspection for horizontal wood diaphragms is not required where the sheathing is gypsum board or fiberboard or where least fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.

1705.11.3 Cold-formed steel light-frame construction. Special inspection for cold-formed light-frame construction within the seismic force-resisting system shall be as required by this section. Special inspection for cold-formed light-frame construction in accordance with this section shall be provided where vertical elements of the seismic force-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls~~Periodic special inspection is required during welding operations of elements of the seismic force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the seismic force-resisting system, including shear walls, braces, diaphragms, collectors (drag struts), and hold-downs.~~

~~**Exception:** *Special inspection* is not required for cold-formed steel light-frame shear walls, braces, diaphragms, collectors (drag struts) and hold-downs where either of the following apply:~~

1. ~~The sheathing is gypsum board or fiberboard.~~
2. ~~The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c).~~

1705.11.3.1 Shear walls and strap-braced walls. Periodic special inspection shall be required for the sheathing fastening, the welding or screw attachment of the strap bracing, and for other connections within the shear wall or strap-braced wall. Such connections shall include hold-down or tie-down connections, bottom track anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.

Exception: Special inspection for cold-formed light-frame shear walls is not required where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, and the fastener spacing along sheathing edges is more than 4 inches (102 mm) on center.

1705.11.3.2 Horizontal diaphragms. Periodic special inspection shall be required for the sheathing fastening, welding or screw attachment of diagonal strap bracing, diaphragm chord connections and splices, and collector connections and fastening.

Exception: Special inspection for cold-formed light-frame horizontal diaphragms is not required where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the framing, and the least fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.

Reason: As currently written, it is not clear how to apply the exceptions to special inspection for wind and seismic as applicable to wood framing and cold-formed steel light frame construction (together “light-frame construction). The exceptions use ”fastener spacing of the sheathing” as the trigger for special inspection. However, the following aspects of light-frame construction are not covered adequately by the exception language:

1. Fastener spacing for shear walls could vary throughout the building. It is not clear that the exception would only be applicable to the particular shear wall or diaphragm with the larger fastening spacing, and to the other elements of the lateral force-resisting system associated with that shear wall or diaphragm.
2. The main elements of the lateral force-resisting system of light-frame buildings are the shear walls and the horizontal diaphragms. Elements associated with the shear walls include hold-downs, and the parts use to make connection to the foundation or the horizontal diaphragms, including sill plates, sole plates, bottom tracks, and blocking and framing clips. Elements associated with the horizontal diaphragms include chords, collectors, and elements used to anchor concrete and masonry walls for out-of-plane forces (such as blocking, straps, and hold-down hardware used horizontally. As written, it is not clear when special inspection would be required for the elements associated with the shear walls and diaphragms.
3. Shear wall sheathing is fastened at the sheathing edges, and in the middle of the panel. It is not clear that the reference to sheathing fastening is intended to apply to fastening along sheathing edges.
4. Diaphragm sheathing fastening is often specified with different spacing at sheathing edges, and at diaphragm boundaries. It is not clear what fastening (edge or boundary) is being referred to, or what portions of a horizontal diaphragm and associated elements would be affected by the exception.
5. Buildings of pre-dominantly light-frame construction often use vertical lateral force-resisting elements made up of other materials, such as steel frames, or concrete shear walls or masonry shear walls. It is not clear under what conditions special inspection would be required for the elements used to connect such vertical lateral force-resisting elements to the light-frame building system.
6. Light-frame diaphragms are often used in buildings where all of the vertical lateral force-resisting elements are made up of other materials, such concrete tilt-up shear or masonry shear walls. It is not clear under what conditions special inspection would be required for the wood, light-frame, and/or steel elements used to anchor the concrete or masonry walls for out-of plane forces.

The proposed change includes similar revisions to the provisions for structural wood, and for cold-formed light-frame construction.
Shear walls and horizontal diaphragms are handled separately and the elements associated with each are identified. This makes it clear, once the special inspection is triggered (by fastener spacing, double sided sheathing, or the use of strap bracing) which elements other than the sheathing fastening, require inspection.
The requirements for inspection of anchorage elements in horizontal diaphragms for out-of-plane support of concrete and masonry walls are made explicit.

Cost Impact: The code change proposal will not increase the cost of construction.

1705.10.1-S-KERR.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This code change seems to add confusion to wood and cold-formed steel inspection, rather than clarifying them. As written this would actually change the current requirements. There's some concern of unintended consequences. There was specific concern that "within the MWFRS" should be changed to "of the MWFRS".

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Stephen Kerr representing Structural Engineers Association of California, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1705.10.1 Structural wood. Special inspection for wood construction within the main windforce-resisting system shall be as required by this section. ~~Special inspection for wood construction in accordance with this section shall also be provided where vertical elements of the main windforce-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls.~~

1705.10.1.1 Field gluing operations. Continuous special inspection is required during field gluing operations of wood elements of the main windforce-resisting system.

1705.10.1.2 Shear walls. Periodic special inspection shall be required for the sheathing fastening, and for other connections within the shear wall. Such connections shall include hold-down or tie-down connections, sill plate and sole plate anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.

> **Exception:** Special inspection for wood shear walls is not required where the sheathing is gypsum board or fiberboard or where ~~the~~ specified fastener spacing along shear wall sheathing edges is more than 4 inches (102 mm) on center,

1705.10.1.3 Horizontal diaphragms. Periodic special inspection shall be required for the sheathing fastening, diaphragm chord connections and splices, and collector connections and fastening.

> **Exception:** Special inspection for horizontal wood diaphragms is not required where the sheathing is gypsum board ~~or fiberboard~~ or where the least specified fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.

1705.10.2 Cold-formed steel light-frame construction. Special inspection for cold-formed light-frame construction within the main windforce-resisting system shall be as required by this section. ~~Special inspection for cold-formed light-frame construction in accordance with this section shall be provided where vertical elements of the main windforce-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls~~.

1705.10.2.1 Shear walls and strap-braced walls. Periodic special inspection shall be required for the sheathing fastening, the welding or screw attachment of the strap bracing, and for other connections within the shear wall or strap-braced wall. Such connections shall include hold-down or tie-down connections, bottom track anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.

> **Exception:** Special inspection for cold-formed light-frame shear walls is not required where either of the following apply:
>
> 1. The sheathing is gypsum board or fiberboard.
> 2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, and the specified fastener spacing along sheathing edges is more than 4 inches (102 mm) on center.

1705.10.2.2 Horizontal diaphragms. Periodic special inspection shall be required for the sheathing fastening, welding or screw attachment of diagonal strap bracing, diaphragm chord connections and splices, and collector connections and fastening.

> **Exception:** Special inspection for cold-formed light-frame horizontal diaphragms is not required where either of the following apply:
>
> 1. The sheathing is gypsum board ~~or fiberboard~~.
> 2. The sheathing is wood structural panel or steel sheets on only one side of the framing, and the least specified fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.

1705.11.2 Structural wood. Special inspection for wood construction within the seismic force-resisting system shall be as required by this section. ~~Special inspection for wood construction in accordance with this section shall be provided where vertical elements of the seismic force-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls.~~

1705.11.2.1 Field gluing operations. Continuous special inspection shall be required during field gluing operations of wood elements of the seismic force-resisting system.

1705.11.2.2 Shear walls. Periodic special inspection shall be required for the sheathing fastening, and for other connections within the shear wall. Such connections shall include hold-down or tie-down connections, sill plate and sole plate anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.

> **Exception:** Special inspection for wood shear walls is not required where the sheathing is gypsum board or fiberboard or where specified fastener spacing along shear wall sheathing edges is more than 4 inches (102 mm) on center,

1705.11.2.3 Horizontal diaphragms. Periodic special inspection shall be required for the sheathing fastening, diaphragm chord connections and splices, and collector connections and fastening.

> **Exception:** Special inspection for horizontal wood diaphragms is not required where the sheathing is gypsum board ~~or fiberboard~~ or where least specified fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.

1705.11.3 Cold-formed steel light-frame construction.~~.~~ Special inspection for cold-formed light-frame construction within the seismic force-resisting system shall be as required by this section. ~~Special inspection for cold-formed light-frame construction in accordance with this section shall be provided where vertical elements of the seismic force-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls.~~

1705.11.3.1 Shear walls and strap-braced walls. Periodic special inspection shall be required for the sheathing fastening, the welding or screw attachment of the strap bracing, and for other connections within the shear wall or strap-braced wall. Such connections shall include hold-down or tie-down connections, bottom track anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.

Exception: Special inspection for cold-formed light-frame shear walls is not required where either of the following apply:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, and the specified fastener spacing along sheathing edges is more than 4 inches (102 mm) on center.

1705.11.3.2 Horizontal diaphragms. Periodic special inspection shall be required for the sheathing fastening, welding or screw attachment of diagonal strap bracing, diaphragm chord connections and splices, and collector connections and fastening.

Exception: Special inspection for cold-formed light-frame horizontal diaphragms is not required where either of the following apply:

1. The sheathing is gypsum board ~~or fiberboard~~.
2. The sheathing is wood structural panel or steel sheets on only one side of the framing, and the least specified fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.

Reason: As currently written, it is not clear how to apply the exceptions to special inspection for wind and seismic as applicable to wood framing and cold-formed steel light frame construction (together "light-frame construction). The exceptions use "fastener spacing of the sheathing" as the trigger for special inspection. However, the following aspects of light-frame construction are not covered adequately by the exception language:

1. Fastener spacing for shear walls could vary throughout the building. It is not clear that the exception would only be applicable to the particular shear wall or diaphragm with the larger fastening spacing, and to the other elements of the lateral force-resisting system associated with that shear wall or diaphragm.
2. The main elements of the lateral force-resisting system of light-frame buildings are the shear walls and the horizontal diaphragms. Elements associated with the shear walls include hold-downs, and the parts use to make connection to the foundation or the horizontal diaphragms, including sill plates, sole plates, bottom tracks, and blocking and framing clips. Elements associated with the horizontal diaphragms include chords, collectors, and elements used to anchor concrete and masonry walls for out-of-plane forces (such as blocking, straps, and hold-down hardware used horizontally. As written, it is not clear when special inspection would be required for the elements associated with the shear walls and diaphragms.
3. Shear wall sheathing is fastened at the sheathing edges, and in the middle of the panel. It is not clear that the reference to sheathing fastening is intended to apply to fastening along sheathing edges.
4. Diaphragm sheathing fastening is often specified with different spacing at sheathing edges, and at diaphragm boundaries. It is not clear what fastening (edge or boundary) is being referred to, or what portions of a horizontal diaphragm and associated elements would be affected by the exception.
5. Buildings of pre-dominantly light-frame construction often use vertical lateral force-resisting elements made up of other materials, such as steel frames, or concrete shear walls or masonry shear walls. It is not clear under what conditions special inspection would be required for the elements used to connect such vertical lateral force-resisting elements to the light-frame building system.
6. Light-frame diaphragms are often used in buildings where all of the vertical lateral force-resisting elements are made up of other materials, such concrete tilt-up shear or masonry shear walls. It is not clear under what conditions special inspection would be required for the wood, light-frame, and/or steel elements used to anchor the concrete or masonry walls for out-of plane forces.

The proposed change includes similar revisions to the provisions for structural wood, and for cold-formed light-frame construction.

Shear walls and horizontal diaphragms are handled separately and the elements associated with each are identified. This makes it clear, once the special inspection is triggered (by specified fastener spacing, double sided sheathing, or the use of strap bracing) which elements other than the sheathing fastening, require inspection.

The requirements for inspection of anchorage elements in horizontal diaphragms for out-of-plane support of concrete and masonry walls are made explicit.

Public Comment 2:

Mark Nowak, MNowak Consulting, LLC, representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1705.10.1 Structural wood. Special inspection for wood construction ~~within~~ comprising the main windforce-resisting system shall be as required by this section. ~~Special inspection for wood construction in accordance with this section shall also be provided where vertical elements of the main windforce-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls.~~

1705.10.1.1 Field gluing operations. Continuous special inspection is required during field gluing operations of wood elements of the main windforce-resisting system~~.~~

~~**1705.10.1.2 Shear walls.** Periodic special inspection shall be required for the sheathing fastening, and for other connections within the shear wall. Such connections shall include hold-down or tie-down connections, sill plate and sole plate anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.~~

> ~~**Exception:** Special inspection for wood shear walls is not required where the sheathing is gypsum board or fiberboard or where the fastener spacing along shear wall sheathing edges is more than 4 inches (102 mm) on center,~~

~~**1705.10.1.3 Horizontal diaphragms.** Periodic special inspection shall be required for the sheathing fastening, diaphragm chord connections and splices, and collector connections and fastening.~~

> ~~**Exception:** Special inspection for horizontal wood diaphragms is not required where the sheathing is gypsum board or fiberboard or where the least fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.~~

1705.10.1.2 Unusual main windforce-resisting systems, components, and connections . Periodic special inspection is required for installation and fastening of unusual materials and methods used in the construction of the main windforce-resisting system. Unusual materials and methods include those conditions which require special tools and techniques and which require a higher than normal level of installation precision to achieve intended performance.

1705.10.2 Cold-formed steel light-frame construction. Special inspection for cold-formed light-frame construction ~~within~~ comprising the main windforce-resisting system shall be as required by this section. ~~Special inspection for cold-formed light-frame construction in accordance with this section shall be provided where vertical elements of the main windforce-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls.~~

~~**1705.10.2.1 Shear walls and strap-braced walls.** Periodic special inspection shall be required for the sheathing fastening, the welding or screw attachment of the strap bracing, and for other connections within the shear wall or strap-braced wall. Such connections shall include hold-down or tie-down connections, bottom track anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.~~

> ~~**Exception:** Special inspection for cold-formed light-frame shear walls is not required where either of the following apply:~~
>
> 1. ~~The sheathing is gypsum board or fiberboard.~~
> 2. ~~The sheathing is wood structural panel or steel sheets on only one side of the shear wall, and the fastener spacing along sheathing edges is more than 4 inches (102 mm) on center.~~

~~**1705.10.2.2 Horizontal diaphragms.** Periodic special inspection shall be required for the sheathing fastening, welding or screw attachment of diagonal strap bracing, diaphragm chord connections and splices, and collector connections and fastening.~~

> ~~**Exception:** Special inspection for cold-formed light-frame horizontal diaphragms is not required where either of the following apply:~~
>
> 1. ~~The sheathing is gypsum board or fiberboard.~~
> 2. ~~The sheathing is wood structural panel or steel sheets on only one side of the framing, and the least fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.~~

1705.10.2.1 Field welding operations. Periodic special inspection is required for field welding operations of steel elements of the main wind force-resisting system.

1705.10.2.2 Unusual main windforce-resisting systems, components, and connections. Periodic special inspection is required for installation and fastening of unusual materials and methods used in the construction of the main windforce-resisting system. Unusual materials and methods include those conditions which require special tools and techniques and which require a higher than normal level of installation precision to achieve intended performance.

1705.11.2 Structural wood. Special inspection for wood construction ~~within~~ comprising the seismic force-resisting system shall be as required by this section. ~~Special inspection for wood construction in accordance with this section shall be provided where vertical elements of the seismic force-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls.~~

1705.11.2.1 Field gluing operations. Continuous special inspection shall be required during field gluing operations of wood elements of the seismic force-resisting system.

~~**1705.11.2.2 Shear walls.** Periodic special inspection shall be required for the sheathing fastening, and for other connections within the shear wall. Such connections shall include hold-down or tie-down connections, sill plate and sole plate anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.~~

> ~~**Exception:** Special inspection for wood shear walls is not required where the sheathing is gypsum board or fiberboard or where fastener spacing along shear wall sheathing edges is more than 4 inches (102 mm) on center,~~

1705.11.2.2 Unusual seismic force-resisting systems, components, and connections . Periodic special inspection is required for installation and fastening of unusual materials and methods used in the construction of the seismic force-resisting system.

Unusual materials and methods include those conditions which require special tools and techniques and which require a higher than normal level of installation precision to achieve intended performance.

~~**1705.11.2.3 Horizontal diaphragms.** Periodic special inspection shall be required for the sheathing fastening, diaphragm chord connections and splices, and collector connections and fastening.~~

> ~~**Exception:** Special inspection for horizontal wood diaphragms is not required where the sheathing is gypsum board or fiberboard or where least fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.~~

1705.11.3 Cold-formed steel light-frame construction. Special inspection for cold-formed light-frame construction ~~within~~ comprising the seismic force-resisting system shall be as required by this section. ~~Special inspection for cold-formed light-frame construction in accordance with this section shall be provided where vertical elements of the seismic force-resisting system are comprised of other materials, such as steel frames and concrete or masonry shear walls.~~

~~**1705.11.3.1 Shear walls and strap-braced walls.** Periodic special inspection shall be required for the sheathing fastening, the welding or screw attachment of the strap bracing, and for other connections within the shear wall or strap-braced wall. Such connections shall include hold-down or tie-down connections, bottom track anchorage and connections, and connections between the top of the wall and the horizontal diaphragm above.~~

> ~~**Exception:** Special inspection for cold-formed light-frame shear walls is not required where either of the following apply:~~
>
> 1. ~~The sheathing is gypsum board or fiberboard.~~
> 2. ~~The sheathing is wood structural panel or steel sheets on only one side of the shear wall, and the fastener spacing along sheathing edges is more than 4 inches (102 mm) on center.~~

1705.11.3.1 Field welding operations. Periodic special inspection is required for field welding operations of steel elements of the seismic force-resisting system.

~~**1705.11.3.2 Horizontal diaphragms.** Periodic special inspection shall be required for the sheathing fastening, welding or screw attachment of diagonal strap bracing, diaphragm chord connections and splices, and collector connections and fastening.~~

> ~~**Exception:** Special inspection for cold-formed light-frame horizontal diaphragms is not required where either of the following apply:~~
>
> 1. ~~The sheathing is gypsum board or fiberboard.~~
> 2. ~~The sheathing is wood structural panel or steel sheets on only one side of the framing, and the least fastener spacing along sheathing edges or diaphragm boundaries is more than 4 inches (102 mm) on center.~~

1705.11.3.2 Unusual seismic force-resisting systems, components, and connections. Periodic special inspection is required for installation and fastening of unusual materials and methods used in the construction of the seismic force-resisting system. Unusual materials and methods include those conditions which require special tools and techniques and which require a higher than normal level of installation precision to achieve intended performance.

Commenter's Reason: This public comment addresses the CDC's concern with the original S156-12 proposal adding confusion to the special inspection requirements. Instead, this PC clarifies and streamlines requirements to conform more closely with the role and purpose of special inspections as defined in Section 1705.1.1 (e.g., must meet the criteria of "unusual design").

S156-12

Final Action: AS AM AMPC____ D

S159-12
1705.10.3

Proposed Change as Submitted

Proponent: Stephen Kerr, S.E. Josephson Werdowatz and Associates, representing Structural Engineers Association of California (SEAOC) (skerr@jwa-se.com)

Revise as follows:

1705.10.3 Wind-resisting components. Periodic special inspection is required for fastening of the following systems and components:

1. Roof ~~cladding~~ covering, roof deck, and roof framing connections.
2. ~~Wall cladding~~ Exterior covering, and wall connections to roof and floor diaphragms and framing.

Reason: The purpose of this change is to provide clarity and detail for the special inspection requirements for wind-resisting components in high-wind regions. The 2009 IBC identified “roof cladding and roof framing connections” and “wall connections to roof and floor diaphragms and framing” as wind-resisting components that needed to be included in the statement of special inspections, but only referenced “roof cladding” and “wall cladding” in the section describing the actual inspection. However, as part of the reorganization of Chapter 17 approved in the previous code change cycle, the more detailed language was deleted when the inspection requirements were combined with the requirements for inclusion in the statement of special inspections. In addition, “cladding” is not defined.

This proposal restores the more detailed description of the elements requiring special inspection, and uses terms defined in the code to identify the elements.

Cost Impact: The code change proposal will not increase the cost of construction.

1705.10.3-S-KERR.doc

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1705.10.3 Wind-resisting components. Periodic special inspection is required for fastening of the following systems and components:

1. Roof covering, roof deck, and roof framing connections.
2. Exterior wall covering and wall connections to roof and floor diaphragms and framing.

Committee Reason: This proposal makes the requirements for special inspections of wind-resisting components more specific, clarifying that the scope of this section should be focused on fastening and connections rather than the framing. The modification clarifies the applicability to exterior wall coverings.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Mark Nowak, MNowak Consulting, LLC, representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1705.10.3 Wind-resisting components. Periodic special inspection is required for ~~fastening of~~ the following systems and components:

1. Roof covering~~,~~ <u>and its attachment to the</u> roof deck~~, and roof framing connections~~.
2. Exterior wall covering and <u>its attachment to</u> wall ~~connections to roof and floor diaphragms and~~ framing.

Commenter's Reason: This public comment addresses the following two problems with the proposal:

1. Special inspection of roof coverings and exterior wall coverings should not just be limited to fastening. The inspection should include the covering materials <u>and</u> the attachment. Attachment of roof and exterior wall covering is often governed by the specific or unique nature of the covering materials or assembly and manufacturer instructions. The roof and exterior wall covering needs to be inspected as an assembly of components, not just the roof covering attachment.
2. Special inspection of roof framing connections and wall framing connections are part of the routine building department inspection process for the buildings structural framing system. These are not "unusual design" conditions as required to justify the need for special inspections in accordance with Section 1705.1.1.

With the above issues addressed this PC will ensure roof coverings and exterior wall coverings and their attachments are properly subject to special inspection in high wind zones.

S159-12

Final Action: AS AM AMPC____ D

S163-12
1705.11.5

Proposed Change as Submitted

Proponent: Stephen Kerr, S.E., Josephson Werdowatz and Associates, representing Structural Engineers Association of California (SEAOC) (skerr@jwa-se.com)

Revise as follows:

1705.11.5 Architectural components. Periodic *special inspection* is required during the erection and fastening of exterior cladding, interior and exterior nonbearing walls<u>, suspended ceiling systems including their anchorage</u> and interior and exterior veneer in structures assigned to *Seismic Design Category* D, E or F.

Exceptions:

1. *Special inspection* is not required for exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer 30 feet (9144 mm) or less in height above grade or walking surface.
2. *Special inspection* is not required for exterior cladding and interior and exterior veneer weighing 5 psf (24.5 N/m^2) or less.
3. *Special inspection* is not required for interior nonbearing walls weighing 15 psf (73.5 N/m^2) or less.

Reason: This proposal restores the needed special inspection for suspended ceiling systems. The 2009 IBC identified "suspended ceiling systems and their anchorage" as components that needed to be included in the statement of special inspections for Seismic Design Category D, E or F, but did not list them in the section that invoked the actual inspection. Then, as part of the reorganization of Chapter 17 approved in the previous code change cycle, the requirement was deleted completely when the inspection requirements were combined with the requirements for inclusion in the statement of special inspections.

Suspended ceiling systems, when not properly anchored and braced, are well known to fail under strong shaking, resulting in debris that can block exits or otherwise impede egress from buildings.

Cost Impact: The code change proposal will increase the cost of construction.

1705.11.5-S-KERR.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee believes that there is no special expertise needed for the inspection of suspended ceilings and that its removal in a prior code cycle was not inadvertent. The committee did not hear any justification for requiring this special inspection.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Gillengerten, Code Resource Support Committee, representing FEMA/Building Seismic Safety Council, requests Approval as Submitted.

Commenter's Reason: Suspended ceilings systems pose a significant risk to public safety, and there are many instances of failures in earthquakes. The Commentary of the 2009 NEHRP Provisions, Section C13.1 states that:

"Suspended or attached nonstructural components that could detach either in full or in part from the structure during an earthquake are referred to as falling hazards and may represent a serious threat to property and life safety. Critical attributes that influence the hazards posed by these components include their weight, their attachment to the structure, their failure or breakage characteristics (e.g., certain types of glass), and their location relative to occupied areas (e.g., over an entry or exit, a public walkway, an atrium, or a lower adjacent structure)."

"Components whose collapse during an earthquake could result in blockage of the means of egress deserve special consideration. The term "means of egress" is used commonly in building codes with respect to fire hazard. Consideration of egress may include intervening aisles, doors, doorways, gates, corridors, exterior exit balconies, ramps, stairways, pressurized enclosures, horizontal exits, exit passageways, exit courts, and yards. Items whose failure could jeopardize the means of egress include walls around stairs and corridors, veneers, cornices, canopies, heavy partition systems, ceilings, architectural soffits, light fixtures, and other ornaments above building exits or near fire escapes."

Recent suspended ceiling damage in significant earthquakes is documented in FEMA E-74. Additional information on the performance of different suspended ceiling types may be viewed at the following web pages:

http://www.fema.gov/earthquake/fema-e-74-reducing-risks-nonstructural-earthquake-damage-76
http://www.fema.gov/earthquake/fema-e-74-reducing-risks-nonstructural-earthquake-damage-79

Earthquake experience has conclusively demonstrated that suspended ceiling performance depends on proper installation. Installation of safety wires for suspended light fixtures and diffusers, proper installation of supports at the ceiling perimeter, and use of the proper fasteners for connection of supports and bracing to the structure are all critical, and installation errors have resulted in failures. Good performance requires special inspection to ensure proper installation.

Special inspection of the installation of suspended ceilings was required in both the 2006 & 2009 IBC. It was removed in the 2012 IBC as part of an overall re-organization of Chapter 17. No justification was provided by the proposer of the 2012 IBC changes other than in his opinion it was not needed. We disagree for the reasons indicated above and request special inspection of suspended ceilings be re-instated which this proposal would do.

S163-12

Final Action: AS AM AMPC____ D

S171-12
1709.3.2

<u>Proposed Change as Submitted</u>

Proponent: Gary R. Searer, Wiss, Janey, Elstner Associates Inc., representing self

Revise as follows:

1709.3.2 Load test procedure not specified. In the absence of applicable load test procedures contained within a standard referenced by this code or acceptance criteria for a specific material or method of construction, such *existing structure* shall be subjected to a test procedure developed by a *registered design professional* that simulates applicable loading and deformation conditions. For components that are not a part of the seismic load-resisting system, the test load shall be equal ~~to two times the unfactored design loads~~ <u>to the minimum of the specified factored design loads. For statically loaded components,</u> the test load shall be left in place for a period of 24 hours. <u>For components such as machine supports or fall arrest anchors that carry dynamic loads, the load shall be left in place for a period consistent with the component's actual function.</u> The structure shall be considered to have successfully met the test requirements where the following criteria are satisfied:

1. Under the design load, the deflection shall not exceed the limitations specified in Section 1604.3.
2. Within 24 hours after removal of the test load, the structure shall have recovered not less than 75 percent of the maximum deflection.
3. During and immediately after the test, the structure shall not show evidence of failure.

Reason: This code change proposal does two things: 1) changes the required static test load from *precisely* "two times the unfactored design load" to a "minimum of the specified factored design loads", and 2) specifies how to test components that carry dynamic loads.

It is essentially not possible for the test load to be precisely two times any particular load, and the requirement to test to two times the unfactored load is arbitrary (i.e., why should you test to 2.0D+2.0L if the commonly accepted and statistically based load combination is 1.2D+1.6L?). By adding the phrase "a minimum of" to the requirement and by referencing factored loads, the intent of the provision is made clear -- that the test load should be *at least* the specified factored design load. Nationally recognized design standards such as the AISC Steel Specifications and ACI 318 have been developed with the intent to ensure that very few elements are unable to carry factored loads. To put it another way, if every element in a structure could carry factored loads, the structure's reliability would be consistent with the intent of such standards. In fact, the load testing provisions in each of the AISC and ACI standards make this clear by requiring proof test loads to essentially the full factored loads. This proposal is in-line with both AISC and ACI standards.

When an element is designed to carry short duration or dynamic loads, there is no need to sustain a proof test load for 24 hours.

Cost Impact: The code change proposal will not increase the cost of construction.

1714.3.2-S-SEARER.doc

<u>Public Hearing Results</u>

Committee Action: **Approved as Modified**

Modify proposal as follows:

1709.3.2 Load test procedure not specified. In the absence of applicable load test procedures contained within a standard referenced by this code or acceptance criteria for a specific material or method of construction, such *existing structure* shall be subjected to a test procedure developed by a *registered design professional* that simulates applicable loading and deformation conditions. For components that are not a part of the seismic load-resisting system, <u>at a minimum</u> the test load shall be equal to ~~the minimum of~~ the specified factored design loads. For statically loaded components, the test load shall be left in place for a period of 24 hours. For components such as machine supports or fall arrest anchors that carry dynamic loads, the load shall be left in place for a period consistent with the component's actual function. The structure shall be considered to have successfully met the test requirements where the following criteria are satisfied:

1. Under the design load, the deflection shall not exceed the limitations specified in Section 1604.3.

2. Within 24 hours after removal of the test load, the structure shall have recovered not less than 75 percent of the maximum deflection.
3. During and immediately after the test, the structure shall not show evidence of failure.

Committee Reason: This proposal clears up the issue of duration of load for the test procedure and removes the arbitrary factor of two. The modification improves the wording to indicate you don't have to test to all load combinations.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary Searer, Wiss, Janney, Elstner Associates, Inc. (WJE) representing self, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1709.3.2 Load test procedure not specified. In the absence of applicable load test procedures contained within a standard referenced by this code or acceptance criteria for a specific material or method of construction, such existing structure shall be subjected to a test procedure developed by a registered design professional that simulates applicable loading and deformation conditions. For components that are not a part of the seismic load-resisting system, at a minimum the test load shall be equal to the specified factored design loads. <u>For materials such as wood that have strengths that are dependent on load duration, the test load shall be adjusted to account for the difference in load duration of the test compared to the expected duration of the design loads being considered.</u> For statically loaded components, the test load shall be left in place for a period of 24 hours. For components such as machine supports or fall arrest anchors that carry dynamic loads, the load shall be left in place for a period consistent with the component's actual function. The structure shall be considered to have successfully met the test requirements where the following criteria are satisfied:

1. Under the design load, the deflection shall not exceed the limitations specified in Section 1604.3.
2. Within 24 hours after removal of the test load, the structure shall have recovered not less than 75 percent of the maximum deflection.
3. During and immediately after the test, the structure shall not show evidence of failure.

Commenter's Reason: I am the author of the original code change proposal, which was approved by the IBC-Structural Committee. The code change proposal was written to bring the testing requirements into line with the standards of most major materials, including concrete (ACI) and steel (AISC). However, wood responds differently under short duration loads and long duration loads, and the test load needs to be adjusted to account for differences caused by load duration. This change accomplishes this goal.

Consequentially, I respectfully ask that the proposed code change be approved as modified by this public comment.

S171-12

Final Action: AS AM AMPC____ D

S172-12
1710.5

Proposed Change as Submitted

Proponent: Julie Ruth, P.E. JRuth Code Consulting, representing American Architectural Manufacturers Association (AAMA) (julruth@aol.com)

Revise as follows:

1710.5 Exterior window and door assemblies. The design pressure rating of exterior windows and doors in buildings shall be determined in accordance with Section 1710.5.1 or 1710.5.2.

> **Exception:** Structural wind load design pressures for window units ~~smaller~~ <u>other</u> than the size tested in accordance with Section 1710.5.1 or 1710.5.2 shall be permitted to be ~~higher~~ <u>different</u> than the design value of the tested unit provided such ~~higher~~ pressures are determined by accepted engineering analysis <u>or validated by an additional test of the window unit to the alternate allowable design pressure in accordance with Section 1710.5.2</u>. All components of the ~~small~~ <u>alternate size</u> unit shall be the same as the tested <u>or labeled</u> unit. Where ~~such calculated design pressures are~~ <u>engineering analysis is</u> used, ~~they shall be validated by an additional test of the window unit having the highest allowable design pressure~~ <u>the glass shall comply with Section 2403</u>.

Reason: The current exception limits the use of comparative analysis to window units smaller than the size originally tested for labeling purposes. If comparative analysis is used to provide a higher design pressure rating of the smaller unit, its resistance to air infiltration and water penetration at the correspondingly higher design pressure required by AAMA/WDMA/CSA 101/I.S.2/A440 must be verified by testing of the unit. These characteristics cannot be determined by calculation.

Comparative analysis is also appropriate to rate window units larger than the size originally tested for labeling purposes to lower design pressures. In this scenario, the corresponding design pressure used to verify resistance to air infiltration and water penetration would also be lower. Testing would not be required to verify this level of performance since a higher level has already been determined by testing of the same components in a smaller window unit.

This proposal revises this section as appropriate to permit the use of comparative analysis for larger as well as smaller window units than those tested for labeling. The last sentence of the section is also revised to specify that when engineering analysis is used, the glass in the fenestration product must also comply with Section 2403. Section 2403 establishes specific criteria for the deflection of the framing supporting the glass.

Cost Impact: The code change proposal will not increase the cost of construction

1710.5 #1-S-RUTH

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee has reservations about allowing test results to be scaled up in order to allow large window units. Preference would be to have this issue resolved within the referenced standards.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Julie Ruth, JRuth Code Consulting, representing American Architectural Manufacturers Association requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1710.5 Exterior window and door assemblies. The design pressure rating of exterior windows and doors in buildings shall be determined in accordance with Section 1710.5.1 or 1710.5.2.

Exceptions:

1. Structural wind load design pressures for window and door units other than the size tested in accordance with Section 1710.5.1 ~~or 1710.5.2~~ shall be permitted to be different than the design value of the tested unit provided such different pressures are determined by accepted engineering analysis or validated by an additional test of the window or door unit to the ~~alternate allowable~~ different design pressure in accordance with Section ~~1710.5.2~~ 1710.5.1. All components of the alternate size unit shall be the same as the tested or labeled unit. ~~Where engineering analysis is used, the glass shall comply with Section 2403.~~
   1.1 Operable windows and doors rated in this manner shall comply with the following:
      1.1.1. The frame area of the alternate size unit shall not exceed the frame area of the tested unit.
      1.1.2. The alternate size unit shall vary from the tested unit only in width, height or load requirements.
      1.1.3. The proportional deflection for fiber stress of intermediate members of the alternate size unit shall not exceed 100 percent of the proportional deflection for fiber stress of the intermediate members of the tested unit.
      1.1.4. The concentrated load at the juncture of the intermediate members and the frame of the alternate size unit shall not exceed 100 percent of the concentrated load at the juncture of the intermediate members and the frame of the tested unit.
      11.5. The rated air and water infiltration resistance of the alternate size unit shall not exceed the air and water infiltration resistance of the tested unit.
      1.1.6. The maximum cyclic pressure of the alternate size unit shall not exceed the maximum cyclic pressure of the tested unit when tested in accordance with ASTM E 1886 and ASTM E 1996, where applicable.
   1.2 Non-operable windows and doors rated in this manner shall comply with the following:
      1.2.1. The frame area of the alternate size unit shall not exceed the frame area of the tested unit.
      1.2.2. The alternate size unit shall vary from the tested unit only in width, height or load requirements.
      1.2.3. The maximum uniform load distribution (ULD) of any side of either unit shall be equal to the uniform load carried by the side divided by the length of the side.
      1.2.4. The ULD of any member of the alternate size unit shall not exceed the ULD of the corresponding member of the tested unit.
      1.2.5. The ULD of each member of both units shall be calculated in accordance with standard engineering analysis.
      1.2.6. The rated air and water infiltration resistance of the alternate size unit shall not exceed the air and water infiltration resistance of the tested unit.
      1.2.7. The maximum cyclic pressure of the alternate size unit shall not exceed the maximum cyclic pressure of the tested unit when tested in accordance with ASTM E 1886 and ASTM E 1996, where applicable.
2. For window and door units tested in accordance with Section 1710.5.2, structural wind load design pressures for window and door units other than the size tested in accordance with Section 1710.5.2 shall be permitted to be different than the design value of the tested unit provided such different pressures are determined by accepted engineering analysis or validated by an additional test of the window or door unit to the different design pressure in accordance with Section 1710.5.2. All components of the alternate size unit shall be the same as the tested unit. Where engineering analysis is used, the glass shall comply with Section 2403.

Commenter's Reason: This Public Comment seeks approval of the original proposal, with modifications that seek to address the concerns raised with the proposal by the IBC Structural Committee during the ICC Group A code development hearings.

At the present time Section 1710.5 requires the design pressure rating of exterior windows and doors to be determined in accordance with either Section 1710.5.1 or 1710.5.2.

Section 1710.5.1 requires exterior windows and sliding doors to be tested and labeled in accordance with AAMA/WDMA/CSA 101/I.S.2/A440. This standard establishes criteria for performance grade rating of the fenestration product as R, LC, CW or AW. It establishes criteria for resistance to air leakage and water penetration, as well as structural testing, based upon the performance grade and design pressure rating. Framing deflection criteria are also established in the standard for fenestration products rated for performance grade CW and AW.

Section 1710.5.2 addresses structural testing only. Through reference to Section 2403 it establishes more rigorous deflection criteria than Section 1710.5.1 for performance grade R and LC fenestration products.

An exception to the criteria of both Sections 1710.5.1 and 1710.5.2 is given in Section 1710.5. The exception permits the rating of smaller fenestration products to a higher design pressure based upon engineering analysis when specific criteria given in the exception are met. The criteria include the use of framing members in the smaller unit that are identical to those of the tested unit, and the testing of the unit that is to have the highest design pressure rating.

Resistance to air leakage and water penetration characteristics cannot be determined by engineering analysis alone. The pressure at which a unit is tested for resistance to air leakage is determined by the performance grade and water penetration is determined by the targeted design pressure rating of a product. Therefore, to verify the higher design pressure rating of the smaller unit in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, it must be tested.

The procedure described in the exception is commonly referred to within the fenestration industry as “comparative analysis”. Basically, a window unit that meets or exceeds the size specified in AAMA/WDMA/CSA 101/I.S.2/A440 is tested to a lower design pressure rating, then a smaller unit is tested to the highest design pressure rating sought for that particular product line. Based upon the results of those 2 testing sequences the design pressure rating of intermediate size units can be interpolated using engineering analysis.

It is not uncommon for fenestration products to be tested to design pressures that are considerably higher than those required by the applicable code, or ASCE 7, for installation in a specific building or use on a certain project. These exceptions provide a method of determining the appropriate design pressure rating of these specialty units without requiring repetition of a complete sequence of testing, through comparison to existing, tested and approved units.

Although having this exception in Section 1710.5 of the IBC is helpful, there are specific scenarios that it does not address. The intent of the original proposal, and this proposed modification, is to seek to address these additional scenarios as accurately as possible.

In the first scenario, specific instances can occur under which it is not clear if the size of an alternate unit is smaller or larger than that of the tested unit. This can occur if the aspect ratio of height to width is different. For example, the height of an alternate unit may be greater than that of the tested unit, but its width narrower. Is such a unit larger or smaller than the reference unit? Proposed exceptions I.i and I.ii of this Public Comment brings in criteria that have been used successfully in Florida for the evaluation of the rating of an alternate size unit. This criteria is based upon consistency with the tested unit with regards to frame area, components, resistance to air and water infiltration and maximum cyclical pressure, when applicable. Additional criteria are given with regards to proportional deflection of intermediate framing members and concentrated loads at the intersection of intermediate members and the frame for operable units. Additional criteria are given with regards to uniform load distribution (ULD) for fixed units.

In the second scenario, engineering analysis alone could be used to evaluate window units larger than those evaluated in accordance with Section 1710.5.2, since that section does not include requirements for air leakage and water penetration resistance. In this scenario all units are subject to the deflection criteria of Section 2403.0. Proposed exception 2 of this Public Comment provides the criteria for evaluating these alternative size units based upon engineering analysis or additional testing, and the deflection criteria of Section 2403.0.

Since the two scenarios described above are not specifically addressed in the current exception, different interpretations of the IBC can result in the exception being applied inconsistently. These proposed modifications will increase the clarity of the exceptions, resulting in greater clarity and more consistent application of the comparative analysis provisions. We urge approval of S172 as modified by this Public Comment.

S172-12

Final Action: AS AM AMPC____ D

S175-12
1710.5.1

Proposed Change as Submitted

Proponent: Thomas S. Zaremba, Roetzel & Associates, representing Glazing Industry Code Committee (tzaremba@ralaw.com)

Revise as follows:

1710.5.1 Exterior windows and doors. Exterior windows and sliding doors shall be tested and labeled as conforming to AAMA/WDMA/CSA101/I.S.2/A440. The *label* shall state the name of the manufacturer, the *approved* labeling agency and the product designation as specified in AAMA/ WDMA/CSA101/I.S.2/A440. Exterior side-hinged doors shall be tested and *labeled* as conforming to AAMA/WDMA/CSA101/I.S.2/A440 or comply with Section 1710.5.2. Products <u>in Risk Category I and II buildings</u> tested and labeled as conforming to AAMA/WDMA/CSA 101/I.S.2/A440 shall not be subject to the requirements of Sections 2403.2 and 2403.3 <u>provided one of the following is met:</u>

1. <u>The required design pressure for the fenestration product does not exceed 60 psf or</u>
2. <u>All glass in the fenestration product is tempered or laminated.</u>

Reason: Chapter 24 and ASTM E1300 require that glazing be firmly supported to prevent breakage under the design load by establishing maximum framing deflection limits. The glass strength calculations in ASTM E1300 use this as a basis to establish a probability of glass breakage less than 8 in 1000. However, Section 1710.5.1 currently exempts certain residential and light commercial products from this requirement if they are labeled to the AAMA/WDMA/CSA 101/I.S.2/A440 standard. While this may be appropriate when these products are used in applications with lower design loads and/or lower risk building types, allowing this exception for *all* product types in *all* occupancies is far too broad. This proposal would correct this overbreadth by ensuring that products used in higher risk situations be firmly supported and meet the frame deflection limit to restore an appropriate safety margin consistent with ASTM E1300.

Specifically, this proposal would limit the exception to only risk category I and II buildings, and products used in higher risk category buildings must meet the Chapter 24 requirement for firmly supported glazing. This includes hospitals, public assembly areas with over 300 people, schools (often used as storm shelters), mission-critical facilities, and infrastructure. To provide flexibility, the proposal also maintains the exception for lower design pressures less than 60 psf, and where tempered or laminated glass is used as an alternative method to reduce the probability of glass breakage and/or potential risk of falling glass.

This proposal is significantly different than other proposals discussed in previous cycles, which would have removed the exception for all buildings other than lowrise residential. This proposal takes a much more moderate approach to restore the appropriate safety margin consistent with Chapter 24 and ASTM E1300 in higher risk situations, but leave the exception and flexibility for residential and light commercial products in lower risk applications.

Cost Impact: The code change proposal will not increase the cost of construction.

1710.5.1-S-ZAREMBA.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels there is no justification for this proposal.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee, requests Approval as Submitted.

Commenter's Reason: Simply put, the Committee got this one wrong. Without offering any technical justification or explanation for its action, the Committee disapproved S175-12, saying, nothing more than: "The Committee feels there is no justification for this proposal."

This code change proposal is an effort to correct a clear inconsistency that exists between Chapters 24 and 17 of the Code. In that regard, Sections 2403.2 and 2403.3 specify how to determine whether glass is adequately supported in its framing. These sections do this by limiting the amount of glass deflection the frame is permitted to allow when the glazing assembly is subjected to the larger of the negative or positive loads described in Chapter 16.

These sections of Chapter 24 are critical to a safe building environment. In that regard, if glass is not adequately supported by its frame, there is a risk that it will break and fall out of its frame under loads specified in Chapter 16. If the glass used in the inadequately supported frame is a non-safety glazing, such as annealed glass, there is a risk that the broken glass will injure a building occupant.

The technical basis for the deflection limit found in Section 2403.3 is ASTM E1300. Based on the engineering analysis and computations underlying the ASTM E1300 standard, the L/175 deflection specified in Section 2403.3 limits the probability of glass breakage to less than 8 in 1,000 (0.8%) under loading conditions described in Chapter 16. Since the exemption afforded by Section 1710.5.1 is significantly less stringent than Section 2403.3, a significantly higher incidence of glass breakage under the loads specified in Chapter 16 can be expected when Section 1710.5.1 is used rather than Section 2403.3. In fact, the standard referenced in Section 1710.5.1 states that if there is any glass breakage during testing, two retests are permitted. On retesting, a failure to meet the standard's acceptance criteria occurs only if all ***three*** test specimens fail the test. If any ***one*** specimen passes in either of two retests, the glazing is deemed to be in full compliance with the standard.

In short, application of the test standard prescribed in Section 1710.5.1 introduces a significant increase in the probability of glass failures into the as-built environment. In the worst case, use of Section 1710.5.1 may increase the probability of breakage from the 0.8% prescribed by Section 2403.3, to as much as 33%.

Even though there is no real justification for allowing framing support standards to fall below those set in Chapter 24, nevertheless, Section 1710.5.1 exempts all "exterior windows and sliding doors" labeled to AAMA/WDMA/CSA 101/I.S.2/A440 from the frame support and deflection limits specified in Chapter 24. While it makes sense to reduce framing support requirements for low risk occupancies, or, when safe breaking glass is used in an installation, it does not make any sense to reduce these requirements for occupancies with high risk profiles, especially when a glass that does not break safely, such as annealed glass, is being used.

Specifically, if adopted, S175-12 would limit the blanket exemption otherwise afforded by Section 1710.5.1 from Chapter 24's framing support requirements to applications (i) where the design pressure for the glazing did not exceed 60 psf (ii) where safe breaking glazing, either tempered or laminated, is used throughout the installation, and (iii) to low-risk, category I and II type buildings. Occupancies with risk profiles higher than category I and II, including hospitals, public assemblies with over 300 people, schools (often used as storm shelters), and mission-critical facilities, would be required to meet the more stringent framing support requirements of Chapter 24 unless safe breaking types of glazing are used.

If the Committee's unsubstantiated recommendation is allowed to stand, the overly broad exemption found in Section 1710.5.1 will continue to provide a blanket exemption from the technically sound and appropriately stringent framing support requirements prescribed by Chapter 24. This is completely unwarranted especially when continuing this blanket exemption would carry with it a significant increase in the risk of glass breakage when subjected to loads addressed in Chapter 16 in building installations where the use of annealed and other forms of non-safety glass may be allowed.

In order to ensure that glazing properly contributes to a safe, as-built environment, rational limits on the blanket exemption provided in Section 1710.5.1 are needed. As a result, the Glazing Industry Code Committee urges you to support S175-12 by voting against the standing motion to disapprove S175-12 and voting in favor of a motion to approve S175-12 as submitted.

S175-12

Final Action: AS AM AMPC____ D

S181-12
1803.5.7, 1804.1, 1804.2 (New), 1804.2.1 (New)

Proposed Change as Submitted

Proponent: Edwin Huston, National Council of Structural Engineers Associations- Code Advisory Committee - General Requirements Subcommittee (huston@smithhustoninc.com)

Revise as follows:

1803.5.7 Excavation near foundations. Where excavation will remove ~~lateral~~ support from any foundation~~, an investigation shall be conducted to assess the potential consequences and address mitigation measures~~ a Registered Design Professional shall prepare a report summarizing the condition of the structure as determined from examination of the structure, the review of available design documents and if necessary, the excavation of test pits. The Registered Design Professional shall determine the requirements for underpinning and protection and prepare site-specific plans, details, and sequence of work for submission. Such support may be provided by underpinning, sheeting, and bracing, or by other means acceptable to the building official.

1804.1 Excavation near foundations. Excavation for any purpose shall not remove lateral support from any foundation or adjacent foundation without first underpinning or protecting the foundation against settlement or lateral translation.

1804.2 Underpinning. Where the protection and/or support of adjacent structures is required, the underpinning system shall be designed and installed in accordance with provisions of this chapter and Chapter 33.

1804.2.1 Underpinning and bracing installation. Where underpinning is used for the support of adjacent structures, the piers, wall piles or footings shall be installed in such manner so as to prevent the lateral or vertical displacement of the adjacent structure, to prevent deterioration of the foundations or other effects that would disrupt the adjacent structure. The sequence of installation shall be identified in the design.

Reason: At present, excavation of foundations is not specifically addressed in relation to adjacent structures. Section 3307, Protection of Adjacent Property, states: “Adjoining public and private property shall be protected from damage during construction, remodeling and demolition work. Protection shall be provided for footings, foundations, party walls, chimneys, skylights and roofs.”

The code currently has minimal and vague requirements of the due diligence required for investigation for excavation near a neighboring structure. Failures to perform proper pre-construction investigations and monitoring procedures have led to failures in construction during underpinning and excavation operations. Improper excavations result nationally in doors and windows that don’t open, increasing through cracking of bearing walls and support members, failures of structural members and to collapse and fatalities.

Specific guidelines are provided to identify responsibilities and basic requirements for providing safe and successful underpinning and excavations.

Cost Impact: The code change proposal will not increase the cost of construction.

1803.5.7-S-HUSTON.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This code change is considered a good effort to clarify requirements for excavations near a neighboring structure, but the committee believes there are details that must be worked out. Requirements for underpinning should make it clear that its not the only means permitted. There should be a link to Chapter 33. The report requirement may not be needed in all cases.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1803.5.7 Excavation near foundations. Where excavation will ~~remove~~ reduce support from any foundation, a Registered Design Professional shall prepare ~~a report summarizing the condition~~ an assessment of the structure as determined from examination of the structure, the review of available design documents and if necessary, the excavation of test pits. The Registered Design Professional shall determine the requirements for underpinning and protection and prepare site-specific plans, details, and sequence of work for submission. Such support may be provided by underpinning, sheeting, and bracing, or by other means acceptable to the building official.

1804.1 Excavation near foundations. Excavation for any purpose shall not ~~remove~~ reduce lateral support from any foundation or adjacent foundation without first underpinning or protecting the foundation against detrimental lateral or vertical movement, or both ~~settlement or lateral translation~~.

1804.2 Underpinning. Where underpinning is chosen to provide the protection ~~and/~~or support of adjacent structures ~~is required~~, the underpinning system shall be designed and installed in accordance with provisions of this chapter and Chapter 33.

~~**1804.2.1 Underpinning and bracing installation**. Where underpinning is used for the support of adjacent structures, the piers, wall piles or footings shall be installed in such manner so as to prevent the lateral or vertical displacement of the adjacent structure, to prevent deterioration of the foundations or other effects that would disrupt the adjacent structure. The sequence of installation shall be identified in the design.~~

1804.2.1 Underpinning Sequencing. Underpinning shall be installed in a sequential manner that protects the neighboring structure and the working construction site. The sequence of installation shall be identified in the construction documents.

Commenter's Reason: At present, excavation of foundations is not specifically addressed in relation to adjacent structures. Section 3307, Protection of Adjacent Property, states: "Adjoining public and private property shall be protected from damage during construction, remodeling and demolition work. Protection shall be provided for footings, foundations, party walls, chimneys, skylights and roofs."

The code currently has minimal and vague requirements of the due diligence required for investigation for excavation near a neighboring structure. Failures to perform proper pre-construction investigations and monitoring procedures have led to failures in construction during underpinning and excavation operations. Improper excavations result nationally in doors and windows that don't open, increasing through cracking of bearing walls and support members, failures of structural members and to collapse and fatalities.

At the Code Development Hearings the Structural Committee struggled with the prohibition of preventing all settlement or lateral translation, which is not possible. Alternate wording was considered. But the committee chose to disapprove this proposal and asked that it be reconsidered under a Public Comment. During testimony for a companion Code Change Proposal, S184-15, it was pointed out that the term "detrimental" is currently used to discuss settlement in Section 1805.1, 1808.4 and 1807.7.2, as well as in other chapters of the IBC and the structural committee approved S184-12 "As Modified" using the term "detrimental". This Public comment seeks to use that same terminology.

One member of the committee noted that a report is not always necessary, so we changed that requirement to require an assessment of the need for underpinning, or other means of providing support.

We are also changing remove support to reduce support, because removal of support could lead to failure.

As 1803.5.7 points out, underpinning is one way of providing support. So in 1804.2, we are noting requirements when underpinning is chosen to provide support.

We urge your support for AMPC.

S181-12

Final Action: AS AM AMPC____ D

S184-12
1808.3.2 (New)

Proposed Change as Submitted

Proponent: Edwin Huston, National Council of Structural Engineers Associations (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee (huston@smithhustoninc.com)

Add new text as follows:

1808.3.2 Surcharge. No fill or other surcharge loads shall be placed adjacent to any building or structure unless such building or structure is capable of withstanding the additional loads caused by the fill or the surcharge. Existing footings or foundations which will be affected by any excavation shall be underpinned or otherwise protected against settlement and shall be protected against lateral movement.

Reason: The code does not comment on permanent loads surcharging a neighboring structure. It references surcharge loads only in reference to construction loading in Chapter 33.

Cost Impact: The code change proposal will not increase the cost of construction.

1808.3.2 (NEW)-S-HUSTON.doc

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1808.3.2 Surcharge. No fill or other surcharge loads shall be placed adjacent to any building or structure unless such building or structure is capable of withstanding the additional loads caused by the fill or the surcharge. Existing footings or foundations which will be affected by any excavation shall be underpinned or otherwise protected against settlement and shall be protected against detrimental lateral or vertical movement, or both.

Committee Reason: This code change adds a needed provision on surcharge loads that affect an adjacent structure. Although Chapter 33 covers this during construction, the committee believes the proposed addition to Chapter 18 is useful and will help the building official. The modification clarifies that the vertical movement is also a concern and further states the protection is against detrimental movements. A public comment is suggested to provide an objective determination of detrimental movements.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1808.3.2 Surcharge. No fill or other surcharge loads shall be placed adjacent to any building or structure unless such building or structure is capable of withstanding the additional loads caused by the fill or the surcharge. Existing footings or foundations which will be affected by any excavation shall be underpinned or otherwise protected against settlement and shall be protected against detrimental lateral or vertical movement, or both.

> **Exception:** Minor grading for landscaping purposes shall be permitted where done with walk-behind equipment, where the grade is not increased more than one foot from original design grade, or where approved by the building official.

Commenter's Reason: : As written, the proposed language would not permit any grading or landscaping against an existing building, even minor amounts placed for landscaping purposes (e.g. maintaining a French drain or adding mulch to plant bends) done with light-duty walk-behind equipment unless the owner hires an engineer to evaluate the foundation and foundation walls. This is unreasonable when the primary issue is major grading done with heavy-duty equipment, particularly where grading and compaction of soil is done perpendicular to the building wall. An exception is proposed for minor grading done with walk-behind equipment (which does not induce high forces against the wall), limited grading heights, or as approved by the building official.

It is noted that many jurisdictions require a "minor grading" permit for work of the nature covered by the exception. These permits typically limit the total cubic yards or square footage of grading, limit the work to the lot covered by the permit (i.e. a permit would not be granted for grading against a building on an adjacent lot), and typically require plans and details signed and sealed by a civil engineer. This permitting process supplies protection against abuse of the exception.

S184-12

Final Action: AS AM AMPC____ D

S190-12
1810.3.3.1.6

Proposed Change as Submitted

Proponent: Lori A. Simpson, P.E., GE, Treadwell & Rollo, a Langan Company, representing Deep Foundations Institute

Revise as follows:

1810.3.3.1.6 Uplift capacity of grouped deep foundation elements. For grouped deep foundation elements subjected to uplift, the allowable working uplift load for the group shall be calculated by an *approved* method of analysis. Where the deep foundation elements in the group are placed at a center-to-center spacing ~~of at least 2.5~~ less than three times the least horizontal dimension of the largest single element, the allowable working uplift load for the group is permitted to be calculated as the lesser of:

1. The proposed individual allowable working uplift ~~working~~ load times the number of elements in the group.
2. Two-thirds of the effective weight of the group and the soil contained within a block defined by the perimeter of the group and the length of the element, plus two-thirds of the ultimate shear resistance long the soil block.

Reason: A period is added because there was a run on sentence which rendered the section unclear. Also, the spacing is clarified to be consistent with Section 1810.2.5. Section 1810.3.3.1.6 had defined the need to evaluate group effects where spacing is at least 2.5 times the least horizontal dimension, but did not define a maximum spacing at which group effects did not need to be evaluated. The minimum spacing for evaluation of group effects on uplift capacity is not appropriate. Section 1810.2.5 says that group effects only need to be evaluated where the spacing is less than 3 times the least horizontal dimension, so that is repeated herein for consistency.

Cost Impact: The code change proposal will not increase the cost of construction.

1810.3.3.1.6-S-SIMPSON.doc

Public Hearing Results

Committee Action: **Approved as Modified**

Modify proposal as follows:

1810.3.3.1.6 Uplift capacity of grouped deep foundation elements. For grouped deep foundation elements subjected to uplift, the allowable working uplift load for the group shall be calculated by ~~an *approved*~~ a generally accepted method of analysis. Where the deep foundation elements in the group are placed at a center-to-center spacing less than three times the least horizontal dimension of ~~the largest single~~ an element, the allowable working uplift load for the group is permitted to be calculated as the lesser of:

1. The proposed individual allowable working uplift load times the number of elements in the group.
2. Two-thirds of the effective weight of the group and the soil contained within a block defined by the perimeter of the group and the length of the element, plus two-thirds of the ultimate shear resistance along the soil block.

Committee Reason: Approval of these group effect clarifications is consistent with the committee's action on S185-12. The modification substitutes preferred wording that is intended to allow standard practice in various regions.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Lori A. Simpson, P.E., G.E., Treadwell & Rollo, a Langan Company, representing Deep Foundations Institute, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1810.3.3.1.6 Uplift capacity of grouped deep foundation elements. For grouped deep foundation elements subjected to uplift, the allowable working uplift load for the group shall be calculated by a generally accepted method of analysis. Where the deep foundation elements in the group are placed at a center-to-center spacing less than three times the least horizontal dimension of ~~an~~ the largest single element, the allowable working uplift load for the group is permitted to be calculated as the lesser of:

1. The proposed individual allowable working uplift load times the number of elements in the group.
2. Two-thirds of the effective weight of the group and the soil contained within a block defined by the perimeter of the group and the length of the element, plus two-thirds of the ultimate shear resistance along the soil block.

Commenter's Reason: The text "of the largest single" was deleted during the Code Change Proposal Hearing, however, it was realized that some foundation elements may have different dimensions (a belled pier, for example); in evaluating if the deep foundation elements are less than three times the least horizontal dimension, the least horizontal dimension of the largest element should be used. Therefore, the text "of the largest single" should be put back in.

S190-12

Final Action: AS AM AMPC____ D

S199-12
1904.1, 1904.2, Figure 1904.2, Table 1904.2

Proposed Change as Submitted

Proponent: Matthew Senecal, P.E., American Concrete Institute (ACI)

Delete and substitute as follows:

~~**1904.1 Exposure categories and classes.** Concrete shall be assigned to exposure classes in accordance with the durability requirements of ACI 318 based on:~~

1. ~~Exposure to freezing and thawing in a moist condition or deicer chemicals;~~
2. ~~Exposure to sulfates in water or soil;~~
3. ~~Exposure to water where the concrete is intended to have low permeability; and~~
4. ~~Exposure to chlorides from deicing chemicals, salt, saltwater, brackish water, seawater or spray from these sources, where the concrete has steel reinforcement.~~

~~**1904.2 Concrete properties.** Concrete mixtures shall conform to the most restrictive maximum water-cementitious materials ratios, maximum cementitious admixtures, minimum air-entrainment and minimum specified concrete compressive strength requirements of ACI 318 based on the exposure classes assigned in Section 1904.1.~~

> ~~**Exception:** For occupancies and appurtenances thereto in Group R occupancies that are in buildings less than four stories above grade plane, normal-weight aggregate concrete is permitted to comply with the requirements of Table 1904.2 based on the weathering classification (freezing and thawing) determined from Figure 1904.2 in lieu of the durability requirements of ACI 318.~~

~~TABLE 1904.2~~
~~MINIMUM SPECIFIED COMPRESSIVE STRENGTH (f'_c)~~

~~TYPE OR LOCATION OF CONCRETE CONSTRUCTION~~	~~MINIMUM SPECIFIED COMPRESSIVE STRENGTH (f'_c at 28 days, psi)~~		
	~~Negligible exposure~~	~~Moderate exposure~~	~~Severe exposure~~
~~Basement walls[c] and foundations not exposed to the weather~~	~~2,500~~	~~2,500~~	~~2,500[a]~~
~~Basement slabs and interior slabs on grade, except garage floor slabs~~	~~2,500~~	~~2,500~~	~~2,500[a]~~
~~Basement walls[c], foundation walls, exterior walls and other vertical concrete surfaces exposed to the weather~~	~~2,500~~	~~3,000[b]~~	~~3,000[b]~~
~~Driveways, curbs, walks, patios, porches, carport slabs, steps and other flatwork exposed to the weather, and garage floor slabs~~	~~2,500~~	~~3,000[b,d]~~	~~3,500[b,d]~~

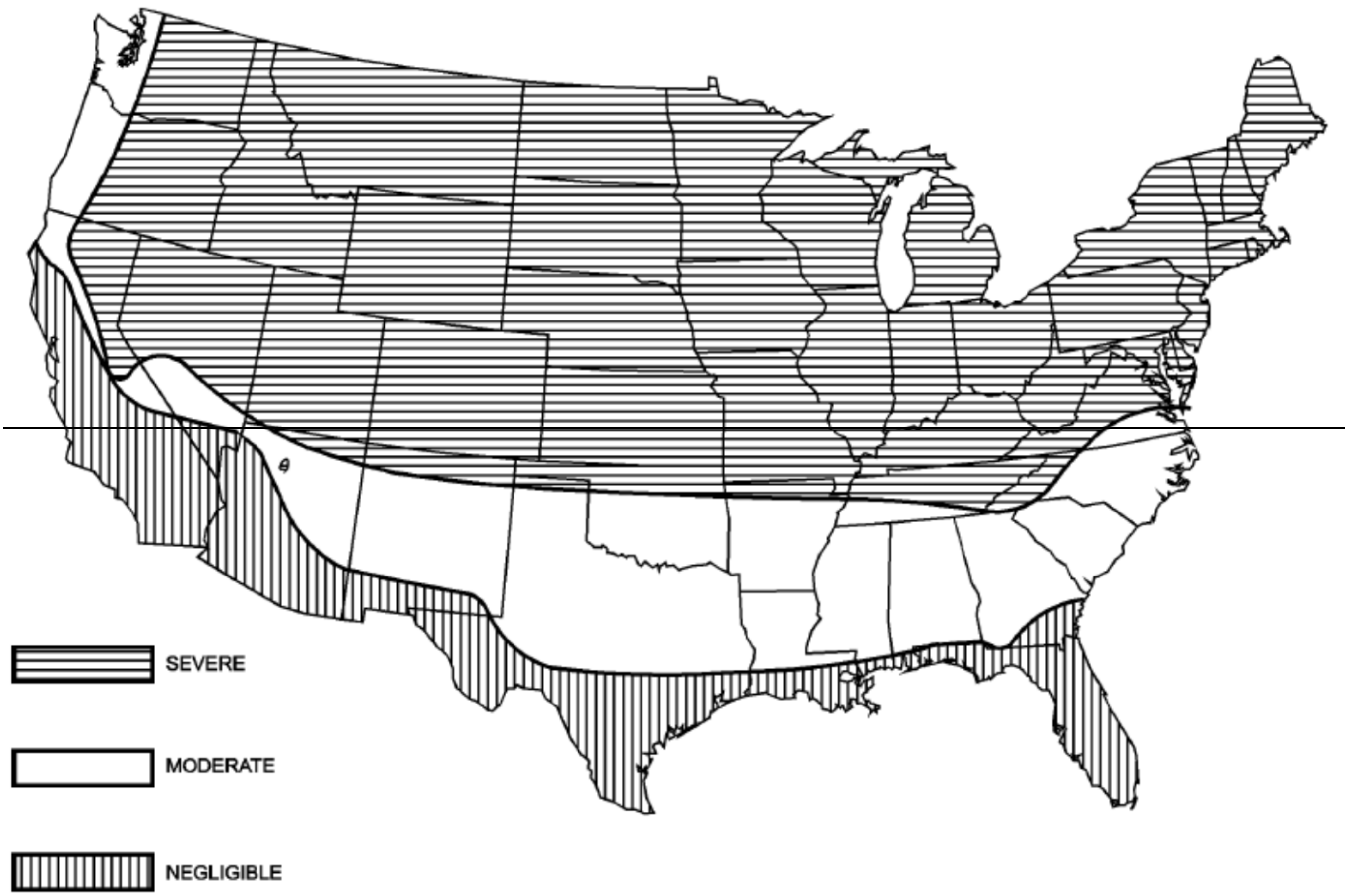
~~For SI: 1 pound per square inch = 0.00689 MPa.~~

~~a. Concrete in these locations that can be subjected to freezing and thawing during construction shall be of air-entrained concrete in accordance with Section 1904.2.~~

~~b. Concrete shall be air entrained in accordance with ACI 318.~~

~~c. Structural plain concrete basement walls are exempt from the requirements for exposure conditions of Section 1904.2.~~

~~d. For garage floor slabs where a steel trowel finish is used, the total air content required by ACI 318 is permitted to be reduced to not less than 3 percent, provided the minimum specified compressive strength of the concrete is increased to 4,000 psi.~~



~~**FIGURE 1904.2**~~
~~**WEATHERING PROBABILITY MAP FOR CONCRETE[a,b,c]**~~

~~a. Lines defining areas are approximate only. Local areas can be more or less severe than indicated by the region classification.~~
~~b. A "severe" classification is where weather conditions encourage or require the use of deicing chemicals or where there is potential for a continuous presence of moisture during frequent cycles of freezing and thawing. A "moderate" classification is where weather conditions occasionally expose concrete in the presence of moisture to freezing and thawing, but where deicing chemicals are not generally used. A "negligible" classification is where weather conditions rarely expose concrete in the presence of moisture to freezing and thawing.~~
~~c. Alaska and Hawaii are classified as severe and negligible, respectively.~~

1904.1 Structural concrete. Structural concrete shall conform to the durability requirements of ACI 318.

1904.2 Nonstructural concrete. The registered design professional shall assign nonstructural concrete a freeze-thaw exposure class, as defined in ACI 318, based on the anticipated exposure of nonstructural concrete. Nonstructural concrete shall have a minimum specified compressive strength, f'_c, of 2500 psi for Class F0; 3000 psi for Class F1; and 3500 psi for Classes F2 and F3. Nonstructural concrete shall be air entrained in accordance with ACI 318.

Reason: This proposal replaces the weathering probability map with ACI 318's performance requirements; removes the exception for structural concrete; and clarifies the durability requirements for nonstructural concrete.

Probability map: The weathering probability map for concrete can be inaccurate since it is possible to have "severe," "moderate," or "negligible" environments in any of the predefined zones shown on the map. ACI 318 requires the designer to classify concrete into one of the freezing and thawing classes as follows:

F0 – Concrete not exposed to freezing-and-thawing cycles
F1 – Concrete exposed to freezing-and-thawing cycles and occasional exposure to moisture

F2 – Concrete exposed to freezing-and-thawing cycles and in continuous contact with moisture

F3 – Concrete exposed to freezing-and-thawing cycles and in continuous contact with moisture and exposed to deicing chemicals

The concrete classes must be applied by the designer, regardless of geographic location. The commentary to ACI 318 provides further discussion and examples to help the designer determine the appropriate class. It is therefore recommended to remove the map and adopt the ACI 318 approach.

Table: The first and second rows of the table provide limits for interior concrete. Interior concrete is equivalent to Class F0 in ACI 318, which requires a minimum concrete compressive strength of 2500 psi. Therefore, the minimum concrete compressive strength requirements listed in the first two rows are the same as the minimum requirements of ACI 318 and may be removed.

The third row of the table provides an exception for exterior structural concrete walls above or below ground. The exception allows for 3000 psi concrete for any environment other than "negligible" or Class F0. Research[1-2] shows that concrete with a minimum amount of hydrated cement resists the negative effects of freezing and thawing. ACI 318 has determined that 4500 psi concrete provides adequate cement hydration for the range of available concrete mixtures used in construction. It is therefore recommended to remove this exception for structural concrete.

The fourth row of the table states strength limits for exterior nonstructural concrete. ACI 318 does not have durability requirements for nonstructural concrete. Therefore, these limits are not an exception to 318 but a requirement. These limits are simply restated in terms of exposure classes as shown in the revision. The limitation on building category and concrete type have been removed, since this appears to be a misunderstanding of what is required in ACI 318.

References:

1. Klieger, P., 1956, "Curing Requirements for Scale Resistance of Concrete," Highway Research Board Bulletin 150, pp.18-31. (PCA Bulletin 82)

2. Mather, B., 1990, "How to Make Concrete that will be Immune to the Effects of Freezing and Thawing," Paul Klieger Symposium on Performance of Concrete, SP-122, D. Whiting, ed., American Concrete Institute, Farmington Hills, MI, pp. 1-18.

Cost Impact: The code change proposal may increase the cost of construction for structural concrete but decrease the cost for nonstructural concrete. By changing the requirement from geometric location to performance criteria, the cost will increase or decrease depending on location and exposure.

1904.1 (NEW)-S-SENECAL

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: This proposal promotes coordination with ACI 318 durability requirements. A public comment is encouraged to bring back the current IBC exception for Group R occupancies with appropriate limitations.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Matthew Senecal, American Concrete Institute, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1902.1 General. The words and terms defined in ACI 318 shall, for the purposes of this chapter and as used elsewhere in this code for concrete construction, have the meanings shown in ACI 318 as modified by Section <u>1902 and </u>1905.1.1.

<u>**1902.2 NONSTRUCTURAL CONCRETE.** Any element made of plain or reinforced concrete that is not part of a structural system required to transfer either gravity or lateral loads to the ground.</u>

1904.1 Structural concrete. Structural concrete shall conform to the durability requirements of ACI 318.

> <u>**Exception:** For Group R3 occupancies not more than three stories above grade plane, the specified compressive strength, f'_c, for concrete in basement walls, foundation walls, exterior walls, and other vertical concrete work exposed to the weather shall be not less than 3000 psi.</u>

1904.2 Nonstructural concrete. The registered design professional shall assign nonstructural concrete a freeze-thaw exposure class, as defined in ACI 318, based on the anticipated exposure of nonstructural concrete. Nonstructural concrete shall have a minimum specified compressive strength, f'_c, of 2500 psi for Class F0; 3000 psi for Class F1; and 3500 psi for Classes F2 and F3. Nonstructural concrete shall be air entrained in accordance with ACI 318.

Commenter's Reason: The original proposal asked that exception for residential occupancies be removed along with the change to the durability classification system. During the CDH, the NAHB explained that this "type" of exception is common throughout the IBC. It allows for commercial structures that more closely resemble a residential structure in function and use to be built in accordance with IRC requirements. ACI accepts this explanation. An attempt was made to restore the exception at the CDH; however, the language for the type of occupancies could not be worked out. As stated in the ROH, the committee encouraged ACI and NAHB to submit a public comment to include the exception.

In addition, an attendee at the CDH mentioned that a definition for "nonstructural concrete" may be helpful. ACI accepts this suggestion.

Public Comment 2:

Gary J. Ehrlich, P.E. National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1904.1 Structural concrete. Structural concrete shall conform to the durability requirements of ACI 318.

> **Exception:** For Group R-2 and R-3 occupancies not more than three stories above grade plane, the specified compressive strength, f'c, for concrete in basement walls, foundation walls, exterior walls and other vertical surfaces exposed to the weather shall be not less than 3000 psi.

1904.2 Nonstructural concrete. The registered design professional shall assign nonstructural concrete a freeze-thaw exposure class, as defined in ACI 318, based on the anticipated exposure of nonstructural concrete. Nonstructural concrete shall have a minimum specified compressive strength, f'_c, of 2500 psi for Class F0; 3000 psi for Class F1; and 3500 psi for Classes F2 and F3. Nonstructural concrete shall be air entrained in accordance with ACI 318.

SECTION 202
DEFINITIONS

NONSTRUCTURAL CONCRETE. Any element made of plain or reinforced concrete that is not part of a structural system required to transfer either gravity or lateral loads to the ground.

Commenter's Reason: The purpose of this public comment is to restore an exemption from the ACI 318 durability requirements for Group R-2 and R-3 occupancies. A definition for "nonstructural concrete" is also added for increased clarity, so that a code user does not have to go to ACI 318 first to decide whether Section 1904.1 or 1904.2 applies.

Group R-3 occupancies are typically one- and two-family dwellings and townhouses either constructed in jurisdictions that have not adopted the IRC, or that are outside the scope of the IRC limits for the purposes of the structural design. Reasons for the latter include being in areas prone to Category 3 or higher hurricanes, assigned to Seismic Design Category E, irregular dwellings in other moderate or high-Seismic Design Categories, or dwellings that exceed wall and story height limits. These dwellings often are designed without the involvement of an engineer and using the provisions of Section 2308 or prescriptive engineering-based standards such as ICC-600 or the Wood Frame Construction Manual. In these cases, the builder or designer has used prescriptive concrete requirements such as the Section 1904.2 exception and Table 1904.2 that were in the 2012 IBC and previous editions in lieu of purchasing and designing to ACI 318.

Group R-2 covers a range of residential buildings where the dwelling units or sleeping units are occupied for more than a month. Many of the structures covered under this group, such as fraternity and sorority houses, back-to-back rows of townhouses, and low-rise "garden style" condominium and apartment buildings typically containing 8-12 units. These structures are very similar in construction and loading to R-3 structures and often also designed using Section 2308 or other prescriptive standards.

This will maintain consistency between dwellings constructed to the IRC and those designed using the IBC, as well as between Group R-3 structures and similar Group R-2 structures. Otherwise, the IBC through reference to ACI 318 will require 4500 psi for concrete exposed to freeze/thaw action or deicing chemicals in Group R-3 structures, where such concrete has traditionally been designed using 3000 psi concrete. It is also noted that ACI 332 *Building Code Requirements for Residential Concrete*, which is referenced in the IRC, also specifies 3000 psi concrete for this condition. Since neither the IRC nor ACI 332 use the new exposure classes (F0, F1, F2, F3), the traditional "exposed to the weather" language is also retained.

S199-12
Final Action: AS AM AMPC____ D

S202-12
1905.1.1, 1905.1.3, 1905.1.4, 1905.1.9, 1905.1.10

Proposed Change as Submitted

Proponent: Philip Brazil, P.E., S.E., Reid Middleton, Inc., representing self (pbrazil@reidmiddleton.com)

Revise as follows:

1905.1.1 ACI 318, Section 2.2. Modify existing definitions and add the following definitions to ACI 318, Section 2.2.

DESIGN DISPLACEMENT. Total lateral displacement expected for the design-basis earthquake, *as specified by Section 12.8.6 of ASCE 7.*

DETAILED PLAIN CONCRETE STRUCTURAL WALL. *A wall complying with the requirements of Chapter 22, including 22.6.7.*

ORDINARY PRECAST STRUCTURAL WALL. *A precast wall complying with the requirements of Chapters 1 through 18.*

ORDINARY REINFORCED CONCRETE STRUCTURAL WALL. A *cast-in-place* wall complying with the requirements of Chapters 1 through 18.

ORDINARY STRUCTURAL PLAIN CONCRETE WALL. A wall complying with the requirements of Chapter 22, *excluding 22.6.7*.

SPECIAL STRUCTURAL WALL. A cast-in-place or precast wall complying with the requirements of 21.1.3 through 21.1.7, 21.9 and 21.10, as applicable, in addition to the requirements for ordinary reinforced concrete structural walls *or ordinary precast structural walls, as applicable*. *Where ASCE 7 refers to a "special reinforced concrete structural wall," it shall be deemed to mean a "special structural wall."*

~~***WALL PIER.*** *A wall segment with a horizontal length-to-thickness ratio of at least 2.5, but not exceeding 6, whose clear height is at least two times its horizontal length.*~~

1905.1.3 ACI 318, Section 21.4. Modify ACI 318, Section 21.4, by renumbering Section 21.4.3 to become 21.4.4 and adding new Sections 21.4.3, ~~21.4.5, 21.4.6 and 21.4.7~~ to read as follows:

21.4.3 - Connections that are designed to yield shall be capable of maintaining 80 percent of their design strength at the deformation induced by the design displacement or shall use Type 2 mechanical splices.
21.4.4 - Elements of the connection that are not designed to yield shall develop at least 1.5 *Sy*.
~~*21.4.5 - Wall piers in Seismic Design Category D, E or F shall comply with Section 1905.1.4 of the International Building Code.*~~
~~*21.4.6 - Wall piers not designed as part of a moment frame in buildings assigned to Seismic Design Category C shall have transverse reinforcement designed to resist the shear forces determined from 21.3.3. Spacing of transverse reinforcement shall not exceed 8 inches (203 mm). Transverse reinforcement shall be extended beyond the pier clear height for at least 12 inches (305 mm).*~~

~~***Exceptions:***~~

~~*1. Wall piers that satisfy 21.13.*~~

2. ~~*Wall piers along a wall line within a story where other shear wall segments provide lateral support to the wall piers and such segments have a total stiffness of at least six times the sum of the stiffnesses of all the wall piers.*~~

~~*21.4.7 - Wall segments with a horizontal length-to-thickness ratio less than 2.5 shall be designed as columns.*~~

~~**1905.1.4 ACI 318, Section 21.9.** Modify ACI 318, Section 21.9, by deleting Section 21.9.8 and replacing with the following:~~

~~*21.9.8 - Wall piers and wall segments.*~~
~~*21.9.8.1 - Wall piers not designed as a part of a special moment frame shall have transverse reinforcement designed to satisfy the requirements in 21.9.8.2.*~~

~~***Exceptions:***~~

1. ~~*Wall piers that satisfy 21.13.*~~
2. ~~*Wall piers along a wall line within a story where other shear wall segments provide lateral support to the wall piers and such segment have a total stiffness of at least six times the sum of the stiffnesses of all the wall piers.*~~

~~*21.9.8.2 - Transverse reinforcement with seismic hooks at both ends shall be designed to resist the shear forces determined from 21.6.5.1. Spacing of transverse reinforcement shall not exceed 6 inches (152 mm). Transverse reinforcement shall be extended beyond the pier clear height for at least 12 inches (305 mm).*~~
~~*21.9.8.3 - Wall segments with a horizontal length-to-thickness ratio less than 2.5 shall be designed as columns.*~~

~~**1905.1.9 ACI 318, Section D.3.3.** Delete ACI 318 Sections D.3.3.4 through D.3.3.7 and replace with the following:~~

~~*D.3.3.4 - The anchor design strength associated with concrete failure modes shall be taken as*~~ $0.75\phi N_n$ ~~*and*~~ $0.75\phi V_n$~~*, where*~~ ϕ ~~*is given in D4.3 or D4.4 and*~~ N_n ~~*and*~~ V_n ~~*are deteremined in accordance with D5.2, D5.3, D5.4, D6.2 and D6.3, assuming the concrete is cracked unless it can be demonstrated that the concrete remains uncracked.*~~
~~*D.3.3.5 - Anchors shall be designed to be governed by the steel strength of a ductile steel element as determined in accordance with D.5.1 and D.6.1, unless either D.3.3.6 or D.3.3.7 is satisfied.*~~

~~***Exceptions:***~~

1. ~~*Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy* Section D.3.3.5.~~
2. ~~*D.3.3.5 need not apply and the design shear strength in accordance with D.6.2.1(c) need not be computed for anchor bolts attaching wood sill plates of bearing or non-bearing walls of light-frame wood structures to foundations or foundation stem walls provided all of the following are satisfied:*~~
   - ~~*2.1. The allowable in-plane shear strength of the anchor is determined in accordance with AF&PA NDS Table 11E for lateral design values parallel to grain.*~~
   - ~~*2.2 The maximum anchor nominal diameter is 5/8 inches (16 mm).*~~
   - ~~*2.3. Anchor bolts are embedded into concrete a minimum of 7 inches (178 mm).*~~
   - ~~*2.4. Anchor bolts are located a minimum of 13/4 inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate.*~~
   - ~~*2.5. Anchor bolts are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.*~~
   - ~~*2.6. The sill plate is 2-inch or 3-inch nominal thickness.*~~

~~*3. Section D.3.3.5 need not apply and the design shear strength in accordance with Section*~~

~~*D.6.2.1(c) need not be computed for anchor bolts attaching cold-formed steel track of bearing or non-bearing walls of light-frame construction to foundations or foundation stem walls provided all of the following are satisfied:*~~

~~*3.1. The maximum anchor nominal diameter is 5/8 inches (16 mm).*~~
~~*3.2. Anchors are embedded into concrete a minimum of 7 inches (178 mm).*~~
~~*3.3. Anchors are located a minimum of 13/4 inches (45 mm) from the edge of the concrete parallel to the length of the track.*~~
~~*3.4. Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the track.*~~
~~*3.5. The track is 33 to 68 mil designation thickness.*~~

~~*Allowable in-plane shear strength of exempt anchors, parallel to the edge of concrete shall be permitted to be determined in accordance with AISI S100 Section E3.3.1.*~~

~~*4. In light-frame construction, design of anchors in concrete shall be permitted to satisfy D.3.3.8.*~~

~~*D.3.3.6 - Instead of D.3.3.5, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a force level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.4.*~~

~~***Exceptions:***~~

~~*1. Anchors in concrete designed to support nonstructural components in accordance with ASCE 7 Section 13.4.2 need not satisfy Section D.3.3.6.*~~
~~*2. Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 need not satisfy Section D.3.3.6.*~~

~~*D.3.3.7 - As an alternative to D.3.3.5 and D.3.3.6, it shall be permitted to take the design strength of the anchors as 0.4 times the design strength determined in accordance with D.3.3.4.*~~
~~*D.3.3.8 – In light-frame construction, bearing or nonbearing walls, shear strength of concrete anchors less than or equal to 1 inch [25 mm] in diameter of sill plate or track to foundation or foundation stem wall need not satisfy D.3.3.7 when the design strength of the anchors is determined in accordance with D.6.2.1(c).*~~

~~**1905.1.10 ACI 318, Section D.4.2.2.** Delete ACI 318, Section D.4.2.2, and replace with the following:~~

~~*D.4.2.2 - The concrete breakout strength requirements for anchors in tension shall be considered satisfied by the design procedure of D.5.2 provided Equation D-7 is not used for anchor embedments exceeding 25 inches. The concrete breakout strength requirements for anchors in shear with diameters not exceeding 2 inches shall be considered satisfied by the design procedure of D.6.2. For anchors in shear with diameters exceeding 2 inches, shear anchor reinforcement shall be provided in accordance with the procedures of D.6.2.9.*~~

Reason: The purpose for this proposal is to update the 2012 IBC for consistency with ACI 318-11 and as explained below.
1. In IBC Section 1905.1.1, the definition of "wall pier" is deleted because of the definition of "wall pier" in Section 2.2 of ACI 318-11.
2. In IBC Section 1905.1.3, Sections 21.4.5 through 21.4.7 are deleted because of Section 21.4.4 of ACI 318-11, which reads: "In structures assigned to SDC D, E or F, wall piers shall be designed in accordance with 21.9 or 21.13."
3. IBC Section 1905.1.4 is deleted because of Section 21.9.8 of ACI 318-11, which specifies requirements for wall piers.
4. IBC Section 1905.1.9 is deleted because of Sections D.3.3.4 through D.3.5 of ACI 318-11, which specify seismic design requirements for anchors in structures that are substantially revised from the corresponding provisions in Sections D.3.3.3 through D.3.3.6 of ACI 318-08.

5. IBC Section 1905.1.10 is deleted because of Sections D.4.2.2 and D.4.3 of ACI 318-11, which specify requirements for concrete breakout strength and bond strength that are substantially revised from the corresponding provisions in Section D.4.2.2 of ACI 318-08.

Cost Impact: The code change proposal will not increase the cost of construction.

1905.1.1-S-BRAZIL.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Disapproved at the proponent's request. This proposal would remove exceptions for light-frame construction that were approved in the last cycle.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Philip Brazil, P.E., S.E., representing self; and Matthew Senecal, P.E., American Concrete Institute, request Approval as Modified by this Public Comment.

Replace the proposal as follows:

1905.1 General. The text of ACI 318 shall be modified as indicated in Sections 1905.1.1 through 1905.1.10.

1905.1.1 ACI 318, Section 2.2. ~~Modify existing definitions and~~ Add the following definitions to ACI 318, Section 2.2.

~~**DESIGN DISPLACEMENT.** Total lateral displacement expected for the design-basis earthquake, *as specified by Section 12.8.6 of ASCE 7.*~~

DETAILED PLAIN CONCRETE STRUCTURAL WALL. *A wall complying with the requirements of Chapter 22, including Section 22.6.7.*

ORDINARY PRECAST STRUCTURAL WALL. *A precast wall complying with the requirements of Chapters 1 through 18.*

~~**ORDINARY REINFORCED CONCRETE STRUCTURAL WALL**. A *cast-in-place* wall complying with the requirements of Chapters 1 through 18.~~

~~**ORDINARY STRUCTURAL PLAIN CONCRETE WALL.** A wall complying with the requirements of Chapter 22, *excluding Section 22.6.7.*~~

~~**SPECIAL STRUCTURAL WALL.** A cast-in-place or precast wall complying with the requirements of 21.1.3 through 21.1.7, 21.9 and 21.10, as applicable, in addition to the requirements for ordinary reinforced concrete structural walls *or ordinary precast structural walls, as applicable. Where ASCE 7 refers to a "special reinforced concrete structural wall," it shall be deemed to mean a "special structural wall."*~~

1905.1.2 ACI 318, Section 21.1.1. Modify ACI 318 Sections 21.1.1.3 and 21.1.1.7 to read as follows:

21.1.1.3. *Structures assigned to Seismic Design Category A* shall satisfy requirements of Chapters 1 to 19 and 22*; Chapter 21 does not apply*. Structures assigned to *Seismic Design Category* B, C, D, E, or F also shall satisfy 21.1.1.4 through 21.1.1.8, as applicable. *Except for structural elements of plain concrete complying with Section 1905.1.8 of the International Building Code, structural elements of plain concrete are prohibited in structures assigned to Seismic Design Category C, D, E or F*.

21.1.1.7. Structural systems designated as part of the seismic-force-resisting system shall be restricted to those *permitted by ASCE 7*. Except for *Seismic Design Category* A, for which Chapter 21 does not apply, the following provision shall be satisfied for each structural system designated as part of the seismic-force-resisting system, regardless of the *Seismic Design Category*:

a. Ordinary moment frames shall satisfy 21.2.
b. Ordinary reinforced concrete structural walls<u>, detailed plain concrete structural walls</u> *and ordinary precast structural walls* need not satisfy any provisions in Chapter 21.

c. Intermediate moment frames shall satisfy 21.3.
d. Intermediate precast *structural* walls shall satisfy 21.4.
e. Special moment frames shall satisfy 21.5 through 21.8.
f. Special structural wall shall satisfy 21.9.
g. Special structural walls constructed using precast concrete shall satisfy 21.10.

All special moment frames and special structural walls shall also satisfy 21.1.3 through 21.1.7.

Commenter's Reason: The public comment builds upon Proposal S203-12, which deleted modifications of ACI 318 from IBC Section 1905 that are no longer needed since they are incorporated into ACI 318-11.

The definitions of *design displacement*, *ordinary reinforced concrete structural wall*, *ordinary structural plain concrete wall* and *special structural wall* are deleted because definitions for them are in Section 2.2 of ACI 318-11.

The definitions for "detailed plain concrete structural wall" and "ordinary precast structural wall" are retained because definitions for them are not in ACI 318-11 but they are listed as seismic force-resisting systems in Table 12.2-1 of AISC 7-10 and their use is permitted in Seismic Design Category B without limitation. Refer to Items A.3, A.6, B.6 and B.9 of Table 12.2-1.

The addition of *detailed plain concrete structural walls* to Item (b) of ACI 318 Section 21.1.1.7 correlates this section with the addition of *detailed plain concrete structural walls* to Section 2.2 of ACI 318.

S202-12

Final Action: AS AM AMPC____ D

S203-12
1905.1, 1905.1.1, 1905.1.3, 1905.1.4

Proposed Change as Submitted

Proponent: Matthew Senecal, P.E., American Concrete Institute (ACI)

Revise as follows:

1905.1 General. The text of ACI 318 shall be modified as indicated in Sections 1905.1.1 through ~~1905.1.10~~ 1905.1.9.

~~***WALL PIER.*** *A wall segment with a horizontal length-tothickness ratio of at least 2.5, but not exceeding 6, whose clear height is at least two times its horizontal length.*~~

1905.1.3 ACI 318, Section 21.4. Modify ACI 318, Section 21.4, by adding new Section 21.4.3 and renumbering existing Section 21.4.3 to become 21.4.4. ~~and adding new Sections 21.4.3, 21.4.5, 21.4.6 and 21.4.7 to read as follows:~~

21.4.3 - Connections that are designed to yield shall be capable of maintaining 80 percent of their design strength at the deformation induced by the design displacement or shall use Type 2 mechanical splices.

21.4.4 - Elements of the connection that are not designed to yield shall develop at least 1.5 S_{y}.

~~*21.4.5 - Wall piers in Seismic Design Category D, E or F shall comply with Section 1905.1.4 of the International Building Code.*~~

~~*21.4.6 - Wall piers not designed as part of a moment frame in buildings assigned to Seismic Design Category C shall have transverse reinforcement designed to resist the shear forces determined from 21.3.3. Spacing of transverse reinforcement shall not exceed 8 inches (203 mm). Transverse reinforcement shall be extended beyond the pier clear height for at least 12 inches (305 mm).*~~

~~***Exceptions:***~~

1. ~~*Wall piers that satisfy 21.13.*~~
2. ~~*Wall piers along a wall line within a story where other shear wall segments provide lateral support to the wall piers and such segments have a total stiffness of at least six times the sum of the stiffnesses of all the wall piers.*~~

~~*21.4.7 - Wall segments with a horizontal length-to thickness ratio less than 2.5 shall be designed as columns.*~~

~~**1905.1.4 ACI 318, Section 21.9.** Modify ACI 318, Section 21.9, by deleting Section 21.9.8 and replacing with the following:~~

~~*21.9.8 - Wall piers and wall segments.*~~

~~*21.9.8.1 - Wall piers not designed as a part of a special moment frame shall have transverse reinforcement designed to satisfy the requirements in 21.9.8.2.*~~

~~***Exceptions:***~~

1. ~~*Wall piers that satisfy 21.13.*~~

2. ~~*Wall piers along a wall line within a story where other shear wall segments provide lateral support to the wall piers and such segments have a total stiffness of at least six times the sum of the stiffnesses of all the wall piers.*~~

~~*21.9.8.2 - Transverse reinforcement with seismic hooks at both ends shall be designed to resist the shear forces determined from 21.6.5.1. Spacing of transverse reinforcement shall not exceed 6 inches (152 mm). Transverse reinforcement shall be extended beyond the pier clear height for at least 12 inches (305 mm).*~~

~~*21.9.8.3 - Wall segments with a horizontal length-to thickness ratio less than 2.5 shall be designed as columns.*~~

Reason: This proposal removes the requirements for wall piers. Wall pier requirements are in 1905 because ACI 318-08 did not address the design of this component. ACI 318 incorporated wall pier design in the 2011 edition. Therefore, these amendments should now be removed.

Cost Impact: The code change proposal will not increase the cost of construction.

1905.1-S-SENECAL

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

1905.1.3 ACI 318, Section 21.4. Modify ACI 318, Section 21.4, by adding new Section 21.4.3 and renumbering existing Section<u>s</u> 21.4.3 <u>and 21.4.4</u> to become 21.4.4 <u>and 21.4.5, respectively</u>.

21.4.3 - Connections that are designed to yield shall be capable of maintaining 80 percent of their design strength at the deformation induced by the design displacement or shall use Type 2 mechanical splices.

21.4.4 - Elements of the connection that are not designed to yield shall develop at least 1.5 S_y.

<u>21.4.5 – In structures assigned to SDC D, E, or F, wall piers shall be designed in accordance with 21.9 or 21.13 *in ACI 318*.</u>

(Portions of proposal not shown are unchanged)

Committee Reason: The committee feels that adopting these provisions for wall piers from the consensus standard with fewer modifications allows that process to work. The modification reflects a renumbered section that keeps the ACI 318 provision intact.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Stephen Kerr, representing Structural Engineers Association of California, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1905.1.3 ACI 318, Section 21.4. Modify ACI 318, Section 21.4, by adding new Section<u>s</u> 21.4.3<u>, 21.4.6 and 21.4.7</u> and renumbering existing Sections 21.4.3 and 21.4.4 to become 21.4.4 and 21.4.5, respectively.

21.4.3 - Connections that are designed to yield shall be capable of maintaining 80 percent of their design strength at the deformation induced by the design displacement or shall use Type 2 mechanical splices.

21.4.4 - Elements of the connection that are not designed to yield shall develop at least 1.5 S_y.

21.4.5 – In structures assigned to SDC D, E, or F, wall piers shall be designed in accordance with 21.9 or 21.13 *in ACI 318*.

21.4.6 - Wall piers not designed as part of a moment frame in buildings assigned to Seismic Design Category C shall have transverse reinforcement designed to resist the shear forces determined from 21.3.3 in ACI 318. Spacing of transverse reinforcement shall not exceed 8 inches (203 mm). Transverse reinforcement shall be extended beyond the pier clear height for at least 12 inches (305 mm).

Exceptions:

1. Wall piers that satisfy 21.13.
2. Wall piers along a wall line within a story where other shear wall segments provide lateral support to the wall piers and such segments have a total stiffness of at least six times the sum of the stiffnesses of all the wall piers.

21.4.7 - Wall segments with a horizontal length-to thickness ratio less than 2.5 shall be designed as columns.

Commenter's Reason: The original code change proposal did not establish why wall pier in lower Seismic Design Categories need not include detailing provision to meet the risk-targeted earthquake throughout the United States. As stated by ACI representative at the CDH, ACI 318 has not developed requirement for wall piers in structures assigned to SDC C. Application of ACI 318 section 21.4.2 does not preclude flexural yielding at intersection of spandrel and wall pier as exhibited in concrete tilt-up frame panels testing. [Dew, Sexsmith, Weiler, 2001]. The flexural hinging can lead to premature shear failure in the wall pier.

While the original wall pier provisions for wall pier were introduced to legacy code 1988 UBC for high seismic regions, and has been part of IBC since the 2000 edition, the 2003 NEHRP provisions included parallel provisions for wall piers in seismic design category C which was adopted into ICC 2006. The provisions are essential to prevent possible buckling of longitudinal reinforcement in wall piers induced from flexural yielding propagated at the intersection of spandrel beam and wall pier.

Provision stated under 21.4.6 and 21.4.7 has been part of the model code since 2006. The provision reflects design and minimum detailing requirements for wall piers in the lower SDC. Since its inclusion in 2006, the provision has been widely used by the tilt-up industry. These two sections stated in this public comment are verbatim from 2012 IBC and should be re-instated.

Reference: Michael Dew, Robert Sexsmith, Gerry Weiler, (2001), "Effect of Hinge Zone Tie Spacing on ductility of Concrete Tilt-up Frame Panels," ACI Structural Journal, Nov.-Dec., 2001, American Concrete Institute, Farmington, IL

S203-12

Final Action: AS AM AMPC____ D

S213-12

Table 1705.3, 1908, 1908.1, 1908.2, Table 1908.2, 1908.3, 1908.4, 1908.5

Proposed Change as Submitted

Proponent: Matthew Senecal, P.E., American Concrete Institute (ACI)

Revise as follows:

TABLE 1705.3
REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
3. Inspection of anchors cast in concrete~~ where allowable loads have been increased or where strength design is used~~.	—	X	ACI 318: 8.1.3, 21.2.8	~~1908.5,~~ 1909.1

(Portions of Table not shown remain unchanged)

Delete without substitution:

~~**SECTION 1908 ANCHORAGE TO CONCRETE—ALLOWABLE STRESS DESIGN**~~

~~**1908.1 Scope.** The provisions of this section shall govern the *allowable stress design* of headed bolts and headed stud anchors cast in normal-weight concrete for purposes of transmitting structural loads from one connected element to the other. These provisions do not apply to anchors installed in hardened concrete or where load combinations include earthquake loads or effects. The bearing area of headed anchors shall be not less than one and one-half times the shank area. Where strength design is used, or where load combinations include earthquake loads or effects, the design strength of anchors shall be determined in accordance with Section 1909. Bolts shall conform to ASTM A 307 or an *approved* equivalent.~~

~~**1908.2 Allowable service load.** The allowable service load for headed anchors in shear or tension shall be as indicated in Table 1908.2. Where anchors are subject to combined shear and tension, the following relationship shall be satisfied:~~

~~$(Ps / Pt)5/3 + (Vs / Vt)\ 5/3 \leq 1$ **(Equation 19-1)**~~

~~where:~~

~~*Ps* = Applied tension service load, pounds (N).~~
~~*Pt* = Allowable tension service load from Table 1908.2, pounds (N).~~
~~*Vs* = Applied shear service load, pounds (N).~~
~~*Vt* = Allowable shear service load from Table 1908.2, pounds (N).~~

~~TABLE 1908.2~~
~~ALLOWABLE SERVICE LOAD ON EMBEDDED BOLTS (pounds)~~

~~BOLT DIAMETER (inches)~~	~~MINIMUM EMBEDMENT (inches)~~	~~EDGE DISTANCE (inches)~~	~~SPACING (inches)~~	~~MINIMUM CONCRETE STRENGTH (psi)~~					
				~~f_c' = 2,500~~		~~f_c' = 3,000~~		~~f_c' = 4,000~~	
				~~Tension~~	~~Shear~~	~~Tension~~	~~Shear~~	~~Tension~~	~~Shear~~
~~1/4~~	~~2-1/2~~	~~1-1/2~~	~~3~~	~~200~~	~~500~~	~~200~~	~~500~~	~~200~~	~~500~~
~~3/8~~	~~3~~	~~2-1/4~~	~~4-1/2~~	~~500~~	~~1,100~~	~~500~~	~~1,100~~	~~500~~	~~1,100~~
~~1/2~~	~~4~~ ~~4~~	~~3~~ ~~5~~	~~6~~ ~~6~~	~~950~~ ~~1,450~~	~~1,250~~ ~~1,600~~	~~950~~ ~~1,500~~	~~1,250~~ ~~1,650~~	~~950~~ ~~1,550~~	~~1,250~~ ~~1,750~~
~~5/8~~	~~4-1/2~~ ~~4-1/2~~	~~3-3/4~~ ~~6-1/4~~	~~7-1/2~~ ~~7-1/2~~	~~1,500~~ ~~2,125~~	~~2,750~~ ~~2,950~~	~~1,500~~ ~~2,200~~	~~2,750~~ ~~3,000~~	~~1,500~~ ~~2,400~~	~~2,750~~ ~~3,050~~
~~3/4~~	~~5~~ ~~5~~	~~4-1/2~~ ~~7-1/2~~	~~9~~ ~~9~~	~~2,250~~ ~~2,825~~	~~3,250~~ ~~4,275~~	~~2,250~~ ~~2,950~~	~~3,560~~ ~~4,300~~	~~2,250~~ ~~3,200~~	~~3,560~~ ~~4,400~~
~~7/8~~	~~6~~	~~5-1/4~~	~~10-1/2~~	~~2,550~~	~~3,700~~	~~2,550~~	~~4,050~~	~~2,550~~	~~4,050~~
~~1~~	~~7~~	~~6~~	~~12~~	~~3,050~~	~~4,125~~	~~3,250~~	~~4,500~~	~~3,650~~	~~5,300~~
~~1-1/8~~	~~8~~	~~6-3/4~~	~~13-1/2~~	~~3,400~~	~~4,750~~	~~3,400~~	~~4,750~~	~~3,400~~	~~4,750~~
~~1-1/4~~	~~9~~	~~7-1/2~~	~~15~~	~~4,000~~	~~5,800~~	~~4,000~~	~~5,800~~	~~4,000~~	~~5,800~~

~~**1908.3 Required edge distance and spacing.** The allowable service loads in tension and shear specified in Table 1908.2 are for the edge distance and spacing specified. The edge distance and spacing are permitted to be reduced to 50 percent of the values specified with an equal reduction in allowable service load. Where edge distance and spacing are reduced less than 50 percent, the allowable service load shall be determined by linear interpolation.~~

~~**1908.4 Increase in allowable load.** Increase of the values in Table 1908.2 by one-third is permitted where the provisions of Section 1605.3.2 permit an increase in allowable stress for wind loading.~~

~~**1908.5 Increase for special inspection.** Where *special inspection* is provided for the installation of anchors, a 100- percent increase in the allowable tension values of Table 1908.2 is permitted. No increase in shear value is permitted.~~

Reason: This proposal removes allowable stress design for anchoring to concrete. This approach to anchor design is not consistent with the standards published by ACI, AISC, or ASCE.

Cost Impact: The code change proposal will not increase the cost of construction.

1908-S-SENECAL

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change removes out of date provisions for concrete anchorage using allowable stress design.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edwin Huston, National Council of Structural Engineers Association (NCSEA), representing NCSEA Code Advisory Subcommittee – General Requirements Subcommittee, requests Disapproval.

Commenter's Reason: Contrary to the proponent's reason statement on cost impact, removing Table 1908.2 will increase cost of construction, design and plan review time. While the allowable stress design method may be antique, Table 1908.2 provides an allowable bolt value in concrete applicable when wind force governs design and when seismic force governs in lower seismic design categories. The table bolt values offers uniformity in enforcement and may avoid needless design error in using ACI 318 Appendix D. Until Appendix D can be made more user friendly, this proposal should be disapproved.

We urge your disapproval of S213.

S213-12
Final Action: AS AM AMPC____ D

S235-12
2112.5, Table 2112.5 (New), Chapter 35 (New)

Proposed Change as Submitted

Proponent: Timothy N. Seaton, B.S.C.E., Empire Masonry Heaters LLC

Revise as follows:

2112.5 Masonry heater clearance. Combustible materials shall not be placed within 36 inches (765 mm) of the outside surface of a masonry heater in accordance with NFPA 211, Section 8-7 (clearances for solid fuel-burning appliances), and the required space between the heater and combustible material shall be fully vented to permit the free flow of air around all heater surfaces.

Exceptions:

1. Where the masonry heater wall thickness is at least 8 inches (203 mm) thick of solid masonry and the wall thickness of the heat exchange channels is at least 5 inches (127 mm) thick of solid masonry, ~~combustible materials shall not be placed within 4 inches (102 mm) of the outside surface of a masonry heater. A clearance of at least 8 inches (203 mm) shall be provided between the gas-tight capping slab of the heater and a combustible ceiling.~~ or when the wall thicknesses are similarly 4 inches (102 mm) at the firebox and 2 ½ inches (64 mm) at the heat exchange channel but are lined with at least the inner 2 inches (51 mm) and 1 inch (25 mm) respectively of firebrick(ASTM C27 or ASTM C1261) or refractory equivalent, clearances shall be according to Table 2112.5
2. Where masonry heaters *listed* and labeled in accordance with UL 1482 and installed in accordance with the manufacturer's instructions clearances will be as listed.

TABLE 2112.5
MASONRY HEATER CLEARANCES TO COMBUSTIBLE MATERIALS

<table>
<tr><th rowspan="3">CONTROLLING STANDARD PROVISIONS</th><th colspan="2">MINIMUM MASONRY HEATER WALL CONSTRUCTION THICKNESS</th><th colspan="6">CLEARANCES FROM COMBUSTIBLE</th></tr>
<tr><th colspan="2"></th><th colspan="4">WALLS</th><th colspan="2">CEILINGS</th></tr>
<tr><td>Firebox</td><td>Channels</td><td>Unprotected</td><td>Non-combustible wall surface material[b]</td><td>Protective shield[c] (from shield)</td><td>Both surface[b] and shield[b] (from shield)</td><td>Unprotected</td><td>Protective shield[c] (from shield)</td></tr>
<tr><td>2112.5 ASTM E 1602 (with NFPA 211)</td><td></td><td></td><td>36” (914 mm)</td><td colspan="3">As per NFPA 211 Section 12.6</td><td colspan="2">As per NFPA 211 Section 12.6</td></tr>
<tr><td rowspan="2">2112.5.1 ASTM E 1602 (with Exception 1)</td><td>8” (203 mm)</td><td>5” (127 mm)</td><td colspan="4">4” (102 mm)</td><td colspan="2">8” (203 mm)</td></tr>
<tr><td>4” (100 mm) [including 2” (50 mm) firebrick lining[a]]</td><td>2.5” (64 mm) [including 1” (25 mm) firebrick lining[a]]</td><td>10” (250 mm)</td><td>6” (150 mm)</td><td>5” (127 mm)</td><td>3” (75 mm)</td><td>10” (260 mm)</td><td>5” (127 mm)</td></tr>
<tr><td>2112.5.2 UL 1482/EN 15250 (with Exception 2)</td><td colspan="2">As per manufacturer</td><td colspan="4">As per listing</td><td colspan="2">As per listing</td></tr>
</table>

a. “Firebrick lining” is a lining constructed of firebrick conforming to ASTM C27 or C1261 or refactor equivalent.
b. “Non-combustible wall surface material” is a wall covering facing the masonry heater made from non-combustible material (Fire Class A) and having at least a 30 minute Fire Resistance Rating

c. <u>"Protective shield" is a non-combustible protective shield placed between the masonry heater and the wall, which extends sideways beyond the heater, and is separated from the wall by at least 1.25 inches (30 mm) and from the floor and ceiling by at least 2 inches (50 mm). The clearance is measured from the shield.</u>

Add new standard to Chapter 35 as follows:

EN

<u>EN 15250-2007 Slow Heat Release Appliances Fired by Solid Fuel - Requirements and Test Methods</u>

Reason: North American masonry heater technology is virtually all sourced in Europe where the devices have been built for centuries. In conformance with typical European standards, ASTM E1602, *Standard Guide for Construction of Solid Fuel Burning Masonry Heaters,* does not stipulate masonry heater wall thickness nor relate it to clearances to combustibles. In contrast to masonry fireplace construction and operation, masonry heater wall thickness does not necessarily relate to surface temperature but instead to the time it takes for the heat to begin radiating from the surface and to the total time radiation will occur. For this reason thicker wall construction may in fact be more dangerous with overfiring situations than thinner wall construction.

Until recent IBC and IRC code revisions, all minimum masonry heater clearances were 4" (102 mm) to surface wall or protective shield as per ASTM E1602. I can locate no documented examples of wall ignition from masonry heaters of any wall thickness at this clearance or under ASTM E1602 as the sole ruling clearance standard.

In the recent IBC/IRC code revisions "NFPA 211, Section 8-7 (clearances for solid fuel-burning appliances)" (*sic)* was made the ruling standard for masonry heater clearances instead of ASTM E1602 even though this former standard was created for wood stoves and similar appliances and had no real application to masonry heaters. This standard stipulates 36" clearance to combustible materials with possible reduction to 12" with approved reduction methods. These clearances may be realistic for metal stoves and similar appliances but are unnecessarily restrictive for masonry heaters which in contrast by definition cannot exceed 230º F (110º C) surface temperatures in normal operation (ASTM E1602 Section 3.2.14).

The recent IBC/IRC revisions created two exceptions to the NFPA 211 rule; 1) for lab tested and listed devices, and 2) for masonry heaters with thick firebox and heat channel walls which by European practice are only used for masonry heaters with large heat storage intended to be fired at very long intervals. This latter class of masonry heaters is built increasingly rarely in Europe as the energy codes were written and tightened there and lower output and more responsive masonry heating was required. The same change in code structure is occurring here in North America, and the 36" clearance stipulation for other than thick walled masonry heaters is making masonry heater construction in new projects and particularly in renovation projects unnecessarily complex and expensive. The typical masonry heater sold is custom in design and cannot support laboratory safety testing.

I am not proposing removing existing code clearance provisions though they have not been lab safety tested and verified (as the code provisions for masonry fireplaces have not). The existing safety tests, UL127 and UL1482 were created for manufactured metal appliances and limited in their application to masonry devices. Instead I am proposing IBC adopt building code provisions from Europe for masonry heater clearances where such clearances have been verified through decades and centuries of use. There is no overall European Union document for code built (as opposed to listed) masonry heater clearances. I am attaching the prevailing Austrian standard TRVB 105:1986, *Technical Regulations for Preventive Fire Protection: Fireplaces for Solid Fuels* as a more conservative European example. I propose these clearances, which are more restrictive than ASTM E1602, be adopted for masonry heaters not covered by the existing IBC language under an expanded Exception 1. Please note that in this Austrian standard "fireplaces" refers collectively to iron stoves, open fireplaces, and masonry heaters.

Note also that the ASTM C27 and C1261 firebrick citation is borrowed from existing IBC/IRC fireplace provisions. C1261 is no longer listed in the ASTM standards volume and may not have been renewed.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

2112.5 #1-S-SEATON.doc

<u>Public Hearing Results</u>

Note: For staff analysis of the content of EN 15250 relative to CP#28, Section 3.6, please visit:
http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Disapproved**

Committee Reason: Disapproval is at the proponent's request in order work on technical issues and needed improvements in a public comment.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Rod Zander, representing New England Hearth & Soapstone LLC, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2112.5 Masonry heater clearance. Combustible materials shall not be placed within 36 inches (765 mm) of the outside surface of a masonry heater in accordance with NFPA 211, Section 8-7 (clearances for solid fuel-burning appliances), and the required space between the heater and combustible material shall be fully vented to permit the free flow of air around all heater surfaces.

Exceptions:

1. Where the masonry heater wall firebox thickness is at least 8 inches (203 mm) thick of solid masonry and the wall thickness of the heat exchange channels is at least 5 inches (127 mm) thick of solid masonry, or when the wall thicknesses are similarly 4 inches (102 mm) at the firebox and 2 ½ inches (64 mm) at the heat exchange channel but are lined with at least the inner 2 inches (51 mm) and 1 inch (25 mm) respectively of firebrick complying with ~~(~~ASTM C27 or ASTM C1261~~)~~ or refractory equivalent, clearances shall be ~~according to~~ in accordance with Table 2112.5.
2. Where masonry heaters are *listed* and labeled in accordance with UL 1482 and installed in accordance with the manufacturer's instructions clearances will be as listed.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: As an experienced masonry heater builder and chair of the ASTM task group on masonry heaters I deal with building codes and officials all of the time.
The code as written is very confusing and difficult to interpret both for the building official and the masonry heater builder trying to work with the code and build a safe appliance. The code as written will not necessarily assure a safe installation. (See below*)
I have worked in Europe under the Austrian fire safety standard TRVB 105. (Adopted in 1986 see attached) this regulation was created in an open, consensus process directly analogous to NFPA 211 and their process.
I do recommend that ICC reference TRVB 105 as it is more stringent, comprehensive and would be easily interpreted in the field by the code officials. This proposal incorporates information from TRVB 105 but should explicitly reference it.
There is urgency regarding this matter as homes are getting tighter and smaller with the new energy codes. The results are that masonry heaters are getting smaller and more responsive. Smaller heaters with thinner wall thicknesses are no more or less safe than those with thick walls.
*There is a definite safety issue with the current code language. The current code only requires solid masonry construction of the walls. It does not require a refractory lining of any sort or any specification of what a masonry material is. This could lead to a failure of the firebox and heat exchange system, possibly causing a fire in the building. Masonry heater fire box and heat exchange channels are similar to a fireplace and chimney construction but will see higher service conditions. The ICC codes for fireplaces and chimneys would not allow this construction.
There is no data to backup the current code requirements of the stipulated 8"-5"wall thicknesses and the 4" clearance to combustibles. I am aware of no instances of unsafe installations when the clearances as outlined in ASTM 1602 are followed regardless of wall thicknesses.
Prior to 2006, ICC referenced ASTM E1602 for masonry heater safety clearances. In 2006, ICC effectively mandated, without supporting research or safety data, that masonry heaters with massive walls were safe at 4" clearance while other heater constructions could only be considered safe at 36" clearance. This is entirely contrary to European experience and practice in both regards, and unfairly discriminates between masonry heater manufacturers. ICC should revisit this matter.

S235-12
Final Action: AS AM AMPC____ D

S240-12

1604.3.3, 2203.2, 2207.1, 2207.1.1 (New), 2207.2, 2207.3, 2207.4, 2207.5,

Proposed Change as Submitted

Proponent: Bonnie Manley, P.E., American Iron and Steel Institute, representing Steel Joist Institute (bmanley@steel.org)

Revise as follows:

1604.3.3 Steel. The deflection of steel structural members shall not exceed that permitted by AISC 360, AISI S100, ASCE 8, SJI CJ~~-1.0~~, SJI JG~~-1.1~~, SJI K~~-1.1~~ or SJI LH/ DLH~~-1.1~~, as applicable.

2203.2 Protection. Painting of structural steel members shall comply with the requirements contained in AISC 360. Painting of open-web steel joists and joist girders shall comply with the requirements of SJI CJ~~-1.0~~, SJI JG~~-1.1~~, SJI K~~-1.1~~ and SJI LH/DLH~~-1.1~~. Individual structural members and assembled panels of cold-formed steel construction shall be protected against corrosion in accordance with the requirements contained in AISI S100. Protection of cold-formed steel light-frame construction shall also comply with the requirements contained in AISI S200.

2207.1 General. The design, manufacture and use of open web steel joists and joist girders shall be in accordance with one of the following Steel Joist Institute (SJI) specifications:

1. SJI-CJ~~-1.0~~
2. SJI-K~~-1.1~~
3. SJI-LH/DLH~~-1.1~~
4. SJI-JG~~-1.1~~

<u>**2207.1.1 Seismic design.**</u> Where required, the seismic design of buildings shall be in accordance with the additional provisions of Section 2205.2 or 2211.6.

2207.2 Design. The *registered design professional* shall indicate on the *construction documents* the steel joist and/or steel joist girder designations from the specifications listed in Section 2207.1 and shall indicate the requirements for joist and joist girder design, layout, end supports, anchorage~~, non-SJI standard~~ bridging, bridging termination connections and bearing connection design to resist uplift and lateral loads. These documents shall indicate special requirements as follows:

1. Special loads including:
   - 1.1. Concentrated loads;
   - 1.2. Nonuniform loads;
   - 1.3. Net uplift loads;
   - 1.4. Axial loads;
   - 1.5. End moments; and
   - 1.6. Connection forces.
2. Special considerations including:
   - 2.1. Profiles for ~~nonstandard~~ joist and joist girder configurations ~~(standard joist and joist girder are as indicated in the SJI catalog)~~ <u>that differ from those defined by the SJI specifications listed in Section 2207.1</u>;
   - 2.2. Oversized or other nonstandard web openings; and
   - 2.3. Extended ends.
3. <u>Live and total load</u> deflection criteria ~~for live and total loads~~ for ~~non-SJI standard~~ joists <u>and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1</u>.

2207.3 Calculations. The steel joist and joist girder manufacturer shall design the steel joists and/or steel joist girders in accordance with the ~~current~~ SJI specifications ~~and load tables~~ listed in Section 2207.1 to support the load requirements of Section 2207.2. The *registered design professional* ~~may~~ shall be permitted to require submission of the steel joist and joist girder calculations as prepared by a *registered design professional* responsible for the product design. If requested by the *registered design professional*, the steel joist manufacturer shall submit design calculations with a cover letter bearing the seal and signature of the joist manufacturer's *registered design professional*. In addition to ~~standard~~ the design calculations submitted under ~~this~~ seal and signature, ~~submittal~~ of the following shall be included:

1. ~~Non-SJI standard~~ Bridging ~~details~~ design that differs from the SJI specifications listed in Section 2207.1 (e.g.for cantilevered conditions, net uplift, etc.).
2. Connection ~~details~~ design for:
   - 2.1. ~~Non-SJI standard~~ Connections that differ from the SJI specifications listed in Section 2207.1 (e.g.flushframed or framed connections);
   - 2.2. Field splices; and
   - 2.3. Joist headers.

2207.4 Steel joist drawings. Steel joist placement plans shall be provided to show the steel joist products as specified on the *construction documents* and are to be utilized for field installation in accordance with specific project requirements as stated in Section 2207.2. Steel joist placement plans shall include, at a minimum, the following:

1. Listing of all applicable loads as stated in Section 2207.2 and used in the design of the steel joists and joist girders as specified in the *construction documents*.
2. Profiles for ~~nonstandard~~ joist and joist girder configurations ~~(standard joist and joist girder configurations are as indicated in the SJI catalog)~~ that differ from those defined by the SJI specifications listed in Section 2207.1.
3. Connection requirements for:
   - 3.1. Joist supports;
   - 3.2. Joist girder supports;
   - 3.3. Field splices; and
   - 3.4. Bridging attachments.
4. Live and total load deflection criteria ~~for live and total loads~~ for ~~non-SJI standard~~ joists and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.
5. Size, location and connections for all bridging.
6. Joist headers.

Steel joist placement plans do not require the seal and signature of the joist manufacturer's *registered design professional*.

2207.5 Certification. At completion of manufacture, the steel joist manufacturer shall submit a *certificate of compliance* in accordance with Section 1704.2.5.2 stating that work was performed in accordance with *approved construction documents* and with SJI ~~standard~~ specifications listed in Section 2207.1.

Reason: This code change is primarily editorial in nature with the intent to clarify and streamline the requirements for steel joists. Major changes include the following:

- Correction of short titles in Section 2207.1, 1604.3.3 and 2203.2 to reflect the appropriate short title listing in Chapter 35 and correction of SJI address in Chapter 35.
- Deletion of reference to the SJI catalog – it is not an adopted reference.
- Deletion of reference to the load tables; they are now incorporated into the relevant SJI specifications.
- Elimination of the vague terms "nonstandard", "non SJI standard", and "standard" used throughout the section. These terms are not defined. To clarify what is intended, a reference to the requirements found in the SJI specifications listed in Section 2207.1 is substituted.

Addition of "joist girders" to Section 2207.2, Item 3 and Section 2207.4, Item 4 for consistency.

Cost Impact: The code change proposal will not increase the cost of construction.

2207.1-S-MANLEY.doc

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

2207.2 Design. The *registered design professional* shall indicate on the *construction documents* the steel joist and/or steel joist girder designations from the specifications listed in Section 2207.1 and shall indicate the requirements for joist and joist girder design, layout, end supports, anchorage, non-SJI standard bridging, bridging termination connections and bearing connection design to resist uplift and lateral loads. These documents shall indicate special requirements as follows:

1. Special loads including:
   1.1. Concentrated loads;
   1.2. Nonuniform loads;
   1.3. Net uplift loads;
   1.4. Axial loads;
   1.5. End moments; and
   1.6. Connection forces.
2. Special considerations including:
   2.1. Profiles for joist and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1;
   2.2. Oversized or other nonstandard web openings; and
   2.3. Extended ends.
3. Live and total load deflection criteria for joists and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.

(Portions of proposal not shown are unchanged)

Committee Reason: This proposal clarifies the intent of steel joist requirements in Section 2207 by making series of editorial improvements.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Bonnie E. Manley, American Iron and Steel Institute, representing Steel Joist Institute requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 2207
STEEL JOISTS

2207.1 General. The design, manufacture and use of open web steel joists and joist girders shall be in accordance with one of the following Steel Joist Institute (SJI) specifications:

1. SJI-CJ
2. SJI-K
3. SJI-LH/DLH
4. SJI-JG

2207.1.1 Seismic design. Where required, the seismic design of buildings shall be in accordance with the additional provisions of Section 2205.2 or 2211.6.

2207.2 Design. The *registered design professional* shall indicate on the *construction documents* the steel joist and/or steel joist girder designations from the specifications listed in Section 2207.1 and shall indicate the requirements for joist and joist girder design, layout, end supports, anchorage, ~~non-SJI standard~~ bridging design that differs from the SJI specifications listed in Section 2207.1, bridging termination connections and bearing connection design to resist uplift and lateral loads. These documents shall indicate special requirements as follows:

1. Special loads including:

1.1. Concentrated loads;
1.2. Nonuniform loads;
1.3. Net uplift loads;
1.4. Axial loads;
1.5. End moments; and
1.6. Connection forces.

2. Special considerations including:
   2.1. Profiles for joist and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1;
   2.2. Oversized or other nonstandard web openings; and
   2.3. Extended ends.
3. Live and total load deflection criteria for joist~~s~~ and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.

2207.3 Calculations. The steel joist and joist girder manufacturer shall design the steel joists and/or steel joist girders in accordance with the SJI specifications listed in Section 2207.1 to support the load requirements of Section 2207.2. The *registered design professional* shall be permitted to require submission of the steel joist and joist girder calculations as prepared by a *registered design professional* responsible for the product design. If requested by the *registered design professional*, the steel joist manufacturer shall submit design calculations with a cover letter bearing the seal and signature of the joist manufacturer's *registered design professional*. In addition to the design calculations submitted under seal and signature, the following shall be included:

1. Bridging design that differs from the SJI specifications listed in Section 2207.1 (e.g. for cantilevered conditions, net uplift, etc.).
2. Connection design for:
   2.1. Connections that differ from the SJI specifications listed in Section 2207.1 (e.g.flushframed or framed connections);
   2.2. Field splices; and
   2.3. Joist headers.

2207.4 Steel joist drawings. Steel joist placement plans shall be provided to show the steel joist products as specified on the *construction documents* and are to be utilized for field installation in accordance with specific project requirements as stated in Section 2207.2. Steel joist placement plans shall include, at a minimum, the following:

1. Listing of all applicable loads as stated in Section 2207.2 and used in the design of the steel joists and joist girders as specified in the *construction documents*.
2. Profiles for joist and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.
3. Connection requirements for:
   3.1. Joist supports;
   3.2. Joist girder supports;
   3.3. Field splices; and
   3.4. Bridging attachments.
4. Live and total load deflection criteria joist~~s~~ and joist girder configurations that differ from those defined by the SJI specifications listed in Section 2207.1.
5. Size, location and connections for all bridging.
6. Joist headers.

Steel joist placement plans do not require the seal and signature of the joist manufacturer's *registered design professional*.

2207.5 Certification. At completion of manufacture, the steel joist manufacturer shall submit a *certificate of compliance* in accordance with Section 1704.2.5.2 stating that work was performed in accordance with *approved construction documents* and with SJI specifications listed in Section 2207.1.

Commenter's Reason: The purpose of this public comment is to ensure that consistent language is used throughout Section 2207. The proposal was approved as modified, with the return of the language "non SJI standard" in Section 2207.2. While it is recognized that the deletion of this phrase in the original proposal expanded the applicability of the section beyond what was preferred, the language "non SJI standard" is awkward and unclear. Rather, we would like to see the section include the same exact phrasing that is used and was approved in Section 2207.3 Item 1 – "bridging design that differs from the SJI specifications listed in Section 2207.1."

S240-12
Final Action: AS AM AMPC____

S244-12

2210.1.1.3 (New), Chapter 35 (New)

<u>Proposed Change as Submitted</u>

Proponent: Thomas Sputo, Ph.D., P.E., S.E., Steel Deck Institute

Add new text as follows:

<u>**2210.1.1.3 Composite slabs on steel decks.** Composite slabs of concrete and steel deck shall be permitted to be designed and constructed in accordance with SDI-C.</u>

Add new standard to Chapter 35 as follows:

SDI

<u>SDI-C-2011 Standard for Composite Steel Floor Deck Slabs</u>

Reason: This Standard contains provisions for the design and construction of composite steel deck-slabs of concrete on composite steel deck, and reflects current design and construction industry practices.

The 2012 IBC contains no provisions for the design of composite slabs on steel deck. The previous reference standard that was contained in the 2009 IBC was deleted from the 2012 IBC. Designers and code officials currently must rely on Section 104.11 of the IBC to use this very common structural system. Adding this Standard to the 2015 IBC would fill this gap.

This Standard is an update to the previous 2006 version of this Standard, and was developed and approved through a consensus process under ANSI guidelines, and complies with ICC CP 28. This Standard, along with all other Steel Deck Institute (SDI) Standards, will be available for free download from the SDI website for all parties.

For review purposes, the SDI C-2011 Standard that is being proposed is available for download and review from this website: http://www.sputoandlammert.com/standard.html

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

2210.1.1.3 (NEW)-S-SPUTO

<u>Public Hearing Results</u>

Note: For staff analysis of the content of SDI C relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: The committee feels it is good to include the proposed reference standard for composite slab construction now that it has completed the ANSI standard process.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Todd Hawkinson, Hawkinson Associates, LLC, representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2210.1.1.3.1 Sampling and inspection of mix proportions containing steel fiber added to concrete for uniform distribution: Sampling of steel fiber added to concrete shall be in accordance with ASTM C172/C172M except as modified and required below:

1. Separate samples of 1 ft^3 shall be taken after discharge of approximately 25 percent and 75 percent of 4 cubic yards of concrete. A minimum of two samples shall be taken every 4 cubic yards depending on placement method. For fibers added at the plant, every other truck shall be sampled. For fibers added at the project site, every truck shall be sampled as outlined here.
2. The samples shall remain separate to determine fiber quantity. Immediately rinse all concrete and remove aggregates and all noticeable water from the samples prior to weighing. The steel fibers shall be patted dry. Steel fibers shall be weighed.
3. Visually inspect the fibers for damage from mixing.
4. Weigh the fibers and compute the ratio of the fiber quantity by weight to volume of concrete sampled. The ratio of fiber to cubic yard of concrete shall be reported and this ratio shall be within 5 percent of the amount of added fiber specified in the design or mix requirements.

2210.1.1.3.2 Sampling and inspection of mix proportions containing micro fiber added to concrete for uniform distribution. Sampling of macro fiber added to concrete shall be in accordance with ASTM C172/C172M except as modified and required below:

1. Separate samples of 1 ft^3 shall be taken after discharge of approximately 25 percent and 75 percent of 4 cubic yards of concrete. A minimum of two samples shall be taken every 4 cubic yards depending on placement method. For fibers added at the plant, every other truck shall be sampled. For fibers added at the project site, every truck shall be sampled as outlined here.
2. The samples shall remain separate to determine fiber quantity. Immediately rinse all concrete and remove aggregates and all noticeable water from the samples prior to weighing. The macro fibers shall be patted dry. Macro fibers shall be weighed.
3. Visually inspect the fibers for damage from mixing.
4. Weigh the fibers and compute the ratio of the fiber quantity by weight to volume of concrete sampled. The ratio of fiber to cubic yard of concrete shall be reported and this ratio shall be within 5 percent of the amount of added fiber specified in the design or mix requirements.

2210.1.1.3.3 Inspection of the Vertical Distribution of Fibers Added to Concrete. Sampling of field placed concrete for verification of the vertical distribution of steel and macro fibers in concrete shall be as follows:

1. Separate samples of 0.5 ft^3 of the field placed concrete shall be taken randomly immediately after placing into forms and prior to finishing. The use of a plastic or metal container placed on the forms/metal deck shall be utilized to collect the sample.
2. One sample per 5 cubic yards of pour shall be taken and shall follow the same procedures as noted in Sections 2210.1.1.3.1 and 2210.1.1.3.2and modified as follows:
3. The sample shall be laid horizontal, poured on to a horizontal surface for visual inspection.
4. The sample then shall follow the procedures as listed in Section 2210.1.1.3.1, items 1 and 2.
5. Weigh the fibers and compute the ratio of the fiber quantity by weight to volume of concrete sampled. The ratio of fiber to cubic yard of concrete shall be reported and this ratio shall be within 5 percent of the amount of added fiber specified in the design or mix requirements.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: It is imperative that the fiber distribution in the concrete be verified during and after placement. The distribution, both uniformly and vertically needs to be inspected.

Given that there is no standard in the United States that inspects or tests for the distribution of fibers in the mix, none that I have been able to find and in the absence of available standards that would require the user, engineer/designer, or owner to meet certain minimum performance requirements or quality control measures, this building code then must provide for those requirements.

S244-12

Final Action: AS AM AMPC____ D

S253-12
2303.2, Chapter 35 (New)

Proposed Change as Submitted

Proponent: Marcelo M. Hirschler, GBH International (gbhint@aol.com)

Revise as follows:

2303.2 Fire-retardant-treated wood. *Fire-retardant-treated wood* is any homogeneous wood product which, when impregnated with chemicals by a pressure process or other means during manufacture, ~~shall have, when tested in accordance with ASTM E 84 or UL 723, a *listed* flame spread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 101/2 feet (3200 mm) beyond the centerline of the burners at any time during the test~~ complies with the requirements of ASTM E 2768 and is listed.

Add new standard to Chapter 35 as follows:

ASTM

E2768-2011 Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)

Reason: ASTM has now issued a test method, ASTM E2768, which contains the three requirements discussed in section 2303.2, namely that a product be tested in accordance with ASTM E84 or UL 723, and exhibit a flame spread index of 25 or less, show no evidence of significant progressive combustion when the test is continued for 30 minutes (i.e. an additional 20-minute period over the standard ASTM E84 duration of 10 minutes) and that the flame front not progress more than 101/2 feet (3200 mm) beyond the centerline of the burners at any time during the test.

Note that products listed as fire-retardant treated wood to UL 723 or to ASTM E84 (with the additional requirements shown above) will be able to continue to be listed to ASTM E2768 without having to be retested as the ASTM E2768 test method contains all of those requirements. Therefore, this code proposal is basically simple clarification.

The addition of the requirement that fire-retardant treated wood must be a "homogeneous" product is necessary to ensure that products that are coated or only partially impregnated with chemicals are not considered "fire-retardant treated wood" as they are not.

Note that there also needs to be consistency between the definition of fire-retardant treated wood and the requirements in this Chapter 23. At the last cycle it was established that it is important that the code not place a requirement regarding the means of manufacture and the definition at present in Chapter 2 discusses purely "pressure treated wood". A separate proposal has been made to change the definition. The two changes can be made independently.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

2303.2-S-HIRSCHLER.doc

Public Hearing Results

Note: For staff analysis of the content of ASTM E 2768 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Disapproved**

Committee Reason: Disapproval is consistent with action taken on G25-12 and G26-12. Adding the proposed standard to the section on fire-retardant-treated wood is a little premature. The current language seems clear, but the proposed wording is not. Questions that were raised about the standard, like testing required on one or more surfaces, were not clarified.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Marcelo M. Hirschler, GBH International, Craig McIntyre, McIntyre Associates and Kris Owen, Lonza Wood Protection, request Approval as Modified by this Public Comment.

Replace the proposal as follows:

2303.2 Fire-retardant-treated wood. *Fire-retardant-treated wood* is any wood product which, when impregnated with chemicals by a pressure process or other means during manufacture shall have, when tested in accordance with ASTM E84 or UL 723, a *listed* flame spread index of 25 or less and show no evidence of progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 101/2 feet (3200 mm) beyond the centerline of the burners at any time during the test. Alternately, *fire-retardant treated wood* is any wood product which, when impregnated with chemicals by a pressure process or other means during manufacture, is listed and complies with the requirements of ASTM E2768 on both the top and bottom surfaces.

Add new standard to Chapter 35 as follows:

ASTM

E2768-2011 Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)

Commenter's Reason: ASTM E2768 was developed by the ASTM committee on fire standards and the code change provides the following:

1. A modification of ASTM E84 that is identical to what has been used and referenced in the IBC and IRC for many years.
2. Passing ASTM E2768 requires that the test specimen be tested to ASTM E84 for an extended period (30 minutes instead of 10 minutes) and that the test specimen comply with: a flame spread index not exceeding 25, a flame front that does not progress more than 101/2 feet (3200 mm) beyond the centerline of the burners at any time during the test and shows no evidence of significant progressive combustion on any surface tested.
3. ASTM E2768 states that, when the flame front does not progress more than 10 ½ feet beyond the centerline of the burners that is evidence of no significant progressive combustion. That is the way each fire test lab who has conducted the test for the last many years has produced the report.
4. The test now known as ASTM E2768 was commonly referred to as the "30-minute E84 tunnel test". However, ASTM E84 has no provisions for extending the test to a 30 minute duration.
5. The "Extended Test Method E84 test" is increasingly being used in requirements that are not limited to fire-retardant-treated wood products, such as ignition-resistant materials in the IWUIC and the California Building codes.
6. Beyond what is stated in ASTM E2768 (section 13.1.2) there has been no definition or clarification or interpretation of what constitutes "significant progressive combustion" anywhere, including in the codes or in any other known document.
7. There has never been a requirement for a material or product to meet either the fire tube test (ASTM E69, Standard Test Method for Combustible Properties of Treated Wood by the Fire-Tube Apparatus) or the "White House" test (NFPA 276, Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-Deck Roofing Components).
8. In order for a product to be able to be listed as fire-retardant treated wood (FRTW) it needs to meet the requirements of this section (and always has).
9. The public comment does not delete the existing requirements for FRTW nor does it require a product to be listed anew to ASTM E2768: it is simply an equivalent alternative.
10. The public comment will require a product to comply with the requirements on both the top and the bottom surfaces and for it to be impregnated with chemicals and, therefore, it will not be able to be complied with by coated products.

Public Comment 2:

Timothy T. Earl, GBH International, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

2303.2 Fire-retardant-treated wood. *Fire-retardant-treated wood* is any wood product which, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a *listed* flame spread index of 25 or less ~~and show no evidence of significant progressive combustion~~ when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 101/2 feet (3200 mm) beyond the centerline of the burners at any time during the test..

Commenter's Reason: All the testing labs that conduct the "extended ASTM E84 test" use the concept that, when the flame front does not progress more than 10 ½ feet beyond the centerline of the burners that is evidence of no significant progressive combustion. They have used that concept for many years. Therefore the additional requirement is redundant and causes confusion. This public comment does nothing more than eliminate the redundant requirement stating "and show no evidence of significant progressive combustion", and retains the remainder of the section exactly as it is in the 2012 code.

S253-12

Final Action: AS AM AMPC____ D

S254-12
2303.4.3

Proposed Change as Submitted

Proponent: Larry Wainright, Qaltim, representing Structural Building Components Association (lwainright@qualtim.com)

Revise as follows:

2303.4.3 Truss submittal package. The truss submittal package provided by the truss manufacturer shall consist of each individual truss design drawing, the truss placement diagram, the permanent individual truss member restraint/bracing method and details and any other structural details germane to the trusses; and, as applicable, the cover/truss index sheet. The submittal package shall be submitted to the *registered design professional in responsible charge* for final approval prior to fabrication of trusses.

Reason: The purpose of this proposal is to help close the gap in communication that many times exists whereby the RDP does not get the truss submittal package for review to ensure the truss package meets the intent of the building design. The RDP should always have the opportunity to review these prior to fabrication. The language in this proposal is taken from the North Carolina Building Code where the issue of RDP approval has been thoroughly vetted.

Cost Impact: The code change proposal will not increase the cost of construction.

2303.4.3-S-WAINRIGHT.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal creates conflicts and the building official can't regulate what happens with outside parties.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Larry Wainright, Qualtim, representing Structural Building Components Association (SBCA), requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

2303.4.3 Truss submittal package. The truss submittal package provided by the truss manufacturer shall consist of each individual truss design drawing, the truss placement diagram, the permanent individual truss member restraint/bracing method and details and any other structural details germane to the trusses; and, as applicable, the cover/truss index sheet. Where required by the owner, building design professional or building official, a designation shall be provided to show that the submittal package has been reviewed by the registered design professional in responsible charge for general conformance to the construction documents.

Commenter's Reason: The proponent asked for disapproval of this code change at the Code development hearings in order to work out problems with the originally proposed language. The purpose of this proposal is to help close the gap in communication that many times exists whereby the RDP does not get the truss submittal package for review to ensure the truss package meets the intent of the building design. The RDP should always have the opportunity to review these prior to fabrication. The language has been modified to address the concerns expressed by the committee and other stakeholders.

S254-12
Final Action: AS AM AMPC____ D

S256-12
Table 2304.6.1

Proposed Change as Submitted

Proponent: Edward L. Keith, P.E., APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

TABLE 2304.6.1
MAXIMUM NOMINAL DESIGN WIND SPEED, V_{asd} PERMITTED FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES [a,b,c]

b. The table is based on wind pressures acting toward and away from building surfaces in accordance with Section 30.7 of ASCE 7. Lateral requirements shall be in accordance with Section 2305 or Section 2308. The table was developed based on the requirement that the specified wood structural panels would alone resist 100% of the applied wind load. Evaluation includes stud strength, nail withdrawal, nail head pull-through, and the sheathing deflection criteria of *l*/120 in accordance with Table 1604.3, where *l* = distance between studs.

(Portions of table and footnotes not shown remain unchanged)

Reason: This code change is proposed to clarify the basis on which Table 2304.6.1 was developed and approved so as to provide guidance for any materials that are intended to establish equivalency to this table in accordance with Section 104.11 of the IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

T2304.6.1-S-KEITH.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Providing guidance for determining equivalency is generally not bad, but the proposed wording is mainly commentary.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edward L. Keith, APA The Engineered Wood Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 2304.6.1
MAXIMUM NOMINAL DESIGN WIND SPEED, V_{asd} PERMITTED FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES [a,b,c]

b. The table is based on wind pressures acting toward and away from building surfaces in accordance with Section 30.7 of ASCE 7. Lateral requirements shall be in accordance with Section 2305 or Section 2308. ~~The table was developed based on the requirement that the specified~~ Specified wood structural panels and fastening to framing are sized to ~~would alone~~ resist 100% of the applied wind load, ~~. Evaluation includes~~ including stud strength, nail withdrawal, nail head pull-through, and the sheathing deflection limit between studs of ~~criteria of~~ *l*/120 ~~in accordance with Table 1604.3,~~ where *l* = distance between studs.

(Portions of table and footnotes not shown remain unchanged)

Commenter's Reason: Table 2304.6.1 is somewhat unique in the conventional construction provisions of the IBC, in that it provides a prescriptive structural solution for wood structural panel wall sheathing. Panels selected and based on this table will provide the structural capacity necessary to resist 100% of the wind load acting normal to the wall. The proposed changes do not change the table that was previously reviewed, approved, and published by ICC. Therefore, the justification of the table, which is not the subject of this public comment, is not repeated here.

With the advent and acceptance in the code of the concept of a structural "system approach" to wind resistance, a large number of engineers, designers and building officials are looking to the prescriptive provisions of the building code to provide them with solutions for traditional single element solutions and multi-part assembly solutions to meet the Section 1609.1 provisions of the building code. This is the provision that requires buildings to be designed to withstand the minimum wind loads.

Because of the relatively new "system approach" concept, confusion has arisen over the applicability of Table 2304.6.1. Is gypsum board required behind the sheathing? Is the use of this table applicable over all siding products or only those with specific wind ratings? Table 1604.3 provides 3 different deflection requirements for wind load, what is the basis of this table? Can stucco be applied over the sheathing thicknesses permitted by this table? These are a few of the questions that we have been asked by building officials and designers over the last two code cycles. While it is not possible to write code to answer all the questions, we have attempted to make the basis of this table clear with our code change proposal. This should, at least, resolve many of the questions relating to this table by making it more clear and transparent.

We were opposed by two camps at the Code Development Hearings:

1. The first camp was adamant that making the basis of the table was not appropriate through the use of the proposed footnote. We challenge this argument by asking to claimant to find a single table in the IBC that has footnotes (most of them) where the footnotes are NOT used to provide the basis for the table and make it more useable. Need examples? I opened the code randomly and the first three tables I found were the below:

Footnote a to Table 1610.1 tells the user that the lateral soil loads given in the table are based on moist conditions.

Footnote a to Table 1609.1.2 tells the user that the table above is based on 140 mph wind speeds and a 45-foot mean roof height. Footnote b tells the user that the table is based on fastener placement 1 inch in from the edge. Footnote c provides the anchor embedment length upon which the table is based.

Footnote a to Table 2306.3(3) tells the user that the values given are based on short-term wind or seismic loading. Footnote c provides the framing spacing basis for the whole table except for those with footnote d. Footnote e tells us that blocked values are based on ALL edges blocked or over framing. Footnotes f and g provide similar guidance about staple geometry that must be met to make that table valid.

All of these footnotes have one thing in common with the footnotes we are proposing – They all provide necessary information for the user of the table to ensure that it is used in a proper and safe manner. All we ask is that we be permitted to do the same for this table.

2. The second camp was those opponents who were concerned that providing the basis for this table would provide a de facto standard for other products that were not able to meet this "standard". This argument is spurious for a couple of different reasons. First off, this table is unique. There are no other single-product tables of this kind in the IBC and any other organizations that want to propose similar tables may do so and should clearly establish the basis for this table as they see fit. The argument to keep this table purposely vague in order to permit some future table to be equally vague for purposes of gaining a market advantage should not be a precedent that this code body should endorse. Secondly, it is the code process and ultimately the building officials who will decide whether this future proposed table is appropriate based on its own merit, not the basis for a pre-existing table that has been in the code for 3 code cycles.

You will also note that an attempt was made to clean up the language in the footnote, hoping to placate at least some of the opponents' issues.

We are simply trying to clarify the basis and use of this existing table to ensure its safe and proper use. We are responding to inquiries by building officials, designers and builders. We ask you to overturn the committee's recommendation for disapproval

S256-12

Final Action: AS AM AMPC____ D

S257-12

2301.2, 2308.2.1, Table 2304.9.1, 2304.7.2.1(New), 2304.7.2.1.1 (New), Figure 2304.7.2.1.1 (New)

Proposed Change as Submitted

Proponent: T. Eric Stafford, representing Insurance Institute for Business and Home Safety

Revise as follows:

2301.2 General design requirements. The design of structural elements or systems, constructed partially or wholly of wood or wood-based products, shall be in accordance with one of the following methods:

1. *Allowable stress design* in accordance with Sections 2304, 2305 and 2306.
2. *Load and resistance factor design* in accordance with Sections 2304, 2305 and 2307.
3. *Conventional light-frame construction* in accordance with Sections 2304 and 2308.

   Exception: Buildings designed in accordance with the provisions of the AF&PA WFCM <u>and Section 2304.7.2.1</u> shall be deemed to meet the requirements of the provisions of Section 2308.

4. The design and construction of log structures shall be in accordance with the provisions of ICC 400.

2308.2.1 Nominal design wind speed greater than 100 mph (3-second gust). Where V_{asd} as determined in accordance with Section 1609.3.1 exceeds 100 mph (3-second gust), the provisions of either AF&PA WFCM, or the ICC 600 are permitted to be used. Wind speeds in Figures 1609A, 1609B, and 1609C shall be converted in accordance with Section 1609.3.1 for use with AF&PA WFCM or ICC 600. <u>Section 2304.7.2.1 shall apply to roof sheathing attachment when using the AF&PA WFCM or ICC 600.</u>

TABLE 2304.9.1
FASTENING SCHEDULE

CONNECTION	FASTENING[a,m]	LOCATION
31. Wood structural panels and particleboard[b] Subfloor, roof and wall sheathing (to framing) <u>Where V_{ult} equals or exceeds 130 mph, wood structural panel roof sheathing shall be fastened in accordance with Section 2304.7.2.1</u> Single floor (combination subfloor-underlayment to framing)		

(Portions of Table not shown remain unchanged)

<u>**2304.7.2.1 Wood structural panel roof sheathing attachment.** Where V_{ult} equals or exceeds 130 mph, wood structural panels used as roof sheathing shall be installed with joints staggered and fastened in accordance with Section 2304.7.2.1.1.</u>

<u>**2304.7.2.1.1 Sheathing fastenings.** Wood structural panel sheathing shall be fastened to roof framing with 8d annular ring-shank nails at 6 inches on center at edges and 6 inches on center at intermediate framing. Ring-shank nails shall have the following minimum dimensions:</u>

1. 0.113 inch nominal shank diameter
2. Ring diameter of 0.012 over shank diameter
3. 16 to 20 rings per inch
4. 0.280 inch full round head diameter
5. 2 inch nail length

Where roof framing with a specific gravity, 0.42 ≤ G < 0.49 is used, spacing of ring-shank fasteners shall be 4 inches on center in nailing zone 3 in accordance with Figure 2304.7.2.1.1 where V_{ult} is 130 mph or greater.

Exceptions:

1. Where roof framing with a specific gravity, 0.42 ≤ G < 0.49 is used, spacing of ring-shank fasteners shall be permitted at 12 inches on center at intermediate framing in nailing zone 1 for any V_{ult} and in nailing zone 2 for V_{ult} less than or equal to 140 mph in accordance with Figure 2304.7.2.1.1.
2. Where roof framing with a specific gravity, G ≥ 0.49 is used, spacing of ring-shank fasteners shall be permitted at 12 inches on center at intermediate framing in nailing zone 1 for any V_{ult} and in nailing zone 2 for V_{ult} less than or equal to 150 mph in accordance with Figure 2304.7.2.1.1.
3. Where roof framing with a specific gravity, G ≥ 0.49 is used, 8d common or 8d hot dipped galvanized box nails at 6 inches on center at edges and 6 inches on center at intermediate framing shall be permitted for V_{ult} less than or equal to 120 mph in accordance with Figure 2304.7.2.1.1.
4. Where roof diaphragm requirements necessitate a closer fastener spacing.

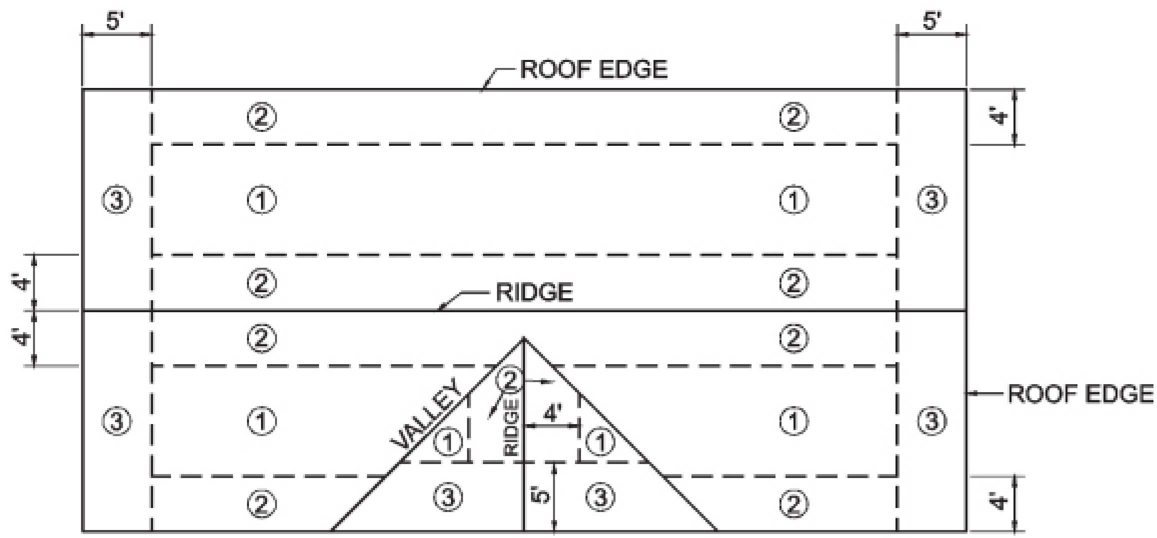


FIGURE 2304.7.2.1.1 ROOF SHEATHING NAILING ZONES

Reason: This proposed modification, if approved, will significantly improve the performance of wood structural panel roofs when subjected to high wind loads. It does so at a minimal to negligible cost which provides an extremely generous benefit/cost ratio. The requirements are based on hundreds of true wood structural panel tests. Extensive roof sheathing fastening tests at Clemson University (Reinhold 2000 – 2002, McKinley 2001) and at the International Hurricane Center – Florida International University (Reinhold, Alvarez 2003) compared the Mean Failure Pressure in psf for roof sheathing panels using both the 8d common and the 8d ring shank nails spaced at 6 inches as prescribed by the code. Sheathing consisted of 5/8 inch thick plywood attached to nominal 2x4 Southern Yellow Pine rafters.

The results of these tests were as follows:

(1) Mean ultimate uplift capacity for panels attached with 8d common nails at 6 inch spacing: 126 pounds per square foot
(2) Mean ultimate uplift capacity for panels attached with 8d ring shank nails at 6 inch spacing: 292 pounds per square foot

This shows a 131% improvement in performance when 8d ring shank nails are used instead of the currently prescribed 8d common nails.

Requiring the use of 8d ring shank nails would result in an almost negligible increase in cost. While variations will occur regionally, it's estimated that the cost increase will be less than $10 for 2000 square foot roof.

Cost Impact: The code change proposal will increase the cost of construction.

2301.2-S-STAFFORD.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This code change would require the use of specialty nails where other fasteners could be used.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

T. Eric Stafford, T. Eric Stafford & Associates, LLC, representing Insurance Institute for Business and Home Safety (IBHS), requests Approval as Submitted.

Commenter's Reason: We are seeking Approval as Submitted for S257-12. The primary purpose of this proposed code change was to significantly improve the performance of wood structural panel roofs when subjected to high wind loads at a minimal to negligible cost increase. Extensive roof sheathing tests at Clemson University (Reinhold 2000 – 2002, McKinley 2001) and at the International Hurricane Center – Florida International University (Reinhold, Alvarez 2003) showed a 131% improvement in panel uplift capacity when ring shank nails are used to fasten the roof deck instead of comparable smooth shank nails. This 131% improvement results in a cost increase of about $10 for a 2000 square foot roof, which provides an extremely generous benefit/cost ratio.

Much of the argument in opposition claimed that the nail was not covered by ASTM F 1667 and would require a specialty nail, both of which are not correct. Deformed shank nails are specifically covered by ASTM F 1667. Section 10.3 in ASTM F 1667, *Altered Shapes and Dimensions*, specifically addresses mechanically formed or deformed nail shanks. It is also worth noting that Note c to Table 2304.9.1 calls for common <u>or</u> deformed shank nails for wood structural panel roof sheathing. Proposed Section 2304.7.2.1.1 specifies the dimensional properties of the nail (shank diameter, ring diameter, etc.), which essentially standardizes this particular nail to be consistent with nails used for the panel tests. During the panel tests, these nails were readily available at local home improvement centers.

S257-12
Final Action: AS AM AMPC____ D

S258-12
2302.1, Table 2304.7(4)

Proposed Change as Submitted

Proponent: John Mulder, Intertek Testing Services, NA, Inc., representing International Standards Organization Technical Committee 77, *Products in Fibre-reinforced Cement,* and self

Revise as follows:

2302.1 Definitions. For the purposes of this chapter, and as used elsewhere in this code the following terms are defined in Chapter 2:

FIBER-CEMENT PRODUCTS

TABLE 2304.7(4)
ALLOWABLE SPAN FOR WOOD STRUCTURAL PANEL COMBINATION SUBFLOOR-UNDERLAYMENT (SINGLE FLOOR)[a, b]
(Panels Continuous Over Two or More Spans and Strength Axis Perpendicular to Supports)

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kN/m2.

a. Spans limited to value shown because of possible effects of concentrated loads. Allowable uniform loads based on deflection of 1/360 of span is 100 pounds per square foot except allowable total uniform load for 11/8-inch wood structural panels over joists spaced 48 inches on center is 65 pounds per square foot. Panel edges shall have approved tongue-and-groove joints or shall be supported with blocking, unless 1/4-inch minimum thickness wood panel-type or fiber-cement underlayment or 11/2 inches of approved cellular or lightweight concrete is placed over the subfloor, or finish floor is 3/4-inch wood strip.

(Portions of table not shown remain unchanged)

Reason: A revision to Table 2304.7(4) is proposed to include “fiber-cement underlayment”. The term “fiber-cement products” is proposed to be included in the definitions here consistent with the definition published in the Terminology Standard ASTM C1154-06, *Standard Terminology for Non-Asbestos Fiber-Reinforced Cement Products* (see attached Standard) and also proposed for revision in Chapter 2 of the IBC code. The current footnote does not clearly describe the allowable type of permitted underlayment. The inclusion of references to ”wood panel-type” and “fiber-cement” clarifies the types of recognized products permitted in this type of Code-compliant subfloor/underlayment application (see attached ICC-ES ESR-1381[reference Section 4.3], ESR-2280[reference Sections 4.2.2.1 and 4.2.3.1], and ESR-2292[reference Section 4.2]). “See the ICC-ES website (http://www.icc-es.org/) to gain access to the referenced ESR reports. “

Cost Impact: The code change proposal will not increase the cost of construction because the proposed addition of fiber-cement underlayment to the table footnote only provides for the choice and use of a type of underlayment currently used in this type of application and permitted in Evaluation Service Reports.

2302.1-T2304.7(4)-S-MULDER.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The current wording is generic and does not exclude fiber-cement products. The proposed wording may exclude other products.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Mulder representing Intertek Testing Services NA, Inc. and self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 2304.7(4)
ALLOWABLE SPAN FOR WOOD STRUCTURAL PANEL COMBINATION SUBFLOOR-UNDERLAYMENT (SINGLE FLOOR)a, b
(Panels Continuous Over Two or More Spans and Strength Axis Perpendicular to Supports)
(No change to table)

a. Spans limited to value shown because of possible effects of concentrated loads. Allowable uniform loads based on deflection of 1/360 of span is 100 pounds per square foot except allowable total uniform load for $1^1/_8$-inch wood structural panels over joists spaced 48 inches on center is 65 pounds per square foot. Panel edges shall have approved tongue-and-groove joints or shall be supported with blocking, unless ¼-inch minimum thickness wood panel-type ~~or fiber-cement~~ underlayment <u>or fiber-cement underlayment complying with ASTM C1288</u> or 1½ inches of approved cellular or lightweight concrete is placed over the subfloor, or finish floor is ¾-inch wood strip.

(footnotes not shown remain unchanged)

Commenter's Reason: The current footnote does not clearly describe the allowable type of permitted underlayment. The additional inclusion of a reference to "fiber-cement" clarifies the types of recognized products permitted in this type of Code-compliant subfloor/underlayment application (see attached ICC-ES ESR-1381[reference Section 4.3], ESR-2280[reference Sections 4.2.2.1 and 4.2.3.1], and ESR-2292[reference Section 4.2]).

S258-12
Final Action: AS AM AMPC____ D

S260-12
2304.9.6

Proposed Change as Submitted

Proponent: Jay Crandell, ARES Consulting, representing Foam Sheathing Committee (jcrandell@aresconsulting.biz)

Revise as follows:

2304.9.6 Load path. Where wall framing members are not continuous from foundation sill to roof, the members shall be secured to ensure a continuous load path. Where required, sheet metal clamps, ties or clips shall be formed of galvanized steel <u>not less than 0.0179 inch (0.45 mm) minimum thickness</u> or other *approved* corrosion-resistant material ~~not less than 0.040 inch (1.01 mm) nominal thickness~~ <u>capable of resisting the applied loads</u>.

Reason: The code needs to allow thinner steel based on performance to, when possible, avoid interference of uplift straps with fastening/installation of interior and exterior finishes and sheathings. AISI Standard S105 Product Data permits minimum steel thickness of 0.0179 inches thick for structural and non-structural applications. In addition, 24CFR Section 3280.305 also permits uplift straps of minimum 26 gage (0.0179 inch thick) for manufactured homes even in the highest of wind zones. The current minimum 0.040 inch thickness requirement is not consistent with existing industry consensus standards and needs to be changed such that minimum required steel thickness is governed by performance needed for a specific application.

Cost Impact: The code change proposal will not increase the cost of construction.

2304.9.6-S-CRANDELL.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee believes that additional background on the current minimum steel tie thickness could help in evaluating this proposal.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jay H. Crandell, ARES Consulting, American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2304.9.6 Load path. Where wall framing members are not continuous from foundation sill to roof, the members shall be secured to ensure a continuous load path. Where required, sheet metal clamps, ties or clips shall be formed of galvanized steel ~~not less than 0.0179 inch (0.45 mm) minimum thickness~~ or other *approved* corrosion-resistant material ~~capable of resisting the applied loads~~.

Commenter's Reason: This PC focuses the subject sentence on its intended purpose: to simply require corrosion resistant connectors where required. The level of corrosion resistance is currently not specified in the code because the amount of resistance depends on use conditions. Similarly, a minimum steel thickness should not be required because the thickness required depends on the use conditions (i.e., performance required to provide the necessary continuous load path). Some applications may require greater thickness and others thinner than the currently stated 0.040" thickness (see original code text).

This proposal was disapproved at the first hearing with the following reason statement by the structural CDC*: "The committee believes that additional background on the current minimum steel tie thickness could help in evaluating this proposal."* The background on the current code text is unclear. Apparently, this section was added during the drafting of the 2000 IBC and the reason for the current minimum 0.040" thickness was not found. However, the current minimum thickness limit of 0.040" is not consistent with the cold-formed steel industry standard minimum base steel thicknesses or available minimum thicknesses of approved connectors (refer to AISI S201 standard for example). Thus, the current language unnecessarily restricts or conflicts with accepted design practice and existing approved materials. Finally, the proposed language "capable of resisting the applied loads" (not in the current code) is deleted from the original proposal because this requirement is addressed by design requirements found elsewhere in the code and is unnecessary and redundant.

Public Comment 2:

Randall Shackelford, Simpson Strong-Tie Co., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2304.9.6 Load path. Where wall framing members are not continuous from foundation sill to roof, the members shall be secured to ensure a continuous load path. Where required, sheet metal clamps, ties or clips shall be formed of galvanized steel ~~not less than 0.0179 inch (0.45 mm) minimum thickness~~, or other *approved* corrosion-resistant material, not less than 0.0329 inch (0.0836 mm) base metal thickness ~~capable of resisting the applied loads~~.

Commenter's Reason: The intent of this change is to only change the required thickness of steel in this section. The current reference to 0.040" thick steel is not a standard thickness according to the newest AISI Product Data Standard, S201.
The assumption is that the thickness was added to represent galvanized 20 gage steel. The term "gage" is no longer a steel thickness designation. What was traditionally 20 ga is now designated as 33 mils. The base metal thickness for 33 mils according to the newest AISI Product Standard is 0.0329 inches. See table below:

Table B2-1
Standard Thickness

Designation Thickness	Minimum Base Steel Thickness		Design Thickness	
	(inch)	(mm)	(inch)	(mm)
18	0.0179	0.455	0.0188	0.478
27	0.0269	0.683	0.0283	0.719
30	0.0296	0.752	0.0312	0.792
33	0.0329	0.836	0.0346	0.879
43	0.0428	1.087	0.0451	1.146
54	0.0538	1.367	0.0566	1.438
68	0.0677	1.720	0.0713	1.811
97	0.0966	2.454	0.1017	2.583
118	0.1180	2.997	0.1242	3.155

S260-12
Final Action: AS AM AMPC____ D

S265-12
Table 2304.9.1

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee (bajnaic@chesterfield.gov)

Delete and substitute as follows:

~~TABLE 2304.9.1~~
~~FASTENING SCHEDULE~~

Table 2304.9.1
FASTENING SCHEDULE

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION
		ROOF	
1	Blocking between ceiling joists or rafters to top plate	3-8d common (2.5” x 0.131”); or 3-10d box (3” x 0.128”); or 3-3” x 0.131” nails; or 3-3” 14 gage staples, 7/16” crown	at each end, toenail
2	Ceiling joists to top plate	3-8d common (2.5” x 0.131”); or 3-10d box (3” x 0.128”); or 3-3” x 0.131” nails; or 3-3” 14 gage staples, 7/16” crown	per joist, toenail
3	Ceiling joist not attached to parallel rafter, laps over partitions (no thrust) (see Section 2308.10.4.1, Table 2308.10.4.1)	3-16d common (3.5" x 0.162"); or 4-10d box (3" x 0.128"); or 4-3” x 0.131” nails; or 4-3” 14 gage staples, 7/16” crown	Face nail
4	Ceiling joist attached to parallel rafter (heel joint) (see Section 2308.10.4.1, Table 2308.10.4.1)	Per table 2308.10.4.1	Face nail
5	Collar tie to rafter	3-10d common (3" x 0.148"); or 4-10d box (3” x 0.128”); or 4-3” x 0.131” nails; or 4-3” 14 gage staples, 7/16” crown	Face nail
6	Rafter or roof truss to top plate (See Section 2308.10.1, Table 2308.10.1)	3-10 common (3" x 0.148"); or 3-16d box (3.5" x 0.135"); or 4-10d box (3" x 0.128"); or 4-3” x 0.131 nails; or 4-3” 14 gage staples, 7/16” crown	Toenail[c]
7	Roof rafters to ridge valley or hip rafters; or, roof rafter to 2-inch ridge beam	2-16d common (3.5” x 0.162”); or 3-10d box (3" x 0.128"); or 3-3” x 0.131” nails; or 3-3” 14 gage staples, 7/16” crown; or	End nail
		3-10d common (3.5” x 0.148”); or 3-16d box (3.5" x 0.135"); or 4-10d box (3" x 0.128"); or 4-3” x 0.131” nails; or 4-3” 14 gage staples, 7/16” crown	Toenail

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION
	WALL		
8	Stud to stud (not at braced wall panels)	16d common (3.5" x 0.162");	24" o.c. face nail
		10d box (3" x 0.128"); or 3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	16" o.c. face nail
9	Stud to stud and abutting studs at intersecting wall corners (at braced wall panels)	16d common (3.5" x 0.162"); or	16" o.c. face nail
		16d box (3.5" x 0.135"); or	12" o.c. face nail
		3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	12" o.c. face nail
10	Built-up header (2-inch to 2-inch header)	16d common (3.5" x 0.162"); or	16" o.c. each edge, face nail
		16d box (3.5" x 0.135")	12" o.c. each edge, face nail
11	Continuous header to stud	4-8d common (2.5" x 0.131"); or 4-10d box (3" x 0.128")	Toenail
12	Top plate to top plate	16d common (3.5" x 0.162"); or	16" o.c. face nail
		10d box (3" x 0.128"); or 3" x 0.131" nails; or 3" 14 gage staples, 7/16" crown	12" o.c. face nail
13	Top plate to top plate, at end joints	8-16d common (3.5" x 0.162"); or 12-10d box (3" x 0.128"); or 12-3" x 0.131" nails; or 12-3" 14 gage staples, 7/16" crown	Face nail on each side of end joint (minimum 24" lap splice length each side of end joint)
14	Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	16d common (3.5" x 0.162"); or	16" o.c. face nail
		16d box (3.5" x 0.135"); or 3" x 0.131" nails; or 3" 14 gage staples, 7/16" crown	12" o.c. face nail
15	Bottom plate to joist, rim joist, band joist or blocking at braced wall panels	2-16d common (3.5" x 0.162"); or 3-16d box (3.5" x 0.135"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	16" o.c. face nail
16	Stud to bottom plate	4-8d common (2.5" x 0.131"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16" crown; or	Toenail
		2-16d common (3.5" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	End nail
17	Top or bottom plate to stud	2-16d common (3.5" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	End nail
18	Top plates, laps at corners and intersections	2-16d common (3.5" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	Face nail
19	1" brace to each stud and plate	2-8d common (2.5" x 0.131"); or 2-10d box (3" x 0.128"); or 2-3" x 0.131" nails; or	Face nail

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION	
		2-3" 14 gage staples, 7/16” crown		
20	1” x 6” sheathing to each bearing	2-8d common (2.5" x 0.131"); or 2-10d box (3" x 0.128")	Face nail	
21	1” x 8” and wider sheathing to each bearing	3-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128")	Face nail	
	FLOOR			
22	Joist to sill, top plate, or girder	3-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16” crown	Toenail	
23	Rim joist, band joist, or blocking to sill or top plate	8d common (2.5" x 0.131"); or 10d box (3" x 0.128"); or 3" x 0.131" nails; or 3" 14 gage staples, 7/16” crown	6” o.c., toenail	
24	1” x 6” subfloor or less to each joist	2-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128")	Face nail	
25	2” subfloor to joist or girder	2-16d common (3.5" x 0.162")	Face nail	
26	2” planks (plank & beam – floor & roof)	2-16d common (3.5" x 0.162")	At each bearing, face nail	
27	Built-up girders and beams, 2-inch lumber layers	20d common (4” x 0.192”)	32” o.c., face nail at top and bottom staggered on opposite sides	
		10d box (3" x 0.128"); or 3" x 0.131" nails; or 3" 14 gage staples, 7/16” crown	24” o.c. face nail at top and bottom staggered on opposite sides	
		And: 2-20d common (4” x 0.192”); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16” crown	Face nail at ends and at each splice	
28	Ledger strip supporting joists or rafters	3-16d common (3.5" x 0.162"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16” crown	At each joist or rafter, face nail	
29	Joist to band joist or rim joist	3-16d common (3.5" x 0.162"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16” crown	End nail	
30	Bridging to joist	2-8d common (2.5" x 0.131"); or 2-10d box (3" x 0.128"); or 2-3" x 0.131" nails; or 2-3" 14 gage staples, 7/16” crown	Each end, toenail	
	Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
			Edges (inches)	Intermediate supports (inches)
31	3/8” – 1/2"	6d common or deformed (2” x 0.113”) (subfloor and wall)	6	12
		8d box or deformed (2.5" x 0.113") (roof)	6	12

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION	
		2 3/8” x 0.113” nail (subfloor and wall)	6	12
		1 ¾” 16 gage staple, 7/16” crown (subfloor and wall)	4	8
		2 3/8 x 0.113” nail (roof)	4	8
		1 ¾” 16 gage staple, 7/16” crown (roof)	3	6
32	19/32” – 3/4"	8d common (2.5" x 0.131"); or 6d deformed (2” x 0.113)	6	12
		2 3/8” x 0.113” nail; or 2” 16 gage staple, 7/16” crown	4	8
33	7/8” – 1 1/4"	10d common (3" x 0.148"); or 8d deformed (2.5" x 0.131")	6	12
		Other exterior wall sheathing		
34	1/2" fiberboard sheathing[b]	1 ½” galvanized roofing nail (7/16” head diameter; or 6d common (2” x 0.113”); or 1 ¼” 16 gage staple with 7/16” or 1” crown	3	6
35	25/32” fiberboard sheathing[b]	1 ¾” galvanized roofing nail (7/16” diameter head); or 8d common (2.5" x 0.131"); or 1 ½” 16 gage staple with 7/16” or 1” crown	3	6
		Wood structural panels, combination subfloor underlayment to framing		
36	3/4” and less	8d common (2.5" x 0.131"); or6d deformed (2” x 0.113”)	6	12
37	7/8” – 1”	8d common (2.5" x 0.131"); or 8d deformed (2 ½” x 0.131”)	6	12
38	1 1/8” – 1 ¼”	10d common (3" x 0.148"); or 8d deformed (2 ½” x 0.131”)	6	12
		Panel Siding to Framing		
39	½” or less	6d corrosion-resistant siding (1 7/8" × 0.106"); or 6d corrosion-resistant casing (2" × 0.099")	6	12
40	5/8”	8d corrosion-resistant siding (2 3/8" × 0.128"); or 8d corrosion-resistant casing (2 1/2" × 0.113")	6	12
		Interior Paneling		
41	¼”	4d casing (11/2" × 0.080"); or 4d finish (11/2" × 0.072")	6	12
42	3/8”	6d casing (2" × 0.099"); or 6d finish (Panel supports at 24 inches)	6	12

a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box, or casing.
b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).
c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

Reason: The ICC Building Code Action Committee sought to reformat and correlate the current fastening schedule for wood frame construction in Chapter 23 with the current fastening schedule in the IRC. The organization of the IRC table was thought to be easier to use, and it was generally acknowledged that it may help users of both codes if the tables more closely resembled each other in format and content.

Descriptions of specified fastening and their capacities in the IBC and IRC tables were compared. In developing the proposed new table, the committee tried to make as few technical changes as possible while reorganizing and reformatting the IBC table to look more like the IRC table. Care was taken to retain, for the most part, all fastening alternatives currently in the IBC, while at the same time adding appropriate alternatives that appear in the IRC for the same connection, if they were missing.

To attain complete coordination between the two tables was not possible because certain technical changes that would have been required were beyond the chosen scope of the committee's work. However, the proposed table is much closer to the IRC table and the committee will look at the IRC table in the Group B changes to attempt further correlations between the two.

When inconsistencies or apparent anomalies were discovered between tables or within the IBC table itself, in general the following principles were applied:

a. attempt to establish a reference common nail specification for each connection where it appeared to be lacking;
b. provide box nails alternatives, if lacking, where possible
c. retain all current alternatives for power-driven and staple alternatives (though in a few cases the number or size of fastener was adjusted to be consistent with the IRC or to achieve consistency within the IBC table itself based on other entries);
d. in creating box nail alternatives where they currently are missing, for simplicity assume 10d box nails (3" x 0.128") to be equivalent to 3" x 0.131" power-driven fasteners;
e. take into account calculated connection capacities. (These were also compared to the engineered connections specified in the AWC Wood Frame Construction Manual for like connections.)

Finally, this proposed IBC table is much cleaner and more complete than the current table. Besides adding many fastener alternatives, many detailed and difficult-to-use footnotes in the current table were eliminated since their content was incorporated directly into the proposed table.

The following three tables are provided: i) the proposed IBC Table 2304.9.1 with an additional column of notes explaining how it correlates to the existing IBC table, ii) the existing IBC Table 2304.9.1 with an additional column of notes explaining how it correlates to the proposed IBC table, and iii) the existing IRC table, shown for reference.

Proposed Table 2304.9.1 with additional column of explanation:

	DESCRIPTION OF BUILDING ELEMENTS	**NUMBER AND TYPE OF FASTENER**	**SPACING AND LOCATION**	***Notes:***
		ROOF		
1	Blocking between ceiling joists or rafters to top plate	3-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	at each end, toenail	*-Nailing from IBC Row 11.* *-10d box equivalent to 8d common added.*
2	Ceiling joists to top plate	3-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	per joist, toenail	*-Nailing from IBC Row 15.* *-10d box equivalent to 8d common added.* *-Correct power driven number from 5 to 3.*
3	Ceiling joist not attached to parallel rafter, laps over partitions (no thrust) (for parallel rafter case see Section 2308.10.4.1, Table 2308.10.4.1)	3-16d common (3.5" x 0.162"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	Face nail	*-Nailing from IBC Row 17.* *-10d box equivalent to power driven nail size added.*
4	Ceiling joist attached to parallel rafter (heel joint) (see Section 2308.10.4.1, Table 2308.10.4.1)	Per table 2308.10.4.1	Face nail	*-Nailing from IBC Row 18.*
5	Collar tie to rafter	3-10d common (3" x 0.148"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	Face nail	*-Nailing from IBC Row 26.* *-10d box equivalent to power driven nail size added.*

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION	*Notes:*
6	Rafter or roof truss to top plate (See Section 2308.10.1, Table 2308.10.1)	3-10 common (3" x 0.148"); or 3-16d box (3.5" x 0.135"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131 nails; or 4-3" 14 gage staples, 7/16" crown	Toenail[c]	*-Nailing from IRC Row 5.* *-10d box equivalent to power driven nail size added.*
7	Roof rafters to ridge valley or hip rafters; or, roof rafter to 2-inch ridge beam	2-16d common (3.5" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown; or	End nail	*-Nailing from IBC Rows 27 and 28.* *-10d box equivalent to power driven nail size added.*
		3-10d common (3.5" x 0.148"); or 3-16d box (3.5" x 0.135"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	Toenail	*-Nailing from IBC Rows 27 and 28.* *-10d box equivalent to power driven nail size added.* *-16d box per IRC for toenailing of rafter in Row 6 added.*
		WALL		
8	Stud to stud (not at braced wall panels)	16d common (3.5" x 0.162");	24" o.c. face nail	*-Nailing from IBC Row 9.*
		10d box (3" x 0.128"); or 3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	16" o.c. face nail	*-10d box equivalent to power driven nail size added.* *-Corrected spacing for power driven nail to be equivalent to the specified common nail.*
9	Stud to stud and abutting studs at intersecting wall corners (at braced wall panels)	16d common (3.5" x 0.162"); or	16" o.c. face nail	*-Nailing from IBC Row 23.* *-16d box equivalent from IRC Row 8.*
		16d box (3.5" x 0.135"); or 3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	12" o.c. face nail	
10	Built-up header (2-inch to 2-inch header)	16d common (3.5" x 0.162"); or	16" o.c. each edge, face nail	*-Nailing from IBC Row 14.* *-16d box equivalent added but at 12" o.c. spacing.*
		16d box (3.5" x 0.135")	12" o.c. each edge, face nail	
11	Continuous header to stud	4-8d common (2.5" x 0.131"); or 4-10d box (3" x 0.128")	Toenail	*-Nailing from IBC Row 16.* *-10d box equivalent to 8d common added.*
12	Top plate to top plate	16d common (3.5" x 0.162"); or	16" o.c. face nail	*-Nailing from IBC Row 10 except that 16d common specified in lieu of 16d box to align with power driven sizes.* *-10d box equivalent to power driven sizes added.*
		10d box (3" x 0.128"); or 3" x 0.131" nails; or 3" 14 gage staples, 7/16" crown	12" o.c. face nail	
13	Top plate to top plate, at end joints	8-16d common (3.5" x 0.162"); or 12-10d box (3" x 0.128"); or 12-3" x 0.131" nails; or 12-3" 14 gage staples, 7/16" crown	Face nail on each side of end joint (minimum 24" lap splice length each side of end joint)	*-Nailing from IBC Row 10.* *-10d box equivalent to power driven sizes added.*

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION	*Notes:*
14	Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	16d common (3.5" x 0.162"); or	16" o.c. face nail	*-Nailing from IBC Row 6 except that 16d common used in lieu of 16d box. -16d box equivalent added at 12" o.c.*
		16d box (3.5" x 0.135"); or 3" x 0.131" nails; or 3" 14 gage staples, 7/16" crown	12" o.c. face nail	
15	Bottom plate to joist, rim joist, band joist or blocking at braced wall panels	2-16d common (3.5" x 0.162"); or 3-16d box (3.5" x 0.135"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	16" o.c. face nail	*-Nailing from IBC Row 6; 16d common equivalent added*
16	Stud to bottom plate	4-8d common (2.5" x 0.131"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16" crown; or	Toenail	*-Nailing per IBC Row 8. -10d box equivalent to 8d common added.*
		2-16d common (3.5" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	End nail	*-Nailing per IBC Row 8. -10d box equivalent to power driven sizes added.*
17	Top or bottom plate to stud	2-16d common (3.5" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	End nail	*-Nailing per IBC Row 7. -10d box equivalent to power driven sizes added.*
18	Top plates, laps at corners and intersections	2-16d common (3.5" x 0.162"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	Face nail	*-Nailing per IBC Row 13. -10d box equivalent to power driven sizes added.*
19	1" brace to each stud and plate	2-8d common (2.5" x 0.131"); or 2-10d box (3" x 0.128"); or 2-3" x 0.131" nails; or 2-3" 14 gage staples, 7/16" crown	Face nail	*-Nailing per IBC Row 20. -10d box equivalent to 8d common added.*
20	1" x 6" sheathing to each bearing	2-8d common (2.5" x 0.131"); or 2-10d box (3" x 0.128")	Face nail	*-Nailing per IRC Row 21 . -10d box equivalent to 8d common added.*
21	1" x 8" and wider sheathing to each bearing	3-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128")	Face nail	*-Nailing per IRC Rows 22 and 23, and IBC Rows 4, 21 and 22. -10d box equivalent to 8d common added.*
		FLOOR		
22	Joist to sill, top plate, or girder	3-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	Toenail	*-Nailing from IBC Row 1. -10d box equivalent to 8d common added.*
23	Rim joist, band joist, or blocking to sill or top plate	8d common (2.5" x 0.131"); or 10d box (3" x 0.128"); or 3" x 0.131" nails; or 3" 14 gage staples, 7/16" crown	6" o.c., toenail	*-Nailing from IBC Row 12. -10d box equivalent to 8d common added.*

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION		*Notes:*
24	1” x 6” subfloor or less to each joist	2-8d common (2.5" x 0.131"); or 3-10d box (3" x 0.128")	Face nail		*-Nailing from IBC Row 3. -10d box equivalent to 8d common added*
25	2” subfloor to joist or girder	2-16d common (3.5" x 0.162")	Face nail		*-Nailing from IBC Row 5.*
26	2” planks (plank & beam – floor & roof)	2-16d common (3.5" x 0.162")	At each bearing, face nail		*-Nailing from IBC Row 25.*
27	Built-up girders and beams, 2-inch lumber layers	20d common (4” x 0.192”)	32” o.c., face nail at top and bottom staggered on opposite sides		*-Nailing from IBC Row 24. -10d box equivalent to power driven nail size added.*
		10d box (3" x 0.128"); or 3" x 0.131" nails; or 3" 14 gage staples, 7/16” crown	24” o.c. face nail at top and bottom staggered on opposite sides		
		And: 2-20d common (4” x 0.192”); or 3-10d box (3" x 0.128"); or 3-3" x 0.131" nails; or 3-3" 14 gage staples, 7/16” crown	Face nail at ends and at each splice		*-Nailing from IBC Row 24. -10d box equivalent to power driven nail sizes added.*
28	Ledger strip supporting joists or rafters	3-16d common (3.5" x 0.162"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16” crown	At each joist or rafter, face nail		*-Nailing from IBC Row 30. -10d box equivalent to power driven nail size added.*
29	Joist to band joist or rim joist	3-16d common (3.5" x 0.162"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails; or 4-3" 14 gage staples, 7/16” crown	End nail		*-Nailing from IBC Row 29. -10d box equivalent to power driven nail size added.*
30	Bridging to joist	2-8d common (2.5" x 0.131"); or 2-10d box (3" x 0.128"); or 2-3" x 0.131" nails; or 2-3" 14 gage staples, 7/16” crown	Each end, toenail		*-Nailing from IBC Row 2. -10d box equivalent to 8d common nail added.*
	Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]				
			Edges (inches)	Intermediate supports (inches)	
31	3/8” – 1/2"	6d common or deformed (2” x 0.113”) (subfloor and wall)	6	12	*-Nailing from IBC Row 31.*
		8d box or deformed (2.5" x 0.113") (roof)	6	12	*-Nailing from IBC Row 31 footnote “L”.*
		2 3/8” x 0.113” nail (subfloor and wall)	6	12	*-Nailing from IBC Row 31.*
		1 ¾” 16 gage staple, 7/16” crown (subfloor and wall)	4	8	*-Nailing from IBC Row 31 and footnote “o”.*
		2 3/8 x 0.113” nail (roof)	4	8	*-Nailing from IBC Row 31 and footnote “n”.*
		1 ¾” 16 gage staple, 7/16” crown (roof)	3	6	*-Nailing from IBC Row 31 and footnote “o”.*
32	19/32” – 3/4"	8d common (2.5" x 0.131"); or 6d deformed (2” x 0.113)	6	12	*-Nailing from IBC Row 31.*
		2 3/8” x 0.113” nail; or 2” 16 gage staple, 7/16” crown	4	8	*-Nailing from IBC Row 31 and footnote “p”.*
33	7/8” – 1 1/4"	10d common (3" x 0.148"); or 8d deformed (2.5" x 0.131")	6	12	*-Nailing from IBC Row 31 and footnote “e”.*
	Other exterior wall sheathing				
34	1/2" fiberboard sheathing[b]	1 ½” galvanized roofing nail (7/16” head diameter; or 6d common (2” x 0.113”); or	3	6	*-Nailing from IBC Row 33 and footnote “g” and “h” and “i”.*

	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION		*Notes:*
		1 ¼" 16 gage staple with 7/16" or 1" crown			
35	25/32" fiberboard sheathing[b]	1 ¾" galvanized roofing nail (7/16" diameter head); or 8d common (2.5" x 0.131"); or 1 ½" 16 gage staple with 7/16" or 1" crown	3	6	*-Nailing from IBC Row 33 and footnote "g" and "h" and "i".*
	Wood structural panels, combination subfloor underlayment to framing				
36	3/4" and less	8d common (2.5" x 0.131"); or6d deformed (2" x 0.113")	6	12	*-Nailing from IBC Row 31 and footnote "e" and IRC Row 39 for common nail size.*
37	7/8" – 1"	8d common (2.5" x 0.131"); or 8d deformed (2 ½" x 0.131")	6	12	*-Nailing from IBC Row 31 and footnote "e" and IRC Row 40 for common nail size.*
38	1 1/8" – 1 ¼"	10d common (3" x 0.148"); or 8d deformed (2 ½" x 0.131")	6	12	*-Nailing from IBC Row 31 for common and deformed nail size.*
	Panel Siding to Framing				
39	½" or less	6d corrosion-resistant siding (1 7/8" × 0.106"); or 6d corrosion-resistant casing (2" × 0.099")	6	12	*-Nailing from IBC Row 32 and footnote "f".*
40	5/8"	8d corrosion-resistant siding (2 3/8" × 0.128"); or 8d corrosion-resistant casing (2 1/2" × 0.113")	6	12	*-Nailing from IBC Row 32 and footnote "f".*
	Interior Paneling				
41	¼"	4d casing (11/2" × 0.080"); or 4d finish (11/2" × 0.072")	6	12	*-Nailing from IBC Row 34 and footnote "j".*
42	3/8"	6d casing (2" × 0.099"); or 6d finish (Panel supports at 24 inches)	6	12	*-Nailing from IBC Row 34 and footnote "k".*

a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.

b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).

c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

<u>Current (Existing)</u> Table 2304.9.1 with additional column indicating new location:

CONNECTION	FASTENING[a, m]	LOCATION	*Notes:*
1. Joist to sill or girder	3-8d common (2 ½ " x 0.131") 3-3" x 0.131" nails 3-3" 14 gage staples	toenail	*to new row 22*
2. Bridging to joist	2-8d common (2 ½" x 0.131") 2-3" x 0.131" nails 2-3" 14 gage staples	toenail each end	*to new row 30*
3. 1" x 6" subfloor or less to each joist	2-8d common (2 ½" x 0.131")	face nail	*to new row 24*
4. Wider than 1" x 6" subfloor to each joist	3-8d common (2 ½" x 0.131")	face nail	*deleted from table, wider condition addressed by row 21*
5. 2" subfloor to joist or girder	2-16d common (3 ½" x 0.162")	Blind and face nail	*to new row 25*
6. sole plate to joist or blocking Sole plate to joist or blocking at braced wall panel	16d (3 ½" x 0.135") at 16" o.c. 3" x 0.131" nails at 8 o.c. 3" 14 gage staples at 12" o.c. 3-16d (3 ½" x 0.135") at 16" o.c. 4-3" x 0.131" nails at 16" o.c. 4-3" 14 gage staples at 16" o.c.	typical face nail braced wall panels	*to new row 14* *to new row 15*

CONNECTION	FASTENING[a, m]	LOCATION	*Notes:*
7. Top plate to stud	2-16d common (3 ½" x 0.162") 3-3" x 0.131" nails 3-3" 14 gage staples	end nail	*to new row 17*
8. Stud to sole plate	4-8d common (2 ½" x 0.131") 4-3" x 0.131" nails 3-3" 14 gage staples	toenail	*to new row 16 and 17*
	2-16d common (3 ½" x 0.162") 3-3" x 0.131" nails 3-3" 14 gage staples	end nail	*to new row 16 and 17*
9. Double studs	16d (3 ½" x 0.135") at 24" o.c. 3" x 0.131" nail at 8" o.c. 3" 14 gage staple at 8" o.c.	face nail	*to new rows 8 and 9*
10. Double top plates Double top plates	16d (3 ½" x 0.135") at 16" o.c. 3" x 0.131" nail at 12" o.c. 3" 14 gage staple at 8" o.c. 8-16d common (3 ½" x 0.162") 12-3" x 0.131" nails 12-3" 14 gage staples	typical face nail lap splice	*to new rows 12*
11. Blocking between joists or rafters to top plate	3-8d common (2 ½" x 0.131") 3-3" x 0.131" nails 3-3" 14 gage staples	toenail	*to new row 1*
12. Rim joist to top plate	8d (2 ½" x 0.131") at 6" o.c. 3" x 0.131" nail at 6" o.c. 3" 14 gage staple at 6" o.c.	toenail	*to new row 23*
13. Top plates, laps and intersections	2-16d common (3 ½" x 0.162") 3-3" x 0.131" nails 3-3" 14 gage staples	face nail	*to new row 18*
14. Continuous header, two pieces	16d common (3 ½" 0.162")	16" o.c. along edge	*to new row 10*
15. Ceiling joists to plate	3-8d common (2 ½" x 0.131") 5-3" x 0.131" nails 5-3" 14 gage staples	toenail	*to new row 2*
16. Continuous header to stud	4-8d common (2 ½" x 0.131")	toenail	*to new row 11*
17. Ceiling joists, laps over partitions (see Section 2308.10.4.1, Table 2308.10.4.1)	3-16d common (3 ½" x 0.162") minimum,Table 2308.10.4.1 4-3" x 0.131" nails 4-3" 14 gage staples	face nail	*to new rows 3 and 4*
18. Ceiling joists to parallel rafters (see Section 2308.10.4.1, Table 2308.10.4.1)	3-16d common (3 ½" x 0.162") minimum,Table 2308.10.4.1 4-3" x 0.131" nails 4-3" 14 gage staples	face nail	*to new row 4*
19. Rafter to plate (see Section 2308.10-.1, Table 2308.10.1)	3-8d common (2 ½" x 0.131") 3-3" x 0.131" nails 3-3" 14 gage staples	Face nail	*to new row 6*
20. 1" diagonal brace to each stud and plate	2-8d common (2 ½" x 0.131") 2-3" x 0.131" nails 3-3" 14 gage staples	Face nail	*to new row 19*
21. 1" x 8" sheathing to each bearing	3-8d common (2 ½" x 0.131")	face nail	*to new row 21*
22. Wider than 1" x 8" sheathing to each bearing	3-8d common (2 ½" x 0.131")	face nail	*to new row 21*
23. Built-up corner studs	16d common (2 ½" x 0.131") 3" x 0.131" nails 3" 14 gage staples	24" o.c. 16" o.c. 16" o.c.	*to new row 9*
24. Built-up girder and beams	20d common (4" x 0.192") 32" o.c. 3" x 0.131" nails @ 24" o.c. 3" 14 gage staples @ 24" o.c.	face nail at top and bottom staggered on opposite sides	*to new row 27*
	2-20d common (4" x 0.192") 3-3" x 0.131" nails @ 24" o.c. 3-3" 14 gage staples @ 24" o.c.	face nail at ends and at each splice	*to new row 27*
25. 2" planks	16d common (3 ½" x 0.162")	at each bearing	*to new row 26*
26. Collar tie to rafter	3-10d common (3" x 0.148") 4-3" x 0.131" nails	face nail	*to new row 5*

CONNECTION	FASTENING[a, m]		LOCATION	*Notes:*
	4-3” 14 gage staples			
27. Jack rafter to hip	3-10d common (3” x 0.148”) 4-3” x 0.131” nails 4-3” 14 gage staples		toenail	*to new row 7*
	2-16d common (3 ½” x 0.162”) 3-3” x 0.131” nails 3-3” 14 gage staples		face nail	*to new row 7*
28. Roof rafter to 2-by ridge beam	2-16d common (3 ½” x 0.162”) 3-3” x 0.131” nails 3-3” 14 gage staples		toenail	*to new row 7 except 10d common is specified for toe-nail case to match jack to hip nailing.*
	2-16d common (3 ½” x 0.162”) 3-3” x 0.131” nails 3-3” 14 gage staples		face nail	*to new row 7*
29. Joist to band joist	3-16d common (3 ½” x 0.162”) 4-3” x 0.131” nails 4-3” 14 gage staples		face nail	*to new row 29*
30. Ledger strip	3-16d common (3 ½” x 0.162”) 4-3” x 0.131” nails 4-3” 14 gage staples		face nail at each joist	*to new row 28*
31. Wood structural panels and particleboard[b] Subfloor, roof and wall sheathing (to framing)	½” and less	6d[c,l] 2 3/8” x 0.113” nail[n] 1 ¾” 16 gage[o]		*to new row 31*
	19/32” to ¾”	8d[d] or 6d[e] 2 3/8” x 0.113” nail[p] 2” 16 gage[p]		*to new rows 32-33*
	7/8” to 1”	8d[c]		
	1 1/8” to 1 ¼”	10d[d] or 8d[e]		*to new rows 36, 37, 38*
Single floor (combination subfloor-underlayment to framing)	¾” and less	6d[e]		
	7/8” to 1”	8d[e]		
	1 1/8” to 1 ¼”	10d[d] or 8d[e]		
32. Panel siding (to framing)	½” or less	6d[f]		*to new rows 39 and 40*
	5/8”	8d[f]		
33. Fiberboard sheathing[g]	½”	No. 11 gage roofing nail[h] 6d common nail (2” x 0.113”) No. 16 gage staple[i]		*to new row 34*
	25/32”	No. 11 gage roofing nail[h] 8d common nail (2” x 0.113”) No. 16 gage staple[i]		*to new row 35*
34. Interior paneling	¼”	4d[j]		*to new row 41*
	3/8”	6d[k]		*to new row 42*

For SI: 1 inch = 25.4 mm.

a. common or box nails are permitted to be used except where otherwise stated.

b. Nails spaced at 6 inches on center at edges, 12 inches at intermediate supports except 6 inches at supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.

c. Common or deformed shank (6d-2” x 0.113”; 8d-2 ½” x 0.131”; 10d-3” x 0.148”).

d. Common (6d-2” x 0.113”; 8d-2 ½” x 0.131”; 10d-3” x 0.148”).

e. Deformed shank (6d-2” x 0.113”; 8d-2 ½” x 0.131”; 10d-3” x 0.148”).

f. Corrosion-resistant siding (6d-1 7/8 x 0.106”; 8d-2 3/8” x 0.128”) or casing (6d-2” x 0.099”; 8d-2 ½” x 0.113”) nail.

g. Fasteners spaced 3 inches on center at exterior edges and 6 inches on center at intermediate supports, when used as structural sheathing. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications.

h. Corrosion-resistant roofing nails with 7/16-inch-diameter head and d1 1 1/2"-inch length for ½-inch sheathing and 1 ¾-inch length for 25/32-inch sheathing.

i. Corrosion-resistant staples with nominal 7/16-inch crown or 1-inch crown and 1 ¼-inch length for ½-inch sheathing and 1 ½-inch length for 25/32-inch sheathing. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).

j. Casing (1 ½" x 0.080") or finish (1 ½" x 0.072") nails spaced 6 inches on panel edges, 12 inches at intermediate supports
k. Panel supports at 24 inches. Casing or finish nails spaced 6 inches on panel edges, 12 inches at intermediate supports.
l. For roof sheathing applications, 8d nails (2 ½" x 0.113") are the minimum required for wood structural panels.
m. Staples shall have a minimum crown width of 7:16 inch.
n. For roof sheathing applications, fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports.
o. Fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports for subfloor and wall sheathing and 3 inches on center at edges, 6 inches at intermediate supports for roof sheathing.
p. Fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports.

(The 2012 IRC fastener schedule is shown below for reference)

TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS
		Roof	
1	Blocking between joists or rafters to top plate, toe nail	3-8d ($2^1/_2'' \times 0.113''$)	—
2	Ceiling joists to plate, toe nail	3-8d ($2^1/_2'' \times 0.113''$)	—
3	Ceiling joists not attached to parallel rafter, laps over partitions, face nail	3-10d	—
4	Collar tie to rafter, face nail or $1^1/_4'' \times 20$ gage ridge strap	3-10d ($3'' \times 0.128''$)	—
5	Rafter or roof truss to plate, toe nail	3-16d box nails ($3^1/_2'' \times 0.135''$) or 3-10d common nails ($3'' \times 0.148''$)	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss[j]
6	Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d ($3^1/_2'' \times 0.135''$) 3-16d ($3^1/_2'' \times 0.135''$)	—
		Wall	
7	Built-up studs-face nail	10d ($3'' \times 0.128''$)	24″ o.c.
8	Abutting studs at intersecting wall corners, face nail	16d (3 ½" x 0.135")	12″ o.c.
9	Built-up header, two pieces with $^1/_2''$ spacer	16d ($3^1/_2'' \times 0.135''$)	16″ o.c. along each edge
10	Continued header, two pieces	16d ($3^1/_2'' \times 0.135''$)	16″ o.c. along each edge
11	Continuous header to stud, toe nail	4-8d ($2^1/_2'' \times 0.113''$)	—
12	Double studs, face nail	10d ($3'' \times 0.128''$)	24″ o.c.
13	Double top plates, face nail	10d ($3'' \times 0.128''$)	24″ o.c.
14	Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d ($3^1/_2'' \times 0.135''$)	—
15	Sole plate to joist or blocking, face nail	16d ($3^1/_2'' \times 0.135''$)	16″ o.c.
16	Sole plate to joist or blocking at braced wall panels	3-16d ($3^1/_2'' \times 0.135''$)	16″ o.c.
17	Stud to sole plate, toe nail	3-8d ($2^1/_2'' \times 0.113''$) or 2-16d ($3^1/_2'' \times 0.135''$)	— —
18	Top or sole plate to stud, end nail	2-16d ($3^1/_2'' \times 0.135''$)	—
19	Top plates, laps at corners and intersections, face nail	2-10d ($3'' \times 0.128''$)	—
20	1″ brace to each stud and plate, face nail	2-8d ($2^1/_2'' \times 0.113''$) 2 staples $1^3/_4''$	— —
21	$1'' \times 6''$ sheathing to each bearing, face nail	2-8d ($2^1/_2'' \times 0.113''$) 2 staples $1^3/_4''$	— —
22	$1'' \times 8''$ sheathing to each bearing, face nail	2-8d ($2^1/_2'' \times 0.113''$) 3 staples $1^3/_4''$	— —
23	Wider than $1'' \times 8''$ sheathing to each bearing, face nail	3-8d ($2^1/_2'' \times 0.113''$) 4 staples $1^3/_4''$	— —
		Floor	
24	Joist to sill or girder, toe nail	3-8d ($2^1/_2'' \times 0.113''$)	—
25	Rim joist to top plate, toe nail (roof applications also)	8d ($2^1/_2'' \times 0.113''$)	6″ o.c.
26	Rim joist or blocking to sill plate, toe nail	8d (2 ½″ × 0.113″)	6″ o.c.
27	$1'' \times 6''$ subfloor or less to each joist, face nail	2-8d ($2^1/_2'' \times 0.113''$) 2 staples $1^3/_4''$	— —
28	2″ subfloor to joist or girder, blind and face nail	2-16d ($3^1/_2'' \times 0.135''$)	—
29	2″ planks (plank & beam - floor & roof)	2-16d ($3^1/_2'' \times 0.135''$)	at each bearing
30	Built-up girders and beams, 2-inch lumber layers	10d ($3'' \times 0.128''$)	Nail each layer as follows: 32″ o.c. at top and bottom and staggered. Two nails at ends and at each splice.
31	Ledger strip supporting joists or rafters	3-16d ($3^1/_2'' \times 0.135''$)	At each joist or rafter

(continued)

TABLE R602.3(1)—continued
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER[b, c, e]	SPACING OF FASTENERS	
			Edges (inches)[i]	Intermediate supports[c, e] (inches)
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing				
32	$^3/_8$″ - $^1/_2$″	6d common (2″ × 0.113″) nail (subfloor wall)[j] 8d common ($2^1/_2$″ × 0.131″) nail (roof)[f]	6	12[g]
33	$^{19}/_{32}$″ - 1″	8d common nail ($2^1/_2$″ × 0.131″)	6	12[g]
34	$1^1/_8$″ - $1^1/_4$″	10d common (3″ × 0.148″) nail or 8d ($2^1/_2$″ × 0.131″) deformed nail	6	12
Other wall sheathing[h]				
35	$^1/_2$″ structural cellulosic fiberboard sheathing	$^1/_2$″ galvanized roofing nail, $^7/_{16}$″ crown or 1″ crown staple 16 ga., $1^1/_4$″ long	3	6
36	$^{25}/_{32}$″ structural cellulosic fiberboard sheathing	$1^3/_4$″ galvanized roofing nail, $^7/_{16}$″ crown or 1″ crown staple 16 ga., $1^1/_2$″ long	3	6
37	$^1/_2$″ gypsum sheathing[d]	$1^1/_2$″ galvanized roofing nail; staple galvanized, $1^1/_2$″ long; $1^1/_4$ screws, Type W or S	7	7
38	$^5/_8$″ gypsum sheathing[d]	$1^3/_4$″ galvanized roofing nail; staple galvanized, $1^5/_8$″ long; $1^5/_8$″ screws, Type W or S	7	7
	Wood structural panels, combination subfloor underlayment to framing			
39	$^3/_4$″ and less	6d deformed (2″ × 0.120″) nail or 8d common ($2^1/_2$″ × 0.131″) nail	6	12
40	$^7/_8$″ - 1″	8d common ($2^1/_2$″ × 0.131″) nail or 8d deformed ($2^1/_2$″ × 0.120″) nail	6	12
41	$1^1/_8$″ - $1^1/_4$″	10d common (3″ × 0.148″) nail or 8d deformed ($2^1/_2$″ × 0.120″) nail	6	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 Ksi = 6.895 MPa.

a. All nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less.

b. Staples are 16 gage wire and have a minimum $^7/_{16}$-inch on diameter crown width.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.

e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. For regions having basic wind speed of 110 mph or greater, 8d deformed ($2^1/_2$″ × 0.120) nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls, if mean roof height is more than 25 feet, up to 35 feet maximum.

g. For regions having basic wind speed of 100 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. When basic wind speed is greater than 100 mph, nails for attaching panel roof sheathing to intermediate supports shall be spaced 6 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls; and 4 inches on center to gable end wall framing.

h. Gypsum sheathing shall conform to ASTM C 1396 and shall be installed in accordance with GA 253. Fiberboard sheathing shall conform to ASTM C 208.

i. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at all floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

j. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

Cost Impact: The code change proposal will not increase the cost of construction.

T2304.9.1-S-BAJNAI-BCAC.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This reformatting and reorganizing of the fastener schedule makes it easier to use and is an excellent idea. Note that the changes approved in S261-12 and S263-12 will be incorporated in items 1, 6, 14 and 23.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Paul Coats, P.E., CBO, American Wood Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Table 2304.9.1
FASTENING SCHEDULE

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION
24	1" x 6" subfloor or less to each joist	2-8d common (2.5" x 0.131"); or 2 ~~3~~-10d box (3" x 0.128")	Face nail

(Portions of table not shown remain unchanged)

Commenter's Reason: As part of the overall table revision, the 10d box nail (3" x 0.128") was added as an equivalent to the 8d common nail (2.5" x 0.131"). The correct number of 10d box nails is 2 which matches the required number of 8d common nails.

S265-12
Final Action: AS AM AMPC____ D

S268-12

2304.11, 2304.11.1, 2304.11.2, 2304.11.2.1, 2304.11.2.2, 2304.11.2.3, 2304.2.4, 2304.11.2.5, 2304.11.2.6, 2304.11.2.7, 2304.11.3, 2304.11.4, 2304.11.4.1, 2304.11.4.2, 2304.11.5, 2304.11.6, 2304.11.7

Proposed Change as Submitted

Proponent: Dennis Pitts, American Wood Council, (dpitts@awc.org)

Revise as follows:

2304.11 Protection against decay and termites. Wood shall be protected from decay and termites in accordance with the applicable provisions of Sections 2304.11.1 through ~~2304.11.9~~ 2304.11.7.

~~**2304.11.1 General.** Where required by this section, protection from decay and termites shall be provided by the use of naturally durable or *preservative-treated wood*.~~

~~**2304.11.2 Wood used above ground**~~ **2304.11.1 Location requiring water-borne preservatives.** Wood used above ground in the locations specified in Sections ~~2304.11.2.1~~ 2304.11.1.1 through ~~2304.11.2.7~~ 2304.11.1.5, 2304.11.3 and 2304.11.5 shall be naturally durable wood or *preservative-treated wood* using water-borne preservatives, in accordance with AWPA U1 ~~(Commodity Specifications A or F)~~ for above-ground use.

~~**2304.11.2.1**~~ **2304.11.1.1 Joists, girders and subfloor.** ~~Where~~ Wood joists or ~~the bottom of~~ a wood structural floor ~~without joists are~~ closer than 18 inches (457 mm), or wood girders ~~are~~ closer than 12 inches (305 mm) to the exposed ground in crawl spaces or unexcavated areas located within the perimeter of the building foundation~~, the floor construction (including posts, girders, joists and subfloor)~~ shall be of naturally durable or *preservative-treated wood*.

~~**2304.11.2.2**~~ **2304.11.1.2 Wood supported by exterior foundation walls.** Wood framing members, including wood sheathing, that ~~rest on~~ are in contact with exterior foundation walls and are less than 8 inches (203 mm) from exposed earth shall be of naturally durable or *preservative-treated wood*.

~~**2304.11.2.3**~~ **2304.11.1.3 Exterior walls below grade.** Wood framing members and furring strips ~~attached directly to~~ in direct contact with the interior of exterior masonry or concrete walls below grade shall be of naturally durable or *preservative-treated wood*.

~~**2304.11.2.4**~~ **2304.11.1.4 Sleepers and sills.** Sleepers and sills on a concrete or masonry slab that is in direct contact with earth shall be of naturally durable or *preservative-treated wood*.

~~**2304.11.2.6**~~ **2304.11.1.5 Wood siding.** Clearance between wood siding and earth on the exterior of a building shall not be less than 6 inches (152 mm) or less than 2 inches (51 mm) vertical from concrete steps, porch slabs, patio slabs and similar horizontal surfaces exposed to the weather except where siding, sheathing and wall framing are of naturally durable or *preservative-treated wood*.

2304.11.2 Other locations. Wood used in the locations specified in Sections 2304.11.2.1 through 2304.11.2.5 shall be naturally durable wood or *preservative treated wood* in accordance with AWPA U1. Preservative treated wood used in interior locations shall be protected with two coats of urethane, shellac, latex epoxy, or varnish unless waterborne preservatives are used. Prior to application of the protective finish, the wood shall be dried in accordance with the manufacturer's recommendations.

~~**2304.11.2.5**~~ **2304.11.2.1 Girder ends.** The ends of wood girders entering exterior masonry or concrete walls shall be provided with a 1/2-inch (12.7 mm) air space on top, sides and end, unless naturally durable or *preservative-treated wood* is used.

~~2304.11.2.7~~ **2304.11.2.2 Posts or columns.** Posts or columns supporting permanent structures and supported by a concrete or masonry slab or footing that is in direct contact with the earth shall be of naturally durable or *preservative-treated wood*.

Exceptions:

~~1.~~ Posts or columns that are ~~either~~ not exposed to the weather ~~or located in basements or cellars,~~ are supported by concrete piers or metal pedestals projected at least 1 inch (25 mm) above the slab or deck and ~~6~~ 8 inches (152 mm) above exposed earth, and are separated ~~therefrom~~ by an impervious moisture barrier.

~~2. Posts or columns in enclosed crawl spaces or unexcavated areas located within the periphery of the building, supported by a concrete pier or metal pedestal at a height greater than 8 inches (203 mm) from exposed ground, and are separated therefrom by an impervious moisture barrier.~~

~~2304.11.5~~ **2304.11.2.3 Supporting member for permanent appurtenances.** Naturally durable or *preservative-treated wood* shall be utilized for those portions of wood members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances where such members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering to prevent moisture or water accumulation on the surface or at joints between members.

Exception: When a building is located in a geographical region where experience has demonstrated that climatic conditions preclude the need to use durable materials where the structure is exposed to the weather.

~~2304.11.3~~ **2304.11.2.4 Laminated timbers.** The portions of glued-laminated timbers that form the structural supports of a building or other structure and are exposed to weather and not fully protected from moisture by a roof, eave or similar covering shall be pressure treated with preservative or be manufactured from naturally durable or *preservative-treated wood*.

2304.11.2.5. Supporting members for permeable floors and roofs. Wood structural members that support moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, shall be of naturally durable or *preservative-treated wood* unless separated from such floors or roofs by an impervious moisture barrier.

~~2304.11.4~~ **2304.11.3 Wood in contact with the ground or fresh water.** Wood used in contact with the ground (exposed earth) ~~in the locations specified in Sections 2304.11.4.1 and 2304.11.4.2~~ shall be naturally durable (species for both decay and termite resistance) or preservative treated ~~using water-borne preservatives~~ in accordance with AWPA U1 ~~(Commodity Specifications A or F)~~ for soil or fresh water use.

Exception: Untreated wood is permitted where such wood is continuously and entirely below the groundwater level or submerged in fresh water.

~~2304.11.4.1~~ **2304.11.3.1 Posts or columns.** Posts and columns supporting permanent structures that are embedded in concrete that is ~~in direct contact with the earth, embedded in concrete that is~~ exposed to the weather or in direct contact with the earth shall be of *preservative-treated wood*.

~~**2304.11.4.2 Wood structural members.** Wood structural members that support moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, shall be of naturally durable or *preservative-treated wood* unless separated from such floors or roofs by an impervious moisture barrier.~~

~~2304.11.6~~ **2304.11.4 Termite protection.** In geographical areas where hazard of termite damage is known to be very heavy, wood floor framing in the locations specified in Section 2304.11.1.1 and exposed framing of exterior decks or balconies shall be of naturally durable species (termite resistant) or preservative treated in accordance with AWPA U1 for the species, product preservative and end use or provided with *approved* methods of termite protection.

~~2304.11.7~~ 2304.11.5 Wood used in retaining walls and cribs. Wood installed in retaining or crib walls shall be preservative treated in accordance with AWPA U1 ~~(Commodity Specifications A or F)~~ for soil and fresh water use.

Reason: This code change contains few technical changes but addresses many editorial clean-ups and some re-organization. The technical change is a delineation of exactly where waterborne preservatives should be required and where they should not. In a reorganization of this section in the 2005 code change cycle, glued laminated and certain exterior applications were lumped under a general section for the purposes of citing the new AWPA U1 standard, but a requirement for waterborne preservatives was inadvertently imposed for all applications in that reorganization. This proposed code change restores the ability for glued laminated beams and wood in exterior applications to be treated with other-than waterborne preservatives in accordance with the U1 standard. As a precaution, a requirement for the drying of treated wood and its sealing was added where used on the interior of a building (proposed section 2304.11.2).

Other changes are explained as follows:

Existing section 2304.11.1 deletion: This section became superfluous.

Proposed 2304.11.1: Section references are changed, and the specific mention of commodity specifications in the U1 standard was deleted because it is unnecessary.

Proposed 2304.11.1.1: Removing "the floor construction (including posts, girders, joists and subfloor)" makes it clear that only those floor elements within proximity to exposed ground need to be protected.

Proposed 2304.11.1.2: Better wording to meet current intent.

Proposed 2304.11.1.3: Better wording to meet current intent.

Proposed 2304.11.2: This new section is needed to introduce the subsections for locations where other-than waterborne preservatives are permitted under certain circumstances, as long as treatment is in accordance with the AWPA U1 standard.

Proposed 2304.11.2.2 Exceptions: The first exception was worded incorrectly and would seem to exempt exposed wood from protection; the proposed wording is a fix. With Exception 1 fixed, exception 2 was so similar in requirement that it was combined with Exception 1 and the clearance dimension was changed from 6 to 8 inches to preserve the intent of the deleted exception and be consistent with the clearance required for wood supported by exterior foundation walls in proposed Section 2304.11.1.2.

Proposed 2304.11.2.5: This is not a new section, but is re-titled and moved up in the text from Section 2304.11.4.2 (shown struck-out further down). There is no obvious reason why it must be a subsection of current 2304.11.4.

Proposed 2304.11.3: The requirement that water-borne preservatives be used exclusively has been struck in accordance with the purpose of this change, which indicates those locations where water-borne preservatives must be used up in proposed Section 2304.11.1 and subsections.

Existing section 2304.11.4.1 and 2304.11.4.2 (shown struck out): These were not lost. The current 2304.11.4.2 was moved up to become proposed 2304.11.2.5, and the current 2304.11.4.1 became 2304.11.3.1 with some editorial rewording for clarity.

Cost Impact: The code change proposal will not increase the cost of construction.

2304.11-S-PITTS.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code makes improvements to the current language regarding preservative treated and naturally durable wood.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Randall Shackelford, Simpson Strong-Tie Co., requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2304.11.2.2 Posts or columns. Posts or columns supporting permanent structures and supported by a concrete or masonry slab or footing that is in direct contact with the earth shall be of naturally durable or *preservative-treated wood*.

> **Exceptions:** Posts or columns that are not exposed to the weather or that are protected from moisture by a roof, eave, or similar covering, are supported by concrete piers or metal pedestals ~~projected~~ projecting at least 1 inch (25 mm) above the slab or deck and 8 inches (~~152~~ 203 mm) above exposed earth, and are separated from concrete by an impervious moisture barrier.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: The original proponent made this requirement much more restrictive by changing this wording. The most common application for the one-inch tall metal pedestal is for posts supporting a porch. The approved wording would require all porch posts to be treated. The existing IBC language, in both 2304.11.3 (Laminated timbers) and 2304.11.5 (Supporting member for permanent appurtenances) provides an exception for wood members that are protected from moisture by a roof, eave, or similar covering. This public comment takes that wording (word for word from 2304.11.3) and inserts it here, also to clarify when it is applicable. Without the clarification, it is open to interpretation what "exposed to the weather" means. It could easily be interpreted to any wood column or post that is outside. Changed "projected" to "projecting" so that it better describes the pier or pedestal, and then added "from concrete" to clarify that the impervious moisture barrier is only needed for the concrete pier, since the metal pedestal already provides the separation.

S268-12

Final Action: AS AM AMPC____ D

S273-12
2308 (New)

Proposed Change as Submitted

Proponent: Robert Rice, Josephine County, OR (structdesigner@yahoo.com)

Delete and substitute as follows:

~~**SECTION 2308**~~
~~**CONVENTIONAL LIGHT-FRAME CONSTRUCTION**~~

SECTION 2308
CONVENTIONAL LIGHT-FRAME CONSTRUCTION

2308.1 General. The requirements of this section are intended for *conventional light-frame construction*. Other construction methods are permitted to be used, provided a satisfactory design is submitted showing compliance with other provisions of this code. Interior non-load-bearing partitions, ceilings and curtain walls of *conventional light-frame construction* are not subject to the limitations of section 2308.2. Alternatively, compliance with AF&PA WFCM shall be permitted subject to the limitations therein and the limitations of this code. Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three *stories above grade plane* in height with a separate *means of egress* and their accessory structures shall comply with the *International Residential Code*.

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the following limitations;

2308.2.1 Stories. Structures of *conventional light-frame construction* shall be limited in story height according to Table 2308.2.1

TABLE 2308.2.1
ALLOWABLE STORY HEIGHT

Seismic Design Category	Allowable Story above grade plane
A and B	Three stories
C	Two Stories
D and E [a]	One story

a. For the purposes of this section, for buildings assigned to *Seismic Design Category* D or E, cripple walls shall be considered to be a *story* unless cripple walls are solid blocked and do not exceed 14 inches in height,

2308.2.2 Allowable floor-to-floor height. Maximum floor-to-floor height shall not exceed 11 feet, 7 inches (3531 mm). Exterior bearing wall and interior braced wall heights shall not exceed a stud height of 10 feet (3048 mm).

2308.2.3 Allowable Loads. Loads shall be in accordance with Chapter 16 and shall not exceed the following:

1. Average dead loads shall not exceed 15 psf (718 N/m^2) for combined roof and ceiling, exterior walls, floors and partitions.

Exceptions:

1. Subject to the limitations of Section 2308.6.10.2, stone or masonry veneer up to the lesser of 5 inches (127 mm) thick or 50 psf (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2438 mm) permitted for gable ends.

2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

2. Live loads shall not exceed 40 psf (1916 N/m^2) for floors.
3. Ground snow loads shall not exceed 50 psf (2395 N/m^2).

2308.2.4 Allowable wind speed. V_{asd} as determined in accordance with Section 1609.3.1 shall not exceed 100 miles per hour (mph) (44 m/s) (3-second gust).

Exceptions:

1. V_{asd} as determined in accordance with Section 1609.3.1 shall not exceed 110 mph (48.4 m/s) (3-second gust) for buildings in Exposure Category B that are not located in a *hurricane-prone region*.
2. Where V_{asd} as determined in accordance with Section 1609.3.1 exceeds 100 mph (3-second gust), the provisions of either AF&PA WFCM or ICC 600 are permitted to be used. Wind speeds in Figures 1609A, 1609B, and 1609C shall be converted in accordance with Section 1609.3.1 for use with AF&PA WFCM or ICC 600.

2308.2.5 Allowable roof span. Roof trusses and rafters shall not span more than 40 feet (12 192 mm) between points of vertical support.

2308.2.6 Risk Category limitation. The use of the provisions for *conventional light-frame construction* in this section shall not be permitted for *Risk Category* IV buildings, as determined by Section 1604.5, assigned to *Seismic Design Category* B, C, D or E.

2308.2.7 Portions exceeding limitations of conventional light-frame construction. When portions of a building of otherwise conventional light-frame construction exceed the limits of Section 2308.2, those portions and the supporting load path shall be designed in accordance with accepted engineering practice and the provisions of this code. For the purposes of this section, the term "portions" shall mean parts of buildings containing volume and area such as a room or a series of rooms. The extent of such design need only demonstrate compliance of the non-conventionally light-framed elements with other applicable provisions of this code and shall be compatible with the performance of the conventional light-framed system.

2308.3 Foundations and footings. Foundations and footings shall be designed and constructed in accordance with Chapter 18 . Connections to foundations and footings shall comply with this section.

2308.3.1 Foundation plates or sills. Foundation plates or sills resting on concrete or masonry foundations shall comply with Section 2304.3.1. Foundation plates or sills shall be bolted or anchored to the foundation with not less than 1/2-inch-diameter (12.7 mm) steel bolts or *approved* anchors spaced to provide equivalent anchorage as the steel bolts. Along *braced wall lines* in structures assigned to *Seismic Design Category* E, steel bolts with a minimum nominal diameter of 5/8 inch (15.9 mm) or approved anchor straps load rated in accordance with Section 1706.1 and spaced to provide equivalent anchorage shall be used. Bolts shall be embedded at least 7 inches (178 mm) into concrete or masonry.

Bolts shall be spaced not more than 6 feet (1829 mm) apart and there shall be a minimum of two bolts or anchor straps per piece with one bolt or anchor strap located not more than 12 inches (305 mm) or less than 4 inches (102 mm) from each end of each piece. Bolts in *braced wall lines* in structures over two stories above grade shall be spaced not more the 4 feet (1219 mm) o.c.. A properly sized nut and washer shall be tightened on each bolt to the plate.

2308.3.2 Braced wall line sill plate anchorage in *Seismic Design Category* D and E. Sill plates along *braced wall lines* shall be anchored with anchor bolts with steel plate washers between the foundation sill plate and the nut, or *approved* anchor straps load rated in accordance with Section 1706.1. Such washers shall be a minimum of 0.229 inch by 3 inches by 3 inches (5.82 mm by 76 mm by 76 mm) in size. The hole in the plate washer is permitted to be diagonally slotted with a width of up to 3/16 inch (4.76 mm) larger than the bolt diameter and a slot length not to exceed 1-3/4 inches (44 mm), provided a standard cut washer is placed between the plate washer and the nut.

2308.4 Floor framing. Floor framing shall comply with this section.

2308.4.1 Girders. Girders for single-story construction or girders supporting loads from a single floor shall not be less than 4 inches by 6 inches (102 mm by 152 mm) for spans 6 feet (1829 mm) or less, provided that girders are spaced not more than 8 feet (2438 mm) o.c. Spans for built-up 2-inch girders shall be in accordance with Table 2308.4.1(1) or 2308.4.1(2). Other girders shall be designed to support the loads specified in this code. Girder end joints shall occur over supports.

Where a girder is spliced over a support, an adequate tie shall be provided. The ends of beams or girders supported on masonry or concrete shall not have less than 3 inches (76 mm) of bearing.

~~TABLE 2308.9.5~~ TABLE 2308.4.1(1)
HEADER AND GIRDER SPANS[a] FOR EXTERIOR BEARING WALLS
(Maximum Spans for Douglas Fir-Larch, Hem-Fir, Southern Pine and Spruce-Pine-Fir[b] and Required Number of Jack Studs)

(Portions of table not shown remain unchanged)

~~TABLE 2308.9.6~~ TABLE 2308.4.1(2)
HEADER AND GIRDER SPANS[a] FOR INTERIOR BEARING WALLS
(Maximum Spans for Douglas Fir-Larch, Hem-Fir, Southern Pine and Spruce-Pine-Fir[b] and Required Number of Jack Studs)

(Portions of table not shown remain unchanged)

2308.4.2 Floor joists. Floor joists shall comply with this section.

2308.4.2.1 Span. Spans for floor joists shall be in accordance with Tables 2308.4.2.1(1) or 2308.4.2.1(2) or the *AF&PA Span Tables for Joists and Rafters*.

2308.4.2.2 Bearing. The ends of each joist shall not have less than 1-1/2 inches (38 mm) of bearing on wood or metal, or not less than 3 inches (76 mm) on masonry, except where supported on a 1-inch by 4-inch (25.4 mm by 102 mm) ribbon strip and nailed to the adjoining stud,

2308.4.2.3 Framing details. Joists shall be supported laterally at the ends and at each support by solid blocking except where the ends of the joists are nailed to a header, band or rim joist or to an adjoining stud or by other means. Solid blocking shall not be less than 2 inches (51mm) in thickness and the full depth of the joist. Joist framing from opposite sides of a beam, girder or partition shall be lapped at least 3 inches (76 mm) or the opposing joists shall be tied together in an approved manner. Joists framing into the side of a wood girder shall be supported by framing anchors or on ledger strips not less than 2 inches by 2 inches (51 mm by 51 mm).

TABLE ~~2308.8(1)~~ 2308.4.2.1(1)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
(Residential Sleeping Areas, Live Load = 30 psf, L/Δ = 360)
(Portions of table not shown remain unchanged)

TABLE ~~2308.8(2)~~ 2308.4.2.1(2)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
(Residential Living Areas, Live Load = 40 psf, L/Δ = 360)

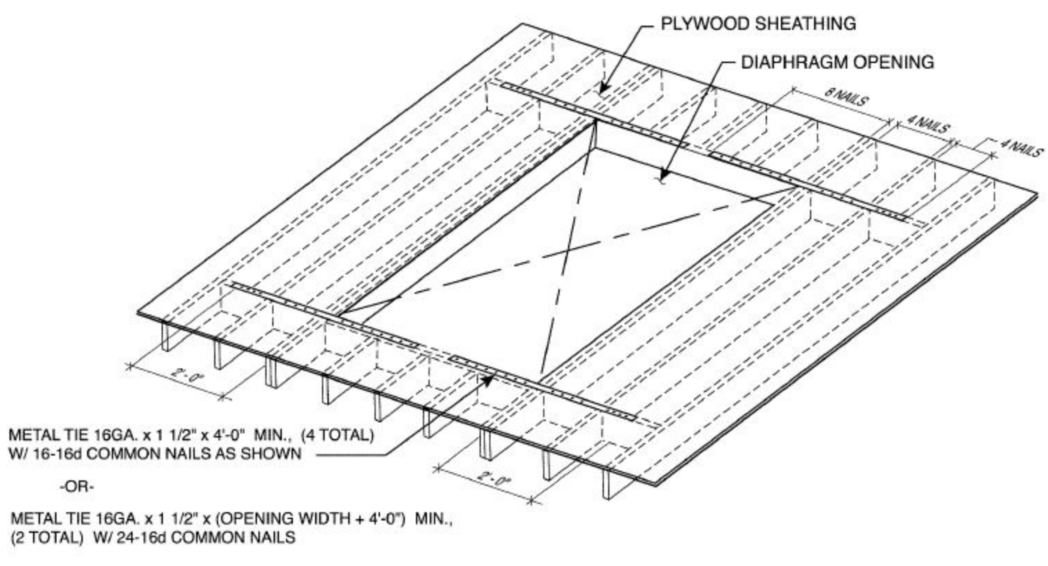
(Portions of table not shown remain unchanged)

2308.4.2.4 Notches and holes. Notches on the ends of joists shall not exceed one-fourth the joist depth. Notches in the top or bottom of joists shall not exceed one sixth the depth and shall not be located in the middle third of the span. Holes bored in joists shall not be within 2 inches (51 mm) of the top or bottom of the joist and the diameter of any such hole shall not exceed one-third the depth of the joist.

2308.4.3 Engineered wood products. Engineered wood products shall be installed in accordance with manufacturer's recommendations. Cuts, notches and holes bored in trusses, structural composite lumber, structural glue-laminated members or I-joists are not permitted except where permitted by the manufacturer's recommendations or where the effects of such alterations are specifically considered in the design of the member by a *registered design professional*.

2308.4.4 Framing around openings. Trimmer and header joists shall be doubled, or of lumber of equivalent cross section, where the span of the header exceeds 4 feet (1219 mm). The ends of header joists more than 6 feet (1829 mm) long shall be supported by framing anchors or joist hangers unless bearing on a beam, partition or wall. Tail joists over 12 feet (3658 mm) long shall be supported at the header by framing anchors or on ledger strips not less than 2 inches by 2 inches (51 mm by 51 mm).

2308.4.4.1 Openings in floor diaphragms in *Seismic Design Categories* B, C, D and E. Openings in horizontal diaphragms with a dimension perpendicular to the joist that is greater than 4 feet (1219 mm) shall be constructed with metal ties and blocking in accordance with this section and Figure 2308.4.4.1(1). Metal ties shall not be less than 0.058 inch [1.47 mm (16 galvanized gage)] thick by 1-1/2 inches (38 mm) wide with a minimum yield stress of 33,000 psi (227 Mpa). Blocking shall be provided 2 feet minimum beyond headers. Ties shall be attached to blocking with eight 16d common nails on each side of the header-joist intersection.



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 2308.4.4.1(1)
OPENINGS IN FLOOR AND ROOF DIAPHRAGMS

Openings in floor diaphragms in *Seismic Design Categories D and E* shall not exceed a dimension greater than 50 percent of the distance between braced wall lines or an area greater than 25 percent of the area between orthogonal pairs of braced wall lines [see Figure 2308.4.4.1(2)], or shall be designed in accordance with accepted engineering practice.

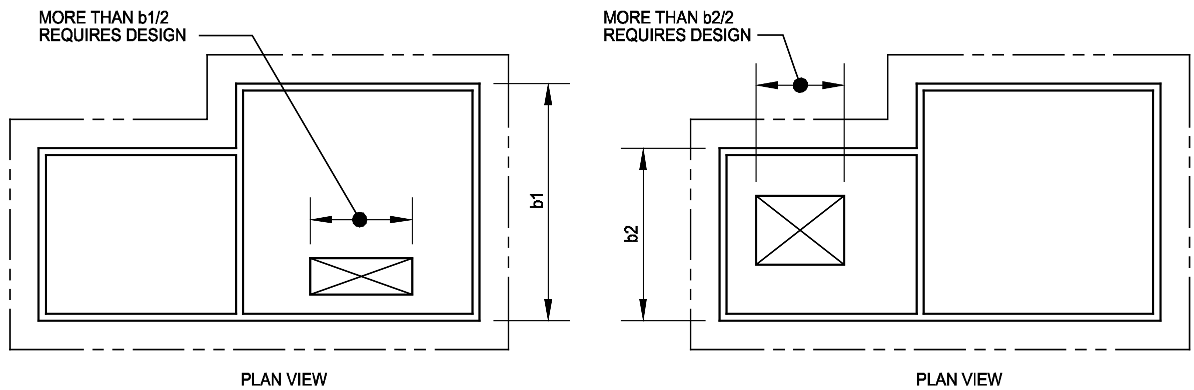


FIGURE 2308.4.4.1(2)
OPENING LIMITATIONS FOR FLOOR AND ROOF DIAPHRAGMS

2308.4.4.2 Vertical offsets in floor diaphragms in *Seismic Design Categories* D and E. Portions of a floor level shall not be vertically offset such that the framing members on either side of the offset cannot be lapped or tied together in an *approved* manner in accordance with Figure 2308.4.4.2.

Exception: Framing supported directly by foundations need not be lapped or tied directly together.

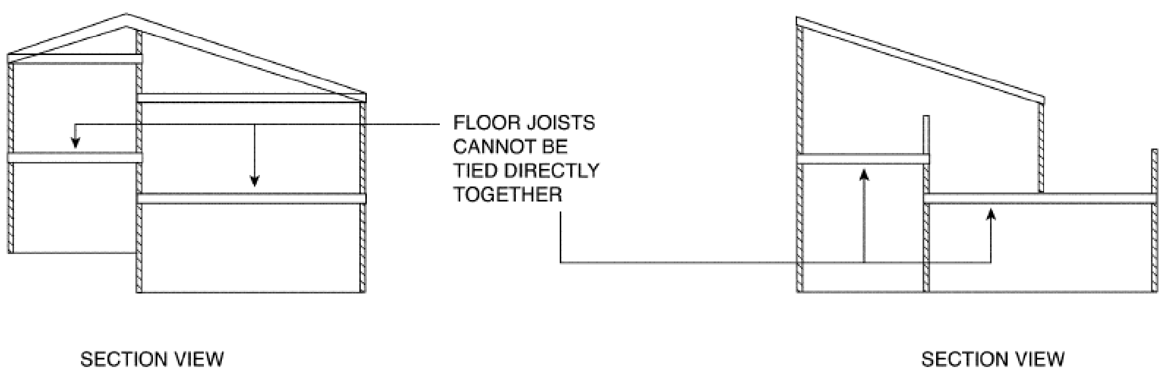


FIGURE 2308.4.4.2
PORTIONS OF FLOOR LEVEL OFFSET VERTICALLY

2308.4.5 Joists supporting bearing partitions. Bearing partitions parallel to joists shall be supported on beams, girders, doubled joists, walls or other bearing partitions. Bearing partitions perpendicular to joists shall not be offset from supporting girders, walls or partitions more than the joist depth unless such joists are of sufficient size to carry the additional load.

2308.4.6 Lateral support. Floor and ceiling framing with a nominal depth-to-thickness ratio greater than or equal to 5:1 shall have one edge held in line for the entire span. Where the nominal depth-to- thickness ratio of the framing member exceeds 6:1, there shall be one line of bridging for each 8 feet (2438 mm) of span, unless both edges of the member are held in line. The bridging shall consist of not less than 1-inch by 3-inch (25 mm by 76 mm) lumber, double nailed at each end, of equivalent metal bracing of equal rigidity, full-depth solid blocking or other *approved* means. A line of bridging shall also be required at supports where equivalent lateral support is not otherwise provided.

2308.4.7 Structural floor sheathing. Structural floor sheathing shall comply with the provisions of Section 2304.7.1.

2308.4.8 Under-floor ventilation. For under-floor ventilation, see Section 1203.3.

2308.4.9 Floor framing supporting *braced wall panels*. When *braced wall panels* are supported by cantilevered floors or are setback from the floor joist support the floor framing shall comply section 2308.6.7.

2308.4.10 Anchorage of exterior means of egress components in *Seismic Design Category D and E*. Exterior egress balconies, exterior exit stairways and similar *means of egress* components in structures assigned to *Seismic Design Category D or E* shall be positively anchored to the primary structure at not over 8 feet (2438 mm) o.c. or shall be designed for lateral forces. Such attachment shall not be accomplished by use of toenails or nails subject to withdrawal.

2308.5 Wall construction. Walls of *conventional light-frame construction* shall be in accordance with this section.

2308.5.1 Stud size, height and spacing. The size, height and spacing of studs shall be in accordance with Table 2308.5.1

Studs shall be continuous from a support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

> **Exception:** Jack studs, trimmer studs and cripple studs at openings in walls that comply with Table 2308.4.1(1) or 2308.4.1(2).

2308.5.2 Framing details. Studs shall be placed with their wide dimension perpendicular to the wall. Not less than three studs shall be installed at each corner of an *exterior wall*.

Exceptions:

1. In interior nonbearing walls and partition, studs are permitted to be set with the long dimension parallel to the wall.

2. At corners, two studs are permitted, provided wood spacers or backup cleats of 3/8-inch-thick (9.5 mm) wood structural panel, 3/8-inch (9.5 mm) Type M “Exterior Glue” particleboard, 1-inch-thick (25 mm) lumber or other *approved* devices that will serve as an adequate backing for the attachment of facing materials are used. Where fire-resistance ratings or shear values are involved, wood spacers, backup cleats or other devices shall not be used unless specifically *approved* for such use.

TABLE 2308.5.1
SIZE, HEIGHT AND SPACING OF WOOD STUDS[c]

STUD SIZE (inches)	BEARING WALLS: Laterally unsupported stud height[a] (feet)	BEARING WALLS: Supporting roof and ceiling only — Spacing (inches)	BEARING WALLS: Supporting one floor, roof and ceiling — Spacing (inches)	BEARING WALLS: Supporting two floors, roof and ceiling — Spacing (inches)	NONBEARING WALLS: Laterally unsupported stud height[a] (feet)	NONBEARING WALLS: Spacing (inches)
2 × 3[b]	NP	NP	NP	NP	10	16
2 × 4	10	24	16	NP	14	24
3 × 4	10	24	24	16	14	24
2 × 5	10	24	24	NP	16	24
2 × 6	10	24	24	16	20	24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
NP=Not Permitted
a. Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall. Increases in unsupported height are permitted where justified by an analysis.
b. Shall not be used in exterior walls.
c. Utility-grade studs shall not be spaced more than 16 inches (406 mm) o.c., or support more than a roof and ceiling, or exceed 8 feet (2438 mm) in height for exterior walls and load-bearing walls or 10 feet (3048 mm) for interior non-load-bearing walls.

2308.5.3 Plates and sills. Studs shall have plates and sills according to this section.

2308.5.3.1. Bottom plate or sill. Studs shall have full bearing on a plate or sill. Plates or sills shall not be less than 2 inches (51 mm) nominal in thickness and have a width at least equal to the width of the wall studs.

2308.5.3.2 Top plates. Studs shall be capped with double top plates installed to provide overlapping at corners and at intersections with other partitions. End joints in double top plates shall be offset at least 48 inches (1219 mm), and shall be nailed in accordance with Table 2304.9.1. Plates shall be a nominal 2 inches (51 mm) in depth and have a width at least equal to the width of the studs.

> **Exception:** A single top plate is permitted, provided the plate is adequately tied at joints, corners and intersecting walls by at least the equivalent of 3-inch by 6-inch (76 mm by 152 mm) by 0.036-inch-thick (0.914 mm) galvanized steel connector that is nailed to each wall or segment of wall by six 8d nails or equivalent, provided the rafters, joists or trusses are centered over the studs with a tolerance of not more than 1 inch (25 mm).

Where bearing studs are spaced at 24-inch (610 mm) intervals and top plates are less than two 2- inch by 6-inch (51 mm by 152 mm) or two 3-inch by 4- inch (76 mm by 102 mm) members and where the floor joists, floor trusses or roof trusses that they support are spaced at more than 16-inch (406 mm) intervals, such joists or trusses shall bear within 5 inches (127 mm) of the studs beneath or a third plate shall be installed.

2308.5.4 Nonbearing walls and partitions. In nonbearing walls and partitions, studs shall be spaced not more than 28 inches (711 mm) o.c. and in interior nonbearing walls and partitions, are permitted to be set with the long dimension parallel to the wall. Interior nonbearing partitions shall be capped with no less than a single top plate installed to provide overlapping at corners and at intersections with other walls and partitions. The plate shall be continuously tied at joints by solid blocking at least 16 inches (406 mm) in length and equal in size to the plate or by 1/2-inch by 1-1/2-inch (12.7 mm by 38 mm) metal ties with spliced sections fastened with two 16d nails on each side of the joint.

2308.5.5 Openings in walls and partitions. Openings in exterior and interior walls and partitions shall comply with sections 2308.5.5.1 through 2308.5.5.3

2308.5.5.1 Openings in exterior bearing walls. Headers shall be provided over each opening in exterior bearing walls. The size and spans in Table 2308.4.1(1) are permitted to be used for one- and two-family *dwellings*. Headers for other buildings shall be designed in accordance with Section 2301.2, Item 1 or 2. Headers shall be of two pieces of nominal 2-inch (51mm) framing lumber set on edge as permitted by Table 2308.4.1(1) and nailed together in accordance with Table 2304.9.1 or of solid lumber of equivalent size.

Wall studs shall support the ends of the header in accordance with Tables 2308.4.1(1). Each end of a lintel or header shall have a bearing length of not less than 1-1/2 inches (38 mm) for the full width of the lintel.

2308.5.5.2 Openings in interior bearing partitions. Headers shall be provided over each opening in interior bearing partitions as required in Section 2308.5.5.1 The spans in Table 2308.4.1(2) are permitted to be used. Wall studs shall support the ends of the header in accordance with Table 2308.4.1(1) or 2308.4.1(2), as appropriate.

2308.5.5.3 Openings in interior nonbearing partitions. Openings in nonbearing partitions are permitted to be framed with single studs and headers. Each end of a lintel or header shall have a bearing length of not less than 11/2 inches (38 mm) for the full width of the lintel.

2308.5.6 Cripple walls. Foundation cripple walls shall be framed of studs not less in size than the studding above with a minimum length of 14 inches (356 mm), or shall be framed of solid blocking. Where exceeding 4 feet (1219 mm) in height, such walls shall be framed of studs having the size required for an additional *story*. See section 2308.6.5 for cripple wall bracing.

2308.5.7 Bridging. Unless covered by interior or *exterior wall coverings* or sheathing meeting the minimum requirements of this code, stud partitions or walls with studs having a height-to-least-thickness ratio exceeding 50 shall have bridging not less than 2 inches (51 mm) in thickness and of the same width as the studs fitted snugly and nailed thereto to provide adequate lateral support. Bridging shall be placed in every stud cavity and at a frequency such that no stud so braced shall have a height-to-least-thickness ratio exceeding 50 with the height of the stud measured between horizontal framing and bridging or between bridging, whichever is greater.

2308.5.8 Pipes in walls. Stud partitions containing plumbing, heating or other pipes shall be so framed and the joists underneath so spaced as to give proper clearance for the piping. Where a partition containing such piping runs parallel to the floor joists, the joists underneath such partitions shall be doubled and spaced to *permit* the passage of such pipes and shall be bridged. Where plumbing, heating or other pipes are placed in or partly in a partition, necessitating the cutting of the soles or plates, a metal tie not less than 0.058 inch (1.47 mm) (16 galvanized gage) and 11/2 inches (38 mm) wide shall be fastened to each plate across and to each side of the opening with not less than six 16d nails.

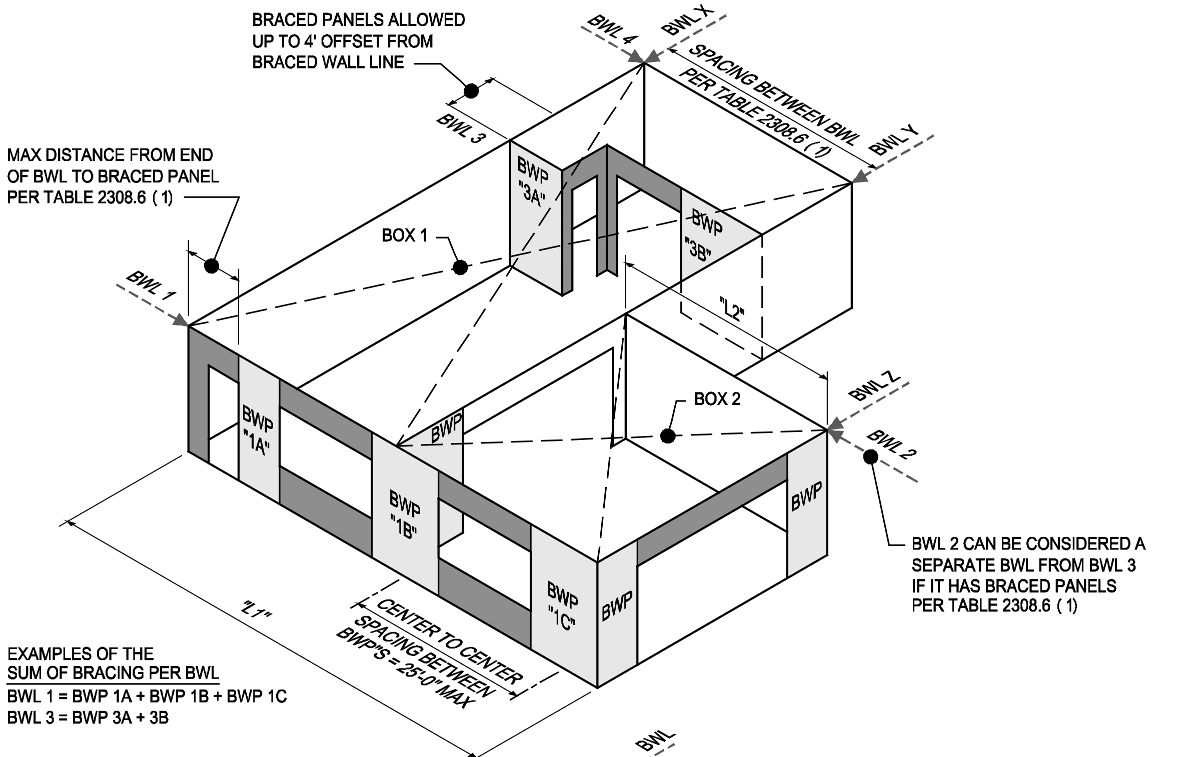
2308.5.9 Cutting and notching. In exterior walls and bearing partitions, any wood stud is permitted to be cut or notched to a depth not exceeding 25 percent of its width. Cutting or notching of studs to a depth not greater than 40 percent of the width of the stud is permitted in nonbearing partitions supporting no loads other than the weight of the partition.

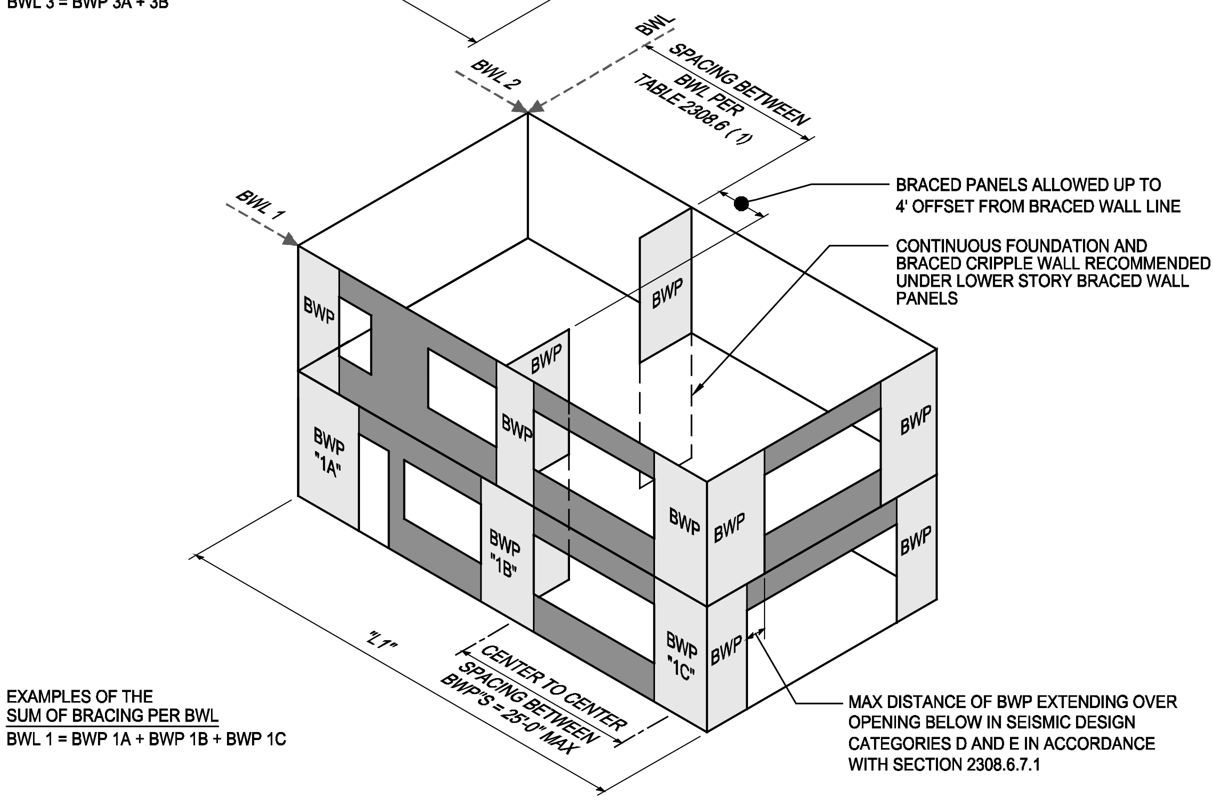
2308.5.10 Bored holes. A hole not greater in diameter than 40 percent of the stud width is permitted to be bored in any wood stud. Bored holes not greater than 60 percent of the width of the stud are permitted in nonbearing partitions or in any wall where each bored stud is doubled, provided not more than two such successive doubled studs are so bored. In no case shall the edge of the bored hole be nearer than 5/8 inch (15.9 mm) to the edge of the stud. Bored holes shall not be located at the same section of stud as a cut or notch.

2308.6 Wall Bracing. Buildings shall be provided with exterior and interior braced wall lines as described in Sections 2308.6.1 through 2308.6.9.2.

2308.6.1 *Braced wall lines*. For the purpose of determining the amount and location of bracing required along each story level of a building, *braced wall lines* shall be designated as straight lines through the building plan in both the longitudinal and transverse direction and placed in accordance with Table 2308.6.1 and Figure 2308.6.1. *Braced wall line* spacing shall not exceed the distance specified in Table 2308.6.1. In structures assigned to Seismic Design Category D or E, braced wall lines shall intersect perpendicularly to each other.

2308.6.2 *Braced wall panels*. *Braced wall panels* shall be placed along *braced wall lines* in accordance with Table 2308.6.1 and Figure 2308.6(1) and specified in Table 2308.6.2(1). A *braced wall panel* must be located at each end of the braced wall line and at the corners of intersecting *braced wall lines* or may begin within the maximum distance from the end of the *braced wall line* in accordance with Table 2308.6(1). *Braced wall panels* in a *braced wall line* shall not be offset from each other by more than 4 feet (1219 mm). Braced wall panels shall be clearly indicated on the plans.

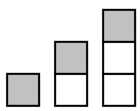
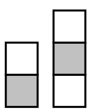
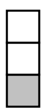
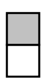
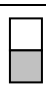
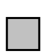




For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
BWL = BRACED WALL LINE, BWP = BRACED WALL PANEL

Figure 2308.6(1)
BASIC COMPONENTS OF THE LATERAL BRACING SYSTEM

TABLE 2308.1
WALL BRACING REQUIREMENTS

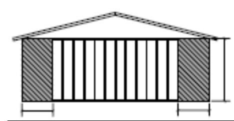
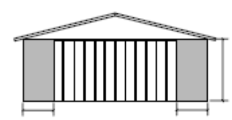
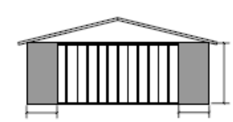
Seismic Design Category	Story Condition (See section 2308.2)	Maximum spacing of braced wall lines	Braced panel location, spacing (o.c.) and minimum percentage (x)			Maximum distance of braced wall panels from each end of braced wall line
			Bracing Method			
			LIB	DWB WSP	SFB PBS PCP HPS GB, [c,d]	
A and B		35’-0”	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	12’-6”
		35’-0”	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	12’-6”
		35’-0”	NP	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	12’-6”
C		35’-0”	NP	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	12’-6”
		35’-0”	NP	Each end and ≤25’-0” o.c. (min 25% of wall length) [e]	Each end and ≤25’-0” o.c. (min 25% of wall length) [e]	12’-6”
D and E		25’-0”	NP	Sds < 0.50: Each end and ≤25’-0” o.c. (min 21% of wall length) [e]	Sds < 0.50: Each end and ≤25’-0” o.c. (min 43% of wall length) [e]	8’-0”
				0.5 ≤ Sds < 0.75: Each end and ≤25’-0” o.c. (min 32% of wall length) [e]	0.5 ≤ Sds < 0.75: Each end and ≤25’-0” o.c. (min 59% of wall length) [e]	
				0.75 ≤Sds ≤ 1.00: Each end and ≤25’-0” o.c. (min 37% of wall length) [e]	0.75 ≤Sds ≤ 1.00: Each end and ≤25’-0” o.c. (min 75% of wall length) [e]	
				Sds > 1.00: Each end and ≤25’-0” o.c. (min 48% of wall length) [e]	Sds > 1.00: Each end and ≤25’-0” o.c. (min 100% of wall length) [e]	

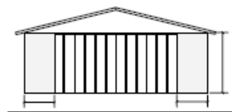
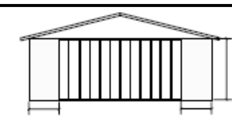
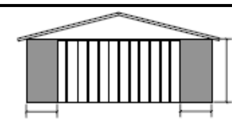
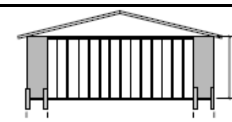
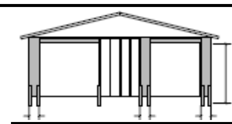
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
NP = Not Permitted

a. This table specifies minimum requirements for *braced wall panels* along interior or exterior *braced wall lines*.
b. See Section 2308.6.2 for full description of bracing methods.
c. Gypsum wallboard applied to framing supports that are spaced at 16 inches on center.
d. The required lengths shall be doubled for gypsum board applied to only one face of a braced wall panel.
e. Percentage shown represents the minimum amount of bracing required along the building length (or wall length if the structure has an irregular shape)

2308.6.3 Braced wall panel methods. Construction of *braced wall panels* shall be by one or a combination of the methods in Table 2308.6.3(1). *Braced wall panel* length shall be in accordance with Section 2308.6.4 or 2308.6.5.

TABLE 2308.6.3(1)
BRACING METHODS

METHODS, MATERIAL	**MINIMUM THICKNESS**	**FIGURE**	**CONNECTION CRITERIA [a]**	
			Fasteners	**Spacing**
LIB[a] Let-in-bracing	1x4 wood or approved metal straps attached at 45° to 60° angles to studs at maximum of 16" o.c.		Per Fastener Table 2304.9.1, item 20	Wood: per stud plus top and bottom plates
			Metal strap: installed per manufacturer's installation recommendations	Metal strap: installed per manufacturer's installation recommendations
DWB Diagonal wood boards	$^{3}/_{4}$" thick (1" nominal) x 6" minimum width to studs at maximum of 24" o.c.		Per Fastener Table 2304.9.1, item 21 or 22	Per stud
WSP Wood structural panel	$^{3}/_{8}$" Per TABLE 2308.6.3(2) or 2308.6.3(3)		Per Fastener Table 2304.9.1, item 31	6" edges 12" field
SFB Structural fiberboard sheathing	$^{1}/_{2}$" Per TABLE 2308.6.3(4)		Per Fastener Table 2304.9.1, item 33	3" edges 6" field
GB Gypsum board (Double sided)	$^{1}/_{2}$" by a minimum of 4 feet wide to studs at maximum of 24" o.c.		Exterior and interior sheathing: with 5d cooler nails (1-5/8" x 0.086") or 1¼" screws (type W or S) for ½" gypsum board or $1^{5}/_{8}$" screws (type	For all braced wall panel locations: 7" o.c. along panel edges (including top and bottom plates) and

METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA [a]	
			W or S) for $^{5}/_{8}$" gypsum board.	7" o.c.in the field
PBS Particle-board sheathing	$^{3}/_{8}$" or $^{1}/_{2}$" per Table 2308.9.3(4) to studs at maximum of 16" o.c.		6d common (2" long x0.113" dia.) nails for $^{3}/_{8}$" thick sheathing or 8d common (2½" long x 0.131" dia.) nails for $^{1}/_{2}$" thick sheathing	3" edges 6" field
PCP Portland cement plaster	See Section 2510 to studs at maximum of 16" o.c.		1½" long, 11 gage, $^{7}/_{16}$" dia. head nails or $^{7}/_{8}$" long, 16 gage staples	6" o.c. on all framing members
HPS Hardboard panel siding	$^{7}/_{16}$" TABLE 2308.6.3(5)		Per Fastener Table 2308.9.1	4" edges 8" field
ABW Alternate braced wall.	$^{3}/_{8}$"		See Figure 2308.6.5(1) and Section 2308.6.5.1	See Figure 2308.6.3(1)
PFH Portal frame with hold-downs	$^{3}/_{8}$		See Figure 2308.6.5(2) and Section 2308.6.5.2	See Figure 2308.6.3(2)

For SI: 1 foot 305 mm

a. Method LIB shall have gypsum board fastened to at least one side with nails or screws.

TABLE 2308.6.3(2)
EXPOSED PLYWOOD PANEL SIDING

MINIMUM THICKNESS[a] (inch)	MINIMUM NUMBER OF PLIES	STUD SPACING (inches) Plywood siding applied directly to studs or over sheathing
$^{3}/_{8}$	3	16[b]
$^{1}/_{2}$	4	24

For SI: 1 inch = 25.4 mm.

a. Thickness of grooved panels is measured at bottom of grooves.

b. Spans are permitted to be 24 inches if plywood siding applied with face grain perpendicular to studs or over one of the following: (1) 1-inch board sheathing, (2) $^{7}/_{16}$-inch wood structural panel sheathing or (3) $^{3}/_{8}$-inch wood structural panel sheathing with strength axis (which is the long direction of the panel unless otherwise marked) of sheathing perpendicular to studs.

TABLE 2308.6.3(3)

WOOD STRUCTURAL PANEL WALL SHEATHING[b]
(Not Exposed to the Weather, Strength Axis Parallel or Perpendicular to Studs Except as Indicated Below)

MINIMUM THICKNESS (inch)	PANEL SPAN RATING	STUD SPACING (inches)		
		Siding nailed to studs	Nailable sheathing	
			Sheathing parallel to studs	Sheathing perpendicular to studs
$^{3}/_{8}$, $^{15}/_{32}$, $^{1}/_{2}$	16/0, 20/0, 24/0, 32/16 Wall—24″ o.c.	24	16	24
$^{7}/_{16}$, $^{15}/_{32}$, $^{1}/_{2}$	24/0, 24/16, 32/16 Wall—24″ o.c.	24	24[a]	24

For SI: 1 inch = 25.4 mm.

a. Plywood shall consist of four or more plies.

b. Blocking of horizontal joints shall not be required except as specified in Sections 2306.3 and 2308.12.4.

TABLE 2308.6.3(4)

ALLOWABLE SPANS FOR PARTICLEBOARD WALL SHEATHING
(Not Exposed to the Weather, Long Dimension of the Panel Parallel or Perpendicular to Studs)

GRADE	THICKNESS (inch)	STUD SPACING (inches)	
		Siding nailed to studs	Sheathing under coverings specified in Section 2308.9.3 parallel or perpendicular to studs
M-S "Exterior Glue" and M-2 "Exterior Glue"	$^{3}/_{8}$	16	—
	$^{1}/_{2}$	16	16

For SI: 1 inch = 25.4 mm.

TABLE 2308.6.3(5)

HARDBOARD SIDING

SIDING	MINIMUM NOMINAL THICKNESS (inch)	2 × 4 FRAMING MAXIMUM SPACING	NAIL SIZE[a, b, d]	NAIL SPACING	
				General	Bracing panels[c]
1. Lap siding					
Direct to studs	$^{3}/_{8}$	16″ o.c.	8d	16″ o.c.	Not applicable
Over sheathing	$^{3}/_{8}$	16″ o.c.	10d	16″ o.c.	Not applicable
2. Square edge panel siding					
Direct to studs	$^{3}/_{8}$	24″ o.c.	6d	6″ o.c. edges; 12″ o.c. at intermediate supports	4″ o.c. edges; 8″ o.c. at intermediate supports
Over sheathing	$^{3}/_{8}$	24″ o.c.	8d	6″ o.c. edges; 12″ o.c. at intermediate supports	4″ o.c. edges; 8″ o.c. at intermediate supports
3. Shiplap edge panel siding					
Direct to studs	$^{3}/_{8}$	16″ o.c.	6d	6″ o.c. edges; 12″ o.c. at intermediate supports	4″ o.c. edges; 8″ o.c. at intermediate supports
Over sheathing	$^{3}/_{8}$	16″ o.c.	8d	6″ o.c. edges; 12″ o.c. at intermediate supports	4″ o.c. edges; 8″ o.c. at intermediate supports

For SI: 1 inch = 25.4 mm.

a. Nails shall be corrosion resistant.

b. Minimum acceptable nail dimensions:

	Panel Siding (inch)	Lap Siding (inch)
Shank diameter	0.092	0.099
Head diameter	0.225	0.240

c. Where used to comply with Section 2308.9.3.

d. Nail length must accommodate the sheathing and penetrate framing $1^{1}/_{2}$ inches.

2308.6.4 Length of *braced wall panels*. For Methods DWB, WSP, SFB, PBS, PCP and HPS each panel must be at least 48 inches (1219 mm) in length, covering three stud spaces where studs are spaced 16 inches (406 mm) apart and covering two stud spaces where studs are spaced 24 inches (610 mm) apart. *Braced wall panels* less than the required 48" length shall not contribute towards the amount of bracing required. *Braced wall panels* longer than the required length shall be credited for their actual length. For Method GB, each panel must be at least 96 inches (2438 mm) in length where applied to one side of the studs or 48 inches (1219 mm) where applied to both sides.

All vertical joints of panel sheathing shall occur over studs and adjacent panel joints shall be nailed to common framing members. Horizontal joints shall occur over blocking or other framing equal in size to the studding except where waived by the installation requirements for the specific sheathing materials. Sole plates shall be nailed to the floor framing in accordance with Section 2308.3.2 and top plates shall be connected to the framing above in accordance with Section 2308.5.3. Where joists are perpendicular to braced wall lines above, blocking shall be provided under and in line with the *braced wall panels.*

2308.6.5 Alternative bracing. An Alternate Braced Wall (ABW) or a Portal Frame with Hold-downs (PFH) described in this section is permitted to substitute for a 48" braced wall panel of methods DWB, WSP, SFB, PBS, PCP or HPS. For method GB, each 96- inch (2438 mm) section (applied to one face) or 48-inch (1219 mm) section (applied to both faces) or portion thereof required by Table 2308.6.1 is permitted to be replaced by one panel constructed in accordance with method ABW or PFH.

2308.6.5.1. Alternate Braced Wall (ABW). An ABW shall be constructed in accordance with this section and Figure 2308.6.5.1. In one-story buildings, each panel shall have a length of not less than 2 feet 8 inches (813 mm) and a height of not more than 10 feet (3048 mm). Each panel shall be sheathed on one face with 3/8- inch-minimum-thickness (9.5 mm) wood structural panel sheathing nailed with 8d common or galvanized box nails in accordance with Table 2304.9.1 and blocked at wood structural panel edges. Two anchor bolts installed in accordance with Section 2308.3.1 shall be provided in each panel. Anchor bolts shall be placed at each panel outside quarter points. Each panel end stud shall have a hold-down device fastened to the foundation, capable of providing an *approved* uplift capacity of not less than 1,800 pounds (8006 N). The hold-down device shall be installed in accordance with the manufacturer's recommendations. The ABW shall be supported directly on a foundation or on floor framing supported directly on a foundation that is continuous across the entire length of the braced wall line. This foundation shall be reinforced with not less than one No. 4 bar top and bottom. Where the continuous foundation is required to have a depth greater than 12 inches (305 mm), a minimum 12-inch by 12-inch (305 mm by 305 mm) continuous footing or turned down slab edge is permitted at door openings in the braced wall line. This continuous footing or turned down slab edge shall be reinforced with not less than one No. 4 bar top and bottom. This reinforcement shall be lapped 15 inches (381 mm) with the reinforcement required in the continuous foundation located directly under the braced wall line.

When the ABW is installed at the first *story* of two-story buildings, the wood structural panel sheathing shall be provided on both faces, three anchor bolts shall be placed at one-quarter points, and tie-down device uplift capacity shall not be less than 3,000 pounds (13 344 N).

2308.6.5.2 Portal Frame with Hold-downs (PFH). A PFH shall be constructed in accordance with this section and Figure 2308.6.5.2. The adjacent door or window opening shall have a full-length header.

In one-story buildings, each panel shall have a length of not less than 16 inches (406 mm) and a height of not more than 10 feet (3048 mm). Each panel shall be sheathed on one face with a single layer of 3/8 inch (9.5 mm) minimum thickness wood structural panel sheathing nailed with 8d common or galvanized box nails in accordance with Figure 2308.6.5.2. The wood structural panel sheathing shall extend up over the solid sawn or glued-laminated header and shall be nailed in accordance with Figure 2308.6.5. A built-up header consisting of at least two 2 × 12s and fastened in accordance with Item 24 of Table 2304.9.1 shall be permitted to be used. A spacer, if used, shall be placed on the side of the built-up beam opposite the wood structural panel sheathing. The header shall extend between the inside faces of the first full-length outer studs of each panel. The clear span of the header between the inner studs of each panel shall be not less than 6 feet (1829 mm) and not more than 18 feet (5486 mm) in length. A strap with an uplift capacity of not less than 1,000 pounds (4,400 N) shall fasten the header to the inner studs opposite the sheathing. One anchor bolt not less than 5/8 inch (15.9 mm) diameter and installed in accordance with Section 2308.3.1 shall be provided in the center of each sill plate. The studs at each end of the panel shall have a hold-down device fastened to the foundation with an uplift capacity of not less than 4,200 pounds (18 480 N).

Where a panel is located on one side of the opening, the header shall extend between the inside face of the first full-length stud of the panel and the bearing studs at the other end of the opening. A strap with an uplift capacity of not less than 1,000 pounds (4400 N) shall fasten the header to the bearing studs. The bearing studs shall also have a hold-down device fastened to the foundation with an uplift capacity of not less than 1,000 pounds (4400 N). The hold-down devices shall be an embedded strap type, installed in accordance with the manufacturer's recommendations. The PFH panels shall be supported directly on a foundation that is continuous across the entire length of the braced wall line. This foundation shall be reinforced with not less than one No. 4 bar top and bottom. Where the continuous foundation is required to have a depth greater than 12 inches (305 mm), a minimum 12-inch by 12-inch (305 mm by 305 mm) continuous footing or turned down slab edge is permitted at door openings in the braced wall line. This continuous footing or turned down slab edge shall be reinforced with not less than one No. 4 bar top and bottom. This reinforcement shall be lapped not less than 15 inches (381 mm) with the reinforcement required in the continuous foundation located directly under the braced wall line.

When a PFH is installed at the first *story* of two-story buildings, each panel shall have a length of not less than 24 inches (610 mm).

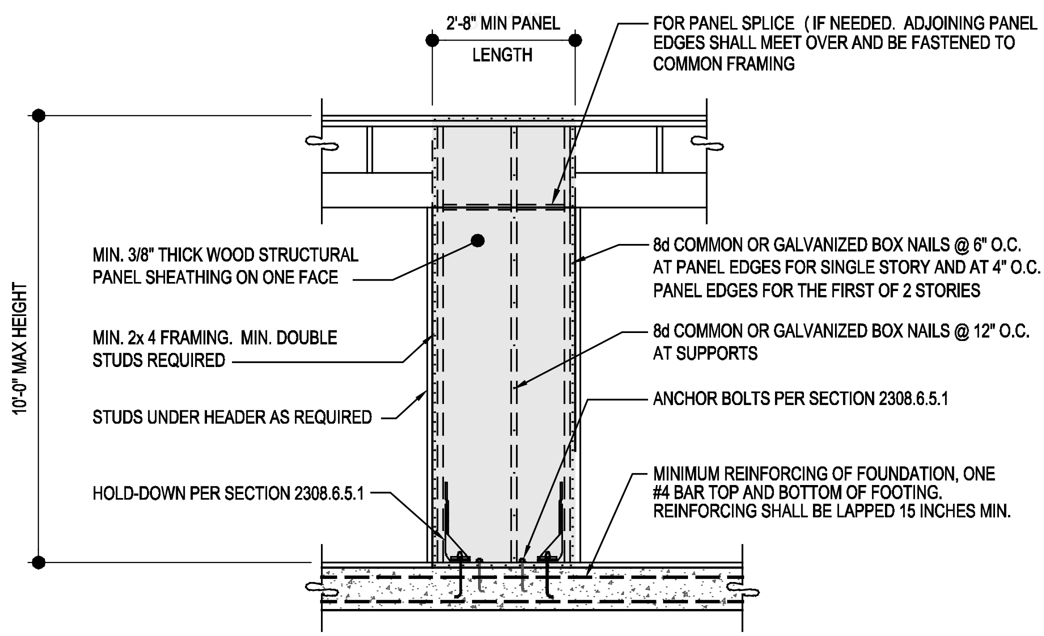


FIGURE 2308.6.5.1
ALTERNATE BRACED WALL PANEL (ABW)

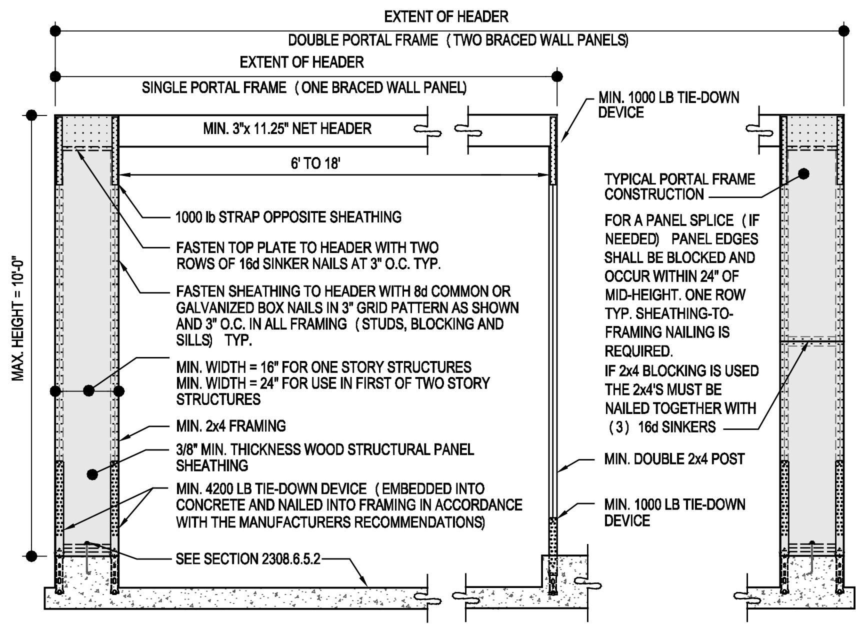


Figure 2308.6.5.2
PORTAL FRAME WITH HOLD-DOWNS (PFH)

2308.6.5 Cripple wall bracing. Cripple walls shall be braced in accordance with the following.

2308.6.5.1 Cripple wall bracing in *Seismic Design Category* A, B and C.. For the purposes of this section, cripple walls having a stud height exceeding 14 inches (356 mm) shall be considered a *story* and shall be braced in accordance with Table 2308.6(1). Spacing of edge nailing for required cripple wall bracing shall not exceed 6 inches (152mm) o.c. along the foundation plate and the top plate of the cripple wall. Nail size, nail spacing for field nailing and more restrictive boundary nailing requirements shall be as required elsewhere in the code for the specific bracing material used.

2308.6.5.2 Cripple wall bracing in *Seismic Design Category* D and E For the purposes of this section, cripple walls having a stud height exceeding 14 inches (356 mm) shall be considered a *story* and shall be braced in accordance with Table 2308.6(1). Where interior braced wall lines occur without a continuous foundation below, the length of parallel exterior cripple wall bracing shall be one and one-half times the lengths required by Table 2308.6(1). Where the cripple wall sheathing type used is method WSP or DWB and this additional length of bracing cannot be provided, the capacity of WSP or DWB sheathing shall be increased by reducing the spacing of fasteners along the perimeter of each piece of sheathing to 4 inches (102 mm) o.c.

2308.6.6 Connections of *braced wall panels*. Braced wall panel joints shall occur over studs or blocking. *Braced wall panels* shall be fastened to studs, top and bottom plates and at panel edges. *Braced wall panels* shall be applied to nominal 2-inch-wide [actual 1-1/2 inch (38 mm)] or larger stud framing.

2308.6.6.1 Bottom plate connection. Braced wall line bottom plates shall be connected to joists or full-depth blocking below in accordance with Table 2304.9.1, Item 6, or to foundations in accordance with Section 2308.3.3.

2308.6.6.2 Top plate connection. Where joists and/or rafters are used, braced wall line top plates shall be fastened over the full length of the braced wall line to joists, rafters, rim boards or blocking above in accordance with Table 2304.9.1, as applicable, based on the orientation of the joists or rafters to the braced wall line. Blocking at joists with walls above shall be equal to the depth of the joist at the braced wall line. Blocking at rafters need not be full depth but shall extend to within 2 inches (51 mm) from the roof sheathing above. Blocking shall be a minimum of 2 inches (51 mm) nominal thickness and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11. Notching or drilling of holes in blocking in accordance with the requirements of Section 2308.8.2 or Section 2308.10.4.2 shall be permitted.

At exterior gable end walls braced wall panel sheathing in the top *story* shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15 240 mm).

Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall over the full length of the braced wall line by blocking of the ends of the trusses or by other *approved* methods providing equivalent lateral force transfer. Blocking shall be minimum 2 inches (51 mm) nominal thickness and shall extend to within 2 inches (51 mm) from the roof sheathing above and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1. Notching or drilling of holes in blocking in accordance with the requirements of Section 2308.4.2.4 or Section 2308.7.4 shall be permitted.

2308.6.6.3 Sill anchorage. Where foundations are required by Section 2308.6.7, braced wall line sills shall be anchored to concrete or masonry foundations. Such anchorage shall conform to the requirements of Section 2308.3. The anchors shall be distributed along the length of the braced wall line. Other anchorage devices having equivalent capacity are permitted.

2308.6.6.4 Anchorage to all-wood foundations. Where all-wood foundations are used, the force transfer from the braced wall lines shall be determined based on calculation and shall have a capacity greater than or equal to the connections required by Section 2308.3.

2308.6.7 Braced wall line and diaphragm support. Braced wall lines and floor and roof diaphragms shall be supported in accordance to this section.

2308.6.7.1 Foundation requirements. Braced wall lines shall be supported by continuous foundations.

Exception: For structures with a maximum plan dimension not over 50 feet (15 240 mm), continuous foundations are required at exterior walls only.

For structures in *Seismic Design Category D and E,* exterior *braced wall panels* shall be in the same plane vertically with the foundation or the braced wall line shall be designed in accordance with accepted engineering practice according to section 2308.1.1

Exceptions:

1. Exterior *braced wall panels* may be located up to 4 feet from the foundation below when supported by a floor constructed in accordance with all the following:
   - 1.1 Cantilevers or setbacks shall not exceed four times the nominal depth of the floor joists
   - 1.2. Floor joists shall be 2 inches by 10 inches (51 mm by 254 mm) or larger and spaced not more than 16 inches (406 mm) o.c.
   - 1.3. The ratio of the back span to the cantilever shall be at least 2:1.
   - 1.4. Floor joists at ends of *braced wall panels* shall be doubled.
   - 1.5. A continuous rim joist shall be connected to the ends of cantilevered joists. The rim joist is permitted to be spliced using a metal tie not less than 0.058 inch (1.47 mm) (16 galvanized gage) and 11/2 inches (38 mm) wide fastened with six 16d common nails on each side. The metal tie shall have a minimum yield stress of 33,000 psi (227 MPa).

1.6. Joists at setbacks or the end of cantilevered joists shall not carry gravity loads from more than a single *story* having uniform wall and roof loads, nor carry the reactions from headers having a span of 8 feet (2438 mm) or more.

2. The end of a required braced wall panel shall be allowed to extend not more than 1 foot (305 mm) over an opening in the wall below. This requirement is applicable to *braced wall panels* offset in plane and to *braced wall panels* offset out of plane as permitted by the exception to Item 1 above in this section.

   Exception: *Braced wall panels* are permitted to extend over an opening not more than 8 feet (2438 mm) in width where the header is a 4-inch by 12-inch (102 mm by 305 mm) or larger member.

2308.6.7.2 Floor and roof diaphragm support in *Seismic Design Category D and E*. In structures assigned to *Seismic Design Category D or E,* floor and roof diaphragms shall be laterally supported by braced wall lines on all edges and connected in accordance with Section 2308.3.2 [see Figure 2308.6.7.2(1)].

Exception: Portions of roofs or floors that do not support *braced wall panels* above are permitted to extend up to 6 feet (1829 mm) beyond a braced wall line [see Figure 2308.6.7.2(2)] provided that the framing members are connected to the braced wall line below in accordance with Section 2308.6.6.

2308.6.7.3 Stepped footings in Seismic Design Category B, C, D and E . Where the height of a required braced wall panel extending from foundation to floor above varies more than 4 feet (1219 mm), the following construction shall be used:

1. Where the bottom of the footing is stepped and the lowest floor framing rests directly on a sill bolted to the footings, the sill shall be anchored as required in Section 2308.3.3.
2. Where the lowest floor framing rests directly on a sill bolted to a footing not less than 8 feet (2438 mm) in length along a line of bracing, the line shall be considered to be braced. The double plate of the cripple stud wall beyond the segment of footing extending to the lowest framed floor shall be spliced to the sill plate with metal ties, one on each side of the sill and plate. The metal ties shall not be less than 0.058 inch [1.47 mm (16 galvanized gage)] by 11/2 inches (38 mm) wide by 48 inches (1219 mm) with eight 16d common nails on each side of the splice location (see Figure 2308.6.7.3(1). The metal tie shall have a minimum yield stress of 33,000 pounds per square inch (psi) (227 MPa).
3. Where cripple walls occur between the top of the footing and the lowest floor framing, the bracing requirements for a *story* shall apply.

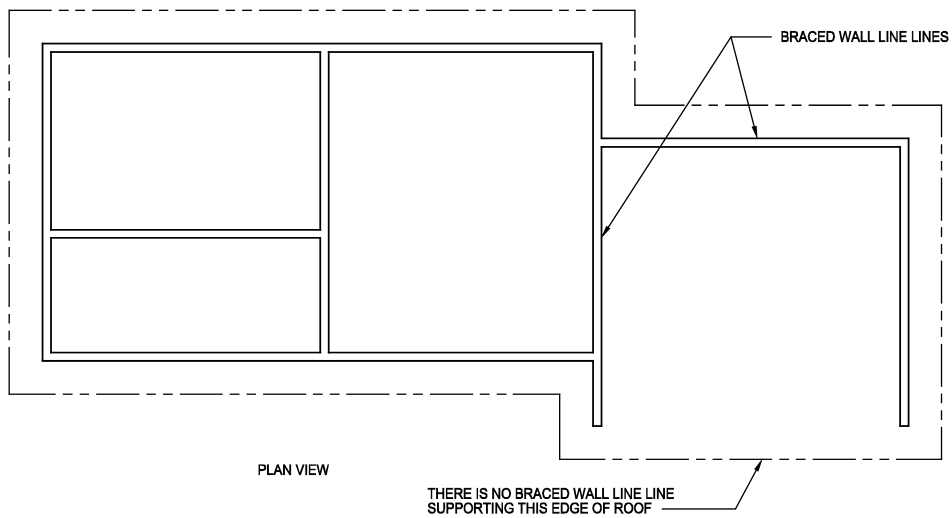


FIGURE 2308.6.7.2(1)
ROOF IN SDC D OR E NOT SUPPORTED ON ALL EDGES

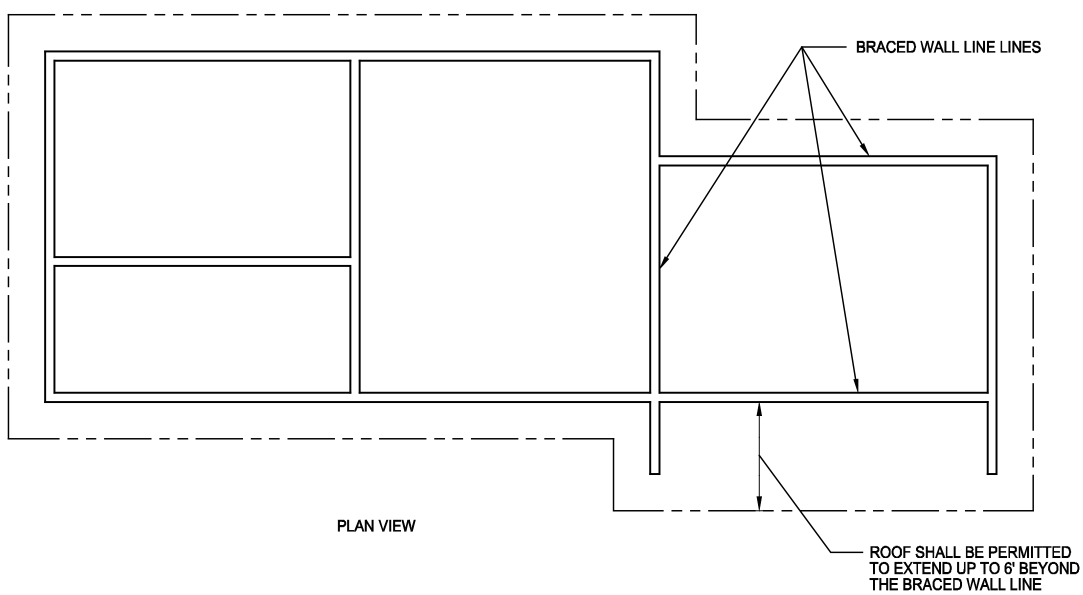
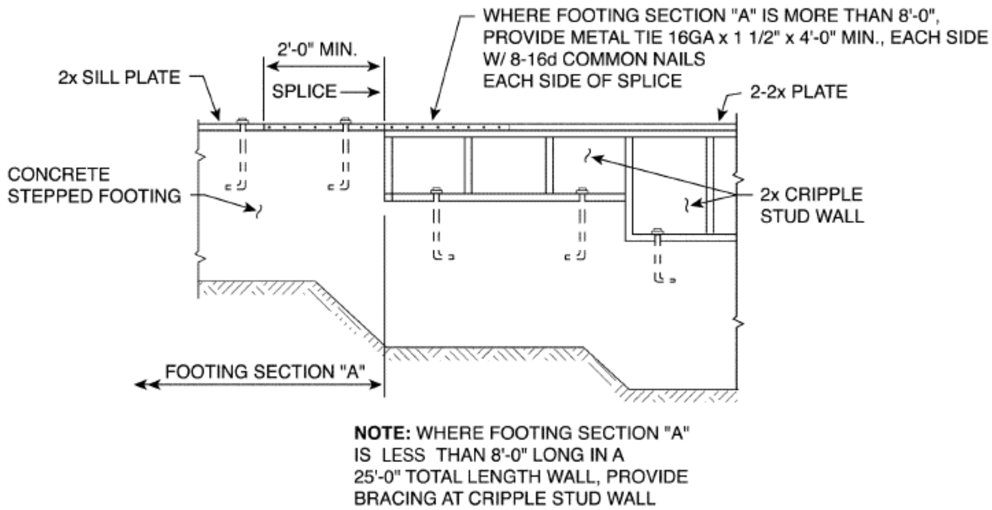


FIGURE 2308.6.7.2(2)
ROOF EXTENSION IN SDC D OR E BEYOND BRACED WALL LINE



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 2308.6.7.3(1)
STEPPED FOOTING CONNECTION DETAILS

2308.6.8 Attachment of sheathing. Fastening of braced wall panel sheathing shall not be less than that prescribed in Tables 2308.6(1) and 2304.9.1. Wall sheathing shall not be attached to framing members by adhesives.

2308.6.9 Limitations of concrete or masonry veneer. Concrete or masonry veneer shall comply with Chapter 14 and this section.

2308.6.9.1 Limitations of concrete or masonry veneer in *Seismic Design Categories* B or C.. Concrete or masonry walls and stone or masonry veneer shall not extend above a basement.

Exceptions:

1. In structures assigned to *Seismic Design Category* B, stone and masonry veneer is permitted to be used in the first two stories above grade plane or the first three stories above grade plane where the lowest story has concrete or masonry walls, provided that structural use panel wall bracing is used and the length of bracing provided is one and one-half times the required length as determined in Table 2308.9.3(1).
2. Stone and masonry veneer is permitted to be used in the first story above grade plane or the first two stories above grade plane where the lowest story has concrete or masonry walls.
3. Stone and masonry veneer is permitted to be used in both stories of buildings with two stories above grade plane, provided the following criteria are met:
   3.1. Type of brace per Section 2308.9.3 shall be WSP and the allowable shear capacity in accordance with Section 2306.3 shall be a minimum of 350 plf (5108 N/m).
   3.2. *Braced wall panels* in the second *story* shall be located in accordance with Section 2308.9.3 and not more than 25 feet (7620 mm) on center, and the total length of braced wall panels shall be not less than 25 percent of the braced wall line length. *Braced wall panels* in the first *story* shall be located in accordance with Section 2308.9.3 and not more than 25 feet (7620 mm) on center, and the total length of *braced wall panels* shall be not less than 45 percent of the braced wall line length.
   3.3. Hold-down connectors shall be provided at the ends of each *braced wall panel* for the second *story* to first *story* connection with an allowable capacity of 2,000 pounds (8896 N). Hold-down connectors shall be provided at the ends of each *braced wall panel* for the first story to foundation connection with an allowable capacity of 3,900

pounds (17 347 N). In all cases, the hold-down connector force shall be transferred to the foundation.

3.4. Cripple walls shall not be permitted.

2308.6.9.2 Limitations of concrete or masonry in *Seismic Design Categories D and E* Concrete or masonry walls and stone or masonry veneer shall not extend above a basement.

Exception: In structures assigned to *Seismic Design Category* D, stone and masonry veneer is permitted to be used in the first story above grade plane, provided the following criteria are met:

1. Type of brace in accordance with Section 2308.9.3 shall be WSP and the allowable shear capacity in accordance with Section 2306.3 shall be a minimum of 350 plf (5108 N/m).
2. The bracing of the first *story* shall be located at each end and at least every 25 feet (7620 mm) o.c. but not less than 45 percent of the braced wall line.
3. Hold-down connectors shall be provided at the ends of braced walls for the first floor to foundation with an allowable capacity of 2,100 pounds (9341 N).
4. Cripple walls shall not be permitted.

2308.7 Roof and ceiling framing. The framing details required in this section apply to roofs having a minimum slope of three units vertical in 12 units horizontal (25-percent slope) or greater. Where the roof slope is less than three units vertical in 12 units horizontal (25-percent slope), members supporting rafters and ceiling joists such as ridge board, hips and valleys shall be designed as beams.

2308.7.1 Ceiling joist spans. Allowable spans for ceiling joists shall be in accordance with Table 2308.7.1(1) or 2308.7.1(2). For other grades and species, refer to the *AF&PA Span Tables for Joists and Rafters*.

~~TABLE 2308.10.2(1)~~ TABLE 2308.7.1(1)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable Attics Without Storage, Live Load = 10 pounds psf, L/Δ = 240)

(Portions of Table not shown remain unchanged)

~~TABLE 2308.10.2(2)~~ TABLE 2308.7.1(2)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable Attics With Limited Storage, Live Load = 20 pounds per square foot, L/Δ = 240)

(Portions of Table not shown remain unchanged)

2308.7.2 Rafter spans. Allowable spans for rafters shall be in accordance with Table 2308.7.2(1), 2308.7.2(2), 2308.7.2(3), 2308.7.2(4), 2308.7.2(5) or 2308.7.2(6). For other grades and species, refer to the *AF&PA Span Tables for Joists and Rafters*.

~~TABLE 2308.10.3(1)~~ TABLE 2308.7.2(1)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Roof Live Load = 20 pounds per square foot, Ceiling Not Attached to Rafters, L/Δ = 180)

(Portions of Table not shown remain unchanged)

~~TABLE 2308.10.3(2)~~ TABLE 2308.7.2(2)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Roof Live Load = 20 pounds per square foot, Ceiling Attached to Rafters, L/Δ = 240)

(Portions of Table not shown remain unchanged)

~~TABLE 2308.10.3(3)~~ TABLE 2308.7.2(3)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground Snow Load = 30 pounds per square foot, Ceiling Not Attached to Rafters, L/Δ = 180)

(Portions of Table not shown remain unchanged)

~~TABLE 2308.10.3(4)~~ TABLE 2308.7.2(4)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground Snow Load = 50 pounds per square foot, Ceiling Not Attached to Rafters, L/Δ = 180)

(Portions of Table not shown remain unchanged)

~~TABLE 2308.10.3(5)~~ TABLE 2308.7.2(5)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground Snow Load = 30 pounds per square foot, Ceiling Attached to Rafters, L/Δ = 240)

(Portions of Table not shown remain unchanged)

~~TABLE 2308.10.3(6)~~ TABLE 2308.7.2(6)
RAFTER SPANS FOR COMMON LUMBER SPECIES
(Ground Snow Load = 50 pounds per square foot, Ceiling Attached to Rafters, L/Δ = 240)

(Portions of Table not shown remain unchanged)

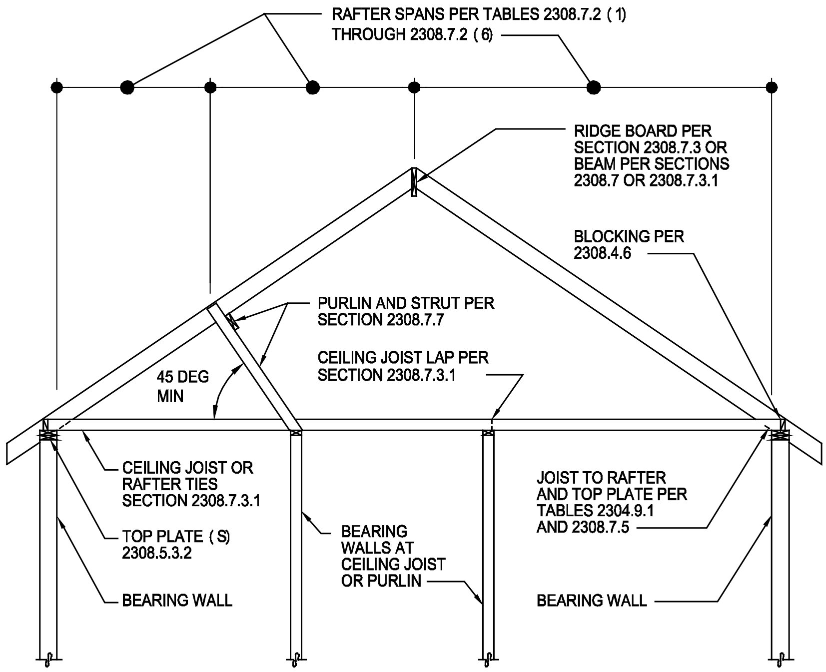
2308.7.3 Ceiling joist and rafter framing. Rafters shall be framed directly opposite each other at the ridge. There shall be a ridge board at least 1-inch (25 mm) nominal thickness at ridges and not less in depth than the cut end of the rafter. At valleys and hips, there shall be a single valley or hip rafter not less than 2-inch (51 mm) nominal thickness and not less in depth than the cut end of the rafter.

2308.7.3.1 Ceiling joist and rafter connections. Ceiling joists and rafters shall be nailed to each other and the assembly shall be nailed to the top wall plate in accordance with Tables 2304.9.1 and 2308.7.5. Ceiling joists shall be continuous or securely joined where they meet over interior partitions and be fastened to adjacent rafters in accordance with Tables 2304.9.1 and 2308.7.3.1 to provide a continuous rafter tie across the building where such joists are parallel to the rafters. Ceiling joists shall have a bearing surface of not less than 1-1/2 inches (38 mm) on the top plate at each end.

Where ceiling joists are not parallel to rafters, an equivalent rafter tie shall be installed in a manner to provide a continuous tie across the building, at a spacing of not more than 4 feet (1219 mm) o.c. The connections shall be in accordance with Tables 2308.7.3.1 and 2304.9.1, or connections of equivalent capacities shall be provided. Where ceiling joists or rafter ties are not provided at the top of the rafter support walls, the ridge formed by these rafters shall also be supported by a girder conforming to Section 2308.2.7. Rafter ties shall be spaced not more than 4 feet (1219 mm) o.c.

Rafter tie connections shall be based on the equivalent rafter spacing in Table 2308.7.3.1. Rafter/ceiling joist connections and rafter/tie connections shall be of sufficient size and number to prevent splitting from nailing.

Roof framing member connection to braced wall lines shall be in accordance with 2308.6.6.2.



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 degree = 0.018 rad.
Note: Where ceiling joints run perpendicular to the rafter, rafter ties shall be installed per section 2308.7.3.1

FIGURE 2308.7
ROOF CEILING FRAMING

~~TABLE 2308.10.4.1~~ TABLE 2308.7.3.1
RAFTER TIE CONNECTIONS[g]

(Portions of Table not shown remain unchanged)

2308.7.4 Notches and holes. Notching at the ends of rafters or ceiling joists shall not exceed one-fourth the depth. Notches in the top or bottom of the rafter or ceiling joist shall not exceed one-sixth the depth and shall not be located in the middle one-third of the span, except that a notch not exceeding one-third of the depth is permitted in the top of the rafter or ceiling joist not further from the face of the support than the depth of the member. Holes bored in rafters or ceiling joists shall not be within 2 inches (51 mm) of the top and bottom and their diameter shall not exceed one-third the depth of the member.

2308.7.5 Wind uplift. The roof construction shall have rafter and truss ties to the wall below. Resultant uplift loads shall be transferred to the foundation using a continuous load path. The rafter or truss to wall connection shall comply with Tables 2304.9.1 and 2308.7.5

~~TABLE 2308.10.1~~ TABLE 2308.7.5
REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a, b, c, e, f, g, h]

(Portions of Table not shown remain unchanged)

2308.7.6 Framing around openings. Trimmer and header rafters shall be doubled, or of lumber of equivalent cross section, where the span of the header exceeds 4 feet (1219 mm). The ends of header rafters more than 6 feet (1829 mm) long shall be supported by framing anchors or rafter hangers unless bearing on a beam, partition or wall.

2308.7.6.1 Openings in roof diaphragms in *Seismic Design Categories* B, C, D and E. Openings in horizontal diaphragms with a dimension perpendicular to the joist that is greater than 4 feet (1219 mm) shall be constructed with metal ties and blocking in accordance with this section and Figure 2308.4.4.1(1). Metal ties shall not be less than 0.058 inch [1.47 mm (16 galvanized gage)] thick by 1-1/2 inches (38 mm) wide with a minimum yield stress of 33,000 psi (227 Mpa). Blocking shall be provided 2 feet minimum beyond headers. Ties shall be attached to blocking with eight 16d common nails on each side of the header-joist intersection.

2308.7.7 Purlins. Purlins to support roof loads are permitted to be installed to reduce the span of rafters within allowable limits and shall be supported by struts to bearing walls. The maximum span of 2-inch by 4-inch (51 mm by 102 mm) purlins shall be 4 feet (1219 mm). The maximum span of the 2-inch by 6-inch (51 mm by 152 mm) purlin shall be 6 feet (1829 mm), but in no case shall the purlin be smaller than the supported rafter. Struts shall not be smaller than 2-inch by 4-inch (51 mm by 102 mm) members. The unbraced length of struts shall not exceed 8 feet (2438 mm) and the minimum slope of the struts shall not be less than 45 degrees (0.79 rad) from the horizontal.

2308.7.8 Blocking. Roof rafters and ceiling joists shall be supported laterally to prevent rotation and lateral displacement in accordance with the provisions of Section 2308.8.5 and connected to braced wall lines per Section 2308.6.6.2.

2308.7.9 Engineered wood products. Prefabricated wood I-joists, structural glued-laminated timber and structural composite lumber shall not be notched or drilled except where permitted by the manufacturer's recommendations or where the effects of such alterations are specifically considered in the design of the member by a *registered design professional*.

2308.7.10 Roof sheathing. Roof sheathing shall be in accordance with Tables 2304.7(3) and 2304.7(5) for wood structural panels, and Tables 2304.7(1) and 2304.7(2) for lumber and shall comply with Section 2304.7.2.

2308.7.11 Joints. Joints in lumber sheathing shall occur over supports unless *approved* end-matched lumber is used, in which case each piece shall bear on at least two supports.

2308.7.12 Roof planking. Planking shall be designed in accordance with the general provisions of this code.

In lieu of such design, 2-inch (51 mm) tongue-and groove planking is permitted in accordance with Table 2308.10.9. Joints in such planking are permitted to be randomly spaced, provided the system is applied to not less than three continuous spans, planks are center matched and end matched or splined, each plank bears on at least one support, and joints are separated by at least 24 inches (610 mm) in adjacent pieces.

2308.7.13 Wood trusses. Wood trusses shall be designed in accordance with Section 2303.4. Connection to braced wall lines shall be in accordance with Section 2308.6.6.2.

2308.7.14 Attic ventilation. For *attic* ventilation, see Section 1203.2.

Reason: This proposal is intended to completely replace the existing section 2308 "Conventional Light-Frame Construction" with a re-formatted version. This proposal is not intended to introduce any new requirements into, nor remove any requirements from, the existing section 2308.

As a result of many code cycles, Section 2308 has become fragmented and is not organized in a logical manner and is difficult to use. With this proposal, Section 2308 is formatted to begin with general requirements then proceed to foundations, floor framing, wall framing, wall bracing and roof-ceiling construction in that order. The additional requirements for *Seismic Design Categories* in the 2012 IBC Sections 2308.11 and 2308.12 (SDC B/C and SDC D/E respectively) have been merged into the appropriate new sections based on the type of construction such as floor framing, wall bracing and roof framing.

Terminology has been coordinated throughout the section such as the terms, "conventional light-frame construction", "braced wall line" and "braced wall panel".

This proposal is intended to be non-technical and separate proposals have been submitted to address technical items in section 2308.

In order to make the prescriptive provisions of the IBC more closely resemble the format of the similar provisions in the IRC, much of the wall bracing terminology is replicated from the IRC, namely:

- The requirements for braced wall line spacing were put into a single table format based on Seismic Design Category rather than scattered throughout all of Section 2308.
- The wall bracing methods were compiled into a table similar to the IRC, including abbreviations for the methods, rather

than referring to them by a number. The fasteners specified in this table were cross-referenced to the fastener table 2308.9.3.1 where applicable.

- For the section, “Alternate bracing” a figure (copied from the IRC) was introduced, but no technical changes were made.
- Similarly, for Section 2308.9.3.2, “Alternate bracing wall panel adjacent to a door or window opening” was renamed since it aligned perfectly with the Portal Frame with Hold-downs method (PFH) in the IRC. The figure was already in the IBC, so the title was changed to reflect the new name.

Comparison of the proposed 2015 to the existing 2012

<table>
<tr><th>Proposed 2015</th><th>2012 IBC</th></tr>
<tr><td>2308 Conventional Light-Frame Construction</td><td>2308 Conventional Light-Frame Construction</td></tr>
<tr><td>2308.1 General. The requirements of this section are intended for conventional light-frame construction. Other construction methods are permitted to be used, provided a satisfactory design is submitted showing compliance with other provisions of this code. Interior non-load-bearing partitions, ceilings and curtain walls of conventional light-frame construction are not subject to the limitations of ~~this~~ section 2308.2.</td><td>2308.1 General. As shown modified to the left</td></tr>
<tr><td></td><td>2308.1.1 Portions exceeding limitations of conventional construction. Moved to 2308.2.8</td></tr>
<tr><td>2308.2 Limitations</td><td>2308.2 Limitations. Included reference to items in 2308.11 (SDC B and C) and 2308.12 (SDC D and E). Those items have been moved here and elsewhere in the section as noted.</td></tr>
<tr><td>2308.2.1 Stories. The height limitations in the table are from:

2308.2.1 Stories. Structures of conventional light-frame construction shall be limited in story height according to the following:
<table>
<tr><th>Seismic Design Category</th><th>Allowable Story above grade plane</th></tr>
<tr><td>A and B</td><td>Three stories</td></tr>
<tr><td>C</td><td>Two Stories</td></tr>
<tr><td>D and E [a]</td><td>One story</td></tr>
</table>
a. For the purposes of this section, for buildings assigned to Seismic Design Category D or E, unless cripple walls are solid blocked and do not exceed 14 inches in height, cripple walls shall be considered to be a story.</td><td>2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of conventional light-frame construction, subject to the following limitations, and to further limitations of Sections 2308.11 and 2308.12.
1. Buildings shall be limited to a maximum of three stories above grade plane. For the purposes of this section, for buildings assigned to Seismic Design Category D or E, cripple stud walls shall be considered to be a story.
Exception: Solid blocked cripple walls not exceeding 14 inches (356 mm) in height need not be considered a story.

2308.11.1 Number of stories. Structures of conventional light-frame construction and assigned to Seismic Design Category C shall not exceed two stories above grade plane.

2308.12.1 Number of stories. Structures of conventional light-frame construction and assigned to Seismic Design Category D or E shall not exceed one story above grade plane.</td></tr>
<tr><td>2308.2.2 Allowable floor-to-floor height</td><td>Moved from 2308.2, item 2</td></tr>
<tr><td>2308.2.3 Allowable Loads</td><td>Moved from 2308.2, item 3</td></tr>
<tr><td>2308.2.4 Allowable wind speed</td><td>Moved from 2308.2, item 4</td></tr>
<tr><td>2308,2,5 Allowable roof span</td><td>Moved from 2308.2, item 5</td></tr>
<tr><td>2308.2.6 Risk Category limitation</td><td>Moved from 2308.2, item 6. SDC “F” was deleted since the provisions of 2308 are not allowed in SDC F.</td></tr>
<tr><td>2308.2.8 Portions exceeding limitations of conventional light-frame construction</td><td>Moved from 2308.1.1 and unchanged. The last sentence was moved here from the last sentence of 2308.4.2. The rest of 2308.4.2 was redundant.</td></tr>
<tr><td>2308.3 Foundations and footings. Foundations and footings shall be as specified in Chapter 18.</td><td>Moved from 2308.6</td></tr>
<tr><td>2308.3.1 Foundation plates or sills</td><td>Moved from 2308.12.9</td></tr>
<tr><td>2308.3.2 Sill plate anchorage in Seismic Design Category D and E.</td><td>2308.12.8 Sill plate anchorage</td></tr>
<tr><td>2308.4 Floor framing</td><td></td></tr>
<tr><td>2308.4.1 Girders</td><td>Moved from 2308.7</td></tr>
<tr><td>2308.4.2 Floor joists</td><td></td></tr>
<tr><td>2308.4.2.1 Span</td><td>Moved from 2308.8</td></tr>
</table>

2308.4.2.2 Bearing	Moved from 2308.8.1. Switched first sentence to end of paragraph
2308.4.2.3 Framing details	Moved from 2308.8.2. Notches portion removed and placed in section 2308.4.2.4
2308.4.2.4 Notches and holes	Moved from 2308.8.2
2308.4.3 Engineered wood products	Moved from 2308.8.2.1. First sentence is new.
2308.4.4 Framing around openings	Moved from 2308.8.3
2308.4.4.1 Openings in horizontal diaphragms in SDC B, C, D and E	From 2308.11.3.3 The text of this section has been re-arranged for clarity. The first sentence states that a tie and blocking are required. Then, the tie is described followed by the blocking.
2308.4.5 Joists supporting bearing partitions	Moved from 2308.8.4
2308.4.6 Lateral support	Moved from 2308.8.5. Changed "Floor, attic and roof…." to "Floor and ceiling…"
2308.4.7 Structural floor sheathing	Moved from 2308.8.6
2308.4.8 Under-floor ventilation	Moved from 2308.8.7
2308.4.9 Floor framing supporting braced wall panels	Reference to existing requirements from 2308.12.6 that have been moved to 2308.6.7
2308.4.10 Anchorage of exterior means of egress components in Seismic Design Category D or E	Moved from 2308.12.7
2308.5 Wall Construction	
2308.5.1 Stud size, height and spacing	Moved from 2308.9.1.
2308.5.2 Framing details	Moved from 2308.9.2 Exception #1 from 2308.9.2.3 Exception #2 from 2308.9.2
Table 2308.5.1	From existing Table 2308.9.1 Footnote "c" is from existing language in section 2308.9.1
2308.5.3 Plates and sills	
2308.5.3.1 Bottom plate or sill	From 2308.9.2.4
2308.5.3.2 Top plates	From 2308.9.2.1
2308.5.4 Nonbearing walls and partitions	From 2308.9.2.3
2308.5.5 Openings in walls and partitions	From 2308.9.5.
2308.5.5.1 Openings in exterior bearing walls "Wall studs shall support……"	From 2308.9.5.1 From 2308.9.5.2
2308.5.5.2 Openings in interior bearing partitions	From 2308.9.6
2308.5.5.2 Openings in interior nonbearing partitions	From 2308.9.7.
2308.5.6 Cripple walls	From 2308.9.4
2308.5.7 Bridging	From 2308.9.9
2308.5.8 Pipes in walls	From 2308.9.8
2308.5.9 Cutting and notching	From 2308.9.10
2308.5.10 Bored holes	From 2308.9.11
2308.6 Wall bracing	
2308.6.1 Braced wall line spacing Refers to new Table 2308.6.1 that contains spacing information from:	 BWL at 35' o.c. from 2308.3.1 BWL in SDC D/E at 25' o.c. from 2308.12.3
2308.6.2 Location of braced panels	From 2308.9.3. Distance of panel from end of wall line (12 ½ feet) was moved to Table 2308.6.1 along with SDC D and E limitation of 8 feet from 2308.12.4
2308.6.3 Braced wall panel methods New Table 2308.6.3(1)	From 2308.9.3. items 1 through 8 are re-located into Table 2308.6.3.(1) and renamed;

	1 LIB Let In Bracing 2 DWB Diagonal Wood Boards 3 WSP Wood Structural Panels 4 SFB Structural Fiberboard Sheathing 5 GB Gypsum Board 6 PBS Particle Board Sheathing 7 PCP Portland Cement Plaster 8 HPS Hardboard Panel Siding The two "Alternative bracing" options from 2308.9.3.1 are incorporated into Table 2308.6.3(1) as items 9 and 10 9 Alt bracing from 2308.9.3.1 ABW (Alternate Braced Wall) 10 Alt bracing wall panel adjacent to a door or window opening PFH (Portal Frame w/ Hold-downs)
2308.6.4 Length of braced wall panels	From 2308.9.3
2308.6.5 Alternative bracing	From 2308.9.3.1
2308.6.5.1 Alternate Braced Wall (ABW)	From 2308.9.3.1
2308.6.5.2 Portal Frame w/ Hold-downs (PFH)	From 2308.9.3.2 "Alternate bracing wall panel adjacent to a door or window opening"
2308.6.6 Cripple wall bracing	From 2308.9.4.1
2308.6.6.1 Cripple wall bracing in Seismic Design Category A, B and C	From 2308.9.4.1 and 2308.9.4.2
2308.6.6.2 Cripple wall bracing in Seismic Design Category D and E	From 2308.12.4
2308.6.7 Connections of braced wall panels	From 2308.12.4
2308.6.6.1 Bottom plate connection	From 2308.3.2.1
2308.6.6.2 Top plate connection	From 2308.3.2.2
2308.6.6.3 Sill anchorage	From first portion of 2308.3.3. The remainder of 2308.3.3 is moved to 2308.3.1 "Foundation Plates and Sills"
2308.6.6.4 Anchorage to all-wood foundations	From 2308.3.3.1
2308.6.7 Braced wall line support	
2308.6.7.1 Foundation requirements Cantilever floor provisions Braced panel over beam below	From 2308.3.4 From 2308.12.6, Item 1 (re-worded) From 2308.12.6, Item 3 (re-worded and shown in Fig. 2308.6(1)
2308.6.7.2 Floor and roof diaphragm support in Seismic Design Category D and E	From 2308.12.6, item 2
2308.6.7.3 Stepped footings in SDC B,C,D and E	From 2308.11.3.2
2308.6.8 Attachment of sheathing	From 2308.12.5
2308.6.9 Limitation of concrete or masonry veneer	
2308.6.9.1 Concrete or masonry veneer in Seismic Design Category B and C	From 2308.11.2
2308.6.9.2 Concrete or masonry veneer in Seismic Design Category D and E	From 2308.12.2
2308.7 Roof and ceiling framing	From 2308.10. Figure 2308.7 is new and is similar to the Figure in the IRC
2308.7.1 Ceiling joist spans	From 2308.10.2
2308.7.2 Rafter spans	From 2308.10.3
2308.7.3 Ceiling joist and rafter framing	From 2308.10.4
2308.7.3 Ceiling joist and rafter connections	From 2308.10.4
2308.7.4 Notches and holes	From 2308.10.4.2
2308.7.5 Wind uplift	From 2308.10.1
2308.7.6 Framing around openings	From 2308.10.4.3

2308.7.6 Openings in roof diaphragms in SDC B, C, D and E	From 2308.11.3.3 The text of this section has been re-arranged for clarity. The first sentence states that a tie and blocking are required. Then, the tie is described followed by the blocking.
2308.7.7 Purlins	From 2308.10.5
2308.7.9 Engineered wood products	From 2308.10.7
2308.7.10 Roof sheathing	From 2308.10.8
2308.7.11 Joints	From 2308.10.8.1
2308.7.12 Roof planking	From 2308.10.9
2308.7.13 Trusses	From 2308.10.10
2308.7.14 Attic ventilation	From 2308.10.11

Cost Impact: The code change proposal will not increase the cost of construction.

2308-S-RICE.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee feels this is a good reorganization of convention construction requirements, but with the number of editorials issues this disapproval will assure that they get done. Proponent is encouraged to work with FEMA and AWC on a public comment.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Chuck Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**2308.2.7**~~ **2308.1.1 Portions exceeding limitations of conventional light-frame construction.** When portions of a building of otherwise conventional light-frame construction exceed the limits of Section 2308.2, those portions and the supporting load path shall be designed in accordance with accepted engineering practice and the provisions of this code. For the purposes of this section, the term "portions" shall mean parts of buildings containing volume and area such as a room or a series of rooms. The extent of such design need only demonstrate compliance of the non-conventionally light-framed elements with other applicable provisions of this code and shall be compatible with the performance of the conventional light-framed system.

2308.1.2 Connections and fasteners. Connectors and fasteners used in conventional construction shall comply with the requirements of Section 2304.9.

2308.2.3 Allowable Loads. Loads shall be in accordance with Chapter 16 and shall not exceed the following:

1. Average dead loads shall not exceed 15 psf (718 N/m^2) for combined roof and ceiling, exterior walls, floors and partitions.

   Exceptions:

   1. Subject to the limitations of Section ~~2308.6.10.2~~ 2308.6.9.2, stone or masonry veneer up to the lesser of 5 inches (127 mm) thick or 50 psf (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2438 mm) permitted for gable ends.
   2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code.

2. Live loads shall not exceed 40 psf (1916 N/m^2) for floors.
3. Ground snow loads shall not exceed 50 psf (2395 N/m^2).

2308.3.1 Foundation plates or sills: Foundation plates or sills resting on concrete or masonry foundations shall comply with Section 2304.3.1. Foundation plates or sills shall be bolted or anchored to the foundation with not less than ½-inch-diameter 912.7 mm) steel bolts or approved anchors spaced to provide equivalent anchorage as the steel bolts. ~~Along braced wall lines in structures assigned to Seismic Design Category E, steel bolts with a minimum nominal diameter of 5/8 inch (15.9 mm) or approved anchor straps load rated in accordance with Section 1706.1 and spaced to provide equivalent anchorage shall be used.~~ Bolts shall be embedded at least 7 inches (178 mm) into concrete or masonry. Bolts shall be spaced not more than 6 feet (1829 mm) apart and there shall be a minimum of two bolts or anchor straps per piece with one bolt or anchor strap located not more than 12 inches (305 mm) or less than 4 inches (102 mm) from each end of each piece. ~~Bolts in braced wall lines in structures over two stories above grade shall be spaced not more the 4 feet (1219 mm) o.c..~~ A properly sized nut and washer shall be tightened on each bolt to the plate.

Exceptions:

1. Along braced wall lines in structures assigned to Seismic Design Category E, steel bolts with a minimum nominal diameter of 5/8 inch (15.9 mm) or approved anchor straps load rated in accordance with Section 1711.1 and spaced to provide equivalent anchorage shall be used.
2. Bolts in braced wall lines in structures over two stories above grade shall be spaced not more than 4 feet (1219 mm) o.c.

2308.4.4.1 Openings in floor diaphragms in Seismic Design Categories B, C, D, and E: Openings in horizontal diaphragms in Seismic Design Categories B, C, D and E with a dimension perpendicular to the joist that is greater than 4 feet (1219 mm) shall be constructed with metal ties and blocking in accordance with this section and Figure 2308.4.4.1(1). Metal ties shall not be less than 0.058 inch [1.47 mm (16 galvanized gage)] thick by 1-1/2 inches (38 mm) wide with a minimum yield stress of 33,000 psi (227 Mpa). Blocking shall be provided 2 feet minimum beyond headers. Ties shall be attached to blocking with eight 16d common nails on each side of the header-joist intersection.

Openings in floor diaphragms in Seismic Design Categories D and E ~~shall not exceed a dimension greater than 50 percent~~ shall not have any dimension exceeding 50 percent of the distance between braced wall lines or an area greater than 25 percent of the area between orthogonal pairs of braced wall lines [see Figure 2308.4.4.1(2)], or the portion of the structure containing the opening shall be designed in accordance with accepted engineering practice to resist the forces specified in Chapter 16, to the extent such irregular opening affects the performance of the conventional framing system.

2308.4.4.2 Vertical offsets in floor diaphragms in Seismic Design Categories D and E: In Seismic Design Categories D and E, portions of a floor level shall not be vertically offset such that the framing members on either side of the offset cannot be lapped or tied together in an approved manner in accordance with Figure 2308.4.4.2 unless the portion of the structure containing the irregular offset is designed in accordance with accepted engineering practice.

Exception: Framing supported directly by foundations need not be lapped or tied directly together.

2308.5.3.2 Top plates: Bearing and exterior wall studs shall be capped with double top plates installed to provide overlapping at corners and at intersections with other partitions. End joints in double top plates shall be offset at least 48 inches (1219 mm), and shall be nailed in accordance with Table 2304.9.1. Plates shall be a nominal 2 inches (51 mm) in depth and have a width at least equal to the width of the studs.

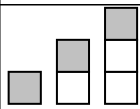
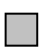
Exception: A single top plate is permitted, provided the plate is adequately tied at joints, corners and intersecting walls by at least the equivalent of 3-inch by 6-inch (76 mm by 152 mm) by 0.036-inch-thick (0.914 mm) galvanized steel connector that is nailed to each wall or segment of wall by six 8d nails or equivalent, provided the rafters, joists or trusses are centered over the studs with a tolerance of not more than 1 inch (25 mm).

Where bearing studs are spaced at 24-inch (610 mm) intervals and top plates are less than two 2- inch by 6-inch (51 mm by 152 mm) or two 3-inch by 4- inch (76 mm by 102 mm) members and where the floor joists, floor trusses or roof trusses that they support are spaced at more than 16-inch (406 mm) intervals, such joists or trusses shall bear within 5 inches (127 mm) of the studs beneath or a third plate shall be installed.

2308.5.6 Cripple walls. *(No change to first two sentences.)* See Section ~~2308.6.5~~ 2308.6.6 for cripple wall bracing.

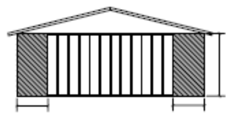
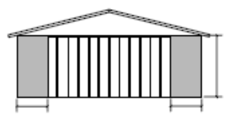
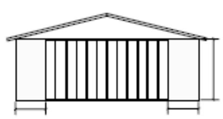
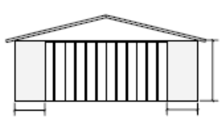
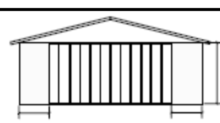
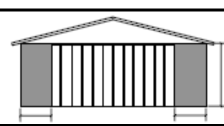
2308.6.1 Braced wall lines: For the purpose of determining the amount and location of bracing required along each story of a building, braced wall lines shall be designated as straight lines through the building plan in both the longitudinal and transverse direction and placed in accordance with Table 2308.6.1 and Figure ~~2308.6.1~~ 2308.6(1). *(no change to the rest of the section)*

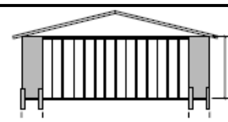
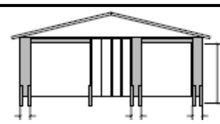
Table ~~2308.1~~ 2308.6.1
WALL BRACING REQUIREMENTS

Seismic Design Category	**Story Condition** (See section 2308.2)	**Maximum spacing of braced wall lines**	**Braced panel location, spacing (o.c.) and minimum percentage (x)** — **Bracing Method**: **LIB**	**DWB WSP**	**SFB PBS PCP HPS GB, ~~c~~,d**	**Maximum distance of braced wall panels from each end of braced wall line**
A and B		35’-0”	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	12’-6”
		35’-0”	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	12’-6”
		35’-0”	NP	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.[c]	12’-6”
C		35’-0”	NP	Each end and ≤25’-0” o.c.	Each end and ≤25’-0” o.c.	12’-6”
		35’-0”	NP	Each end and ≤25’-0” o.c. (min 25% of wall length) [e]	Each end and ≤25’-0” o.c. (min 25% of wall length) [e,c]	12’-6”
D and E		25’-0”	NP	Sds < 0.50: Each end and ≤25’-0” o.c. (min 21% of wall length) [e]	Sds < 0.50: Each end and ≤25’-0” o.c. (min 43% of wall length) [e]	8’-0”
				0.5 ≤ Sds < 0.75: Each end and ≤25’-0” o.c. (min 32% of wall length) [e]	0.5 ≤ Sds < 0.75: Each end and ≤25’-0” o.c. (min 59% of wall length) [e]	
				0.75 ≤Sds ≤ 1.00: Each end and ≤25’-0” o.c. (min 37% of wall length) [e]	0.75 ≤Sds ≤ 1.00: Each end and ≤25’-0” o.c. (min 75% of wall length) [e]	
				Sds > 1.00: Each end and ≤25’-0” o.c. (min 48% of wall length) [e]	Sds > 1.00: Each end and ≤25’-0” o.c. (min 100% of wall length) [e]	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
NP = Not Permitted
a. This table specifies minimum requirements for *braced wall panels* along interior or exterior *braced wall lines*.
b. See Section 2308.6.2 for full description of bracing methods.
c. For method GB, gypsum wallboard applied to framing supports that are spaced at 16 inches on center.
d. The required lengths shall be doubled for gypsum board applied to only one face of a braced wall panel.
e. Percentage shown represents the minimum amount of bracing required along the building length (or wall length if the structure has an irregular shape)

TABLE 2308.6.3(1)
BRACING METHODS

METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA [a]	
			Fasteners	**Spacing**
LIB [a] Let-in-bracing	1x4 wood or approved metal straps attached at 45° to 60° angles to studs at maximum of 16" o.c.		Per Fastener Table 2304.9.1~~, item 20~~ Metal strap: installed per manufacturer's installation recommendations	Wood: per stud plus top and bottom plates Metal strap: installed per manufacturer's installation recommendations
DWB Diagonal wood boards	3/4" thick (1" nominal) x 6" minimum width to studs at maximum of 24" o.c.		Per Fastener Table 2304.9.1~~, item 21 or 22~~	Per stud
WSP Wood structural panel	3/8" Per TABLE 2308.6.3(2) or 2308.6.3(3)		Per Fastener Table 2304.9.1~~, item 31~~	6" edges 12" field
SFB Structural fiberboard sheathing	1/2" Per TABLE ~~2308.6.3(4)~~ 2304.9.1 to studs at maximum 16" o.c.		Per Fastener Table 2304.9.1~~, item 33~~	3" edges 6" field
GB Gypsum board (Double sided)	1/2" by a minimum of 4 feet wide to studs at maximum of 24" o.c.		Exterior and interior sheathing: with 5d cooler nails (1-5/8" x 0.086") or 1¼" screws (type W or S) for ½" gypsum board or 1 5/8" screws (type W or S) for 5/8" gypsum board.	For all braced wall panel locations: 7" o.c. along panel edges (including top and bottom plates) and 7" o.c.in the field
PBS Particle-board sheathing	3/8" or 1/2" per Table ~~2308.9.3(4)~~ 2308.6.3(4) to studs at maximum of 16" o.c.		6d common (2" long x0.113" dia.) nails for 3/8" thick sheathing or 8d common (2½" long x 0.131" dia.) nails for 1/2" thick sheathing	3" edges 6" field
PCP Portland cement plaster	See Section 2510 to studs at maximum of 16" o.c.		1½" long, 11 gage, 7/16" dia. head nails or 7/8" long, 16 gage staples	6" o.c. on all framing members
HPS Hardboard panel siding	7/16" TABLE 2308.6.3(5)		Per Fastener Table ~~2308.9.1~~ 2304.9.1	4" edges 8" field

METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA [a]	
ABW Alternate braced wall.	$^{3}/_{8}$"		See Figure 2308.6.5(1) and Section 2308.6.5.1	See Figure ~~2308.6.3(1)~~ 2308.6.5(1)
PFH Portal frame with hold-downs	$^{3}/_{8}$		See Figure 2308.6.5(2) and Section 2308.6.5.2	See Figure ~~2308.6.3(2)~~ 2308.6.5(2)

For SI: 1 foot 305 mm

a. Method LIB shall have gypsum board fastened to at least one side with nails or screws.

TABLE 2308.6.3(3)
WOOD STRUCTURAL PANEL WALL SHEATHING

(No change to table)

a. *(no change)*
b. Blocking of horizontal joints shall not be required except as specified in Sections ~~2306.3 and 2308.12.4~~ 2308.6.4.

TABLE 2308.6.3(5)
HARDBOARD SIDING

(No change to table)

a. *(no changes)*
b. *(no changes)*
c. Where used to comply with Section ~~2308.9.3~~ 2308.6.
d. *(no changes)*

2308.6.4 Length of braced wall panels. For Methods DWB, WSP, SFB, PBS, PCP and HPS each panel must be at least 48 inches (1219 mm) in length, covering three stud spaces where studs are spaced 16 inches (406 mm) apart and covering two stud spaces where studs are spaced 24 inches (610 mm) apart. *Braced wall panels* less than the required 48" length shall not contribute towards the amount of bracing required. *Braced wall panels* longer than the required length shall be credited for their actual length. For Method GB, each panel must be at least 96 inches (2438 mm) in length where applied to one side of the studs or 48 inches (1219 mm) where applied to both sides.

All vertical joints of panel sheathing shall occur over studs and adjacent panel joints shall be nailed to common framing members. Horizontal joints shall occur over blocking or other framing equal in size to the studding except where waived by the installation requirements for the specific sheathing materials. Sole plates shall be nailed to the floor framing in accordance with Section ~~2308.3.2~~ 2308.6.7 and top plates shall be connected to the framing above in accordance with Section 2308.5.3. Where joists are perpendicular to braced wall lines above, blocking shall be provided under and in line with the braced wall panels.

2308.6.5.2 Portal Fame with Hold-downs (PFH). A PFH shall be constructed in accordance with this section and Figure 2308.6.5.2. The adjacent door or window opening shall have a full-length header.

In one-story buildings, each panel shall have a length of not less than 16 inches (406 mm) and a height of not more than 10 feet (3048 mm). Each panel shall be sheathed on one face with a single layer of 3/8 inch (9.5 mm) minimum thickness wood structural panel sheathing nailed with 8d common or galvanized box nails in accordance with Figure 2308.6.5.2. The wood structural panel sheathing shall extend up over the solid sawn or glued-laminated header and shall be nailed in accordance with Figure ~~2308.6.5~~ 2308.6.5.2. A built-up header consisting of at least two 2 × 12s and fastened in accordance with Item 24 of Table 2304.9.1 shall be permitted to be used. A spacer, if used, shall be placed on the side of the built-up beam opposite the wood structural panel sheathing. The header shall extend between the inside faces of the first full-length outer studs of each panel. The clear span of the header between the inner studs of each panel shall be not less than 6 feet (1829 mm) and not more than 18 feet (5486 mm) in length. A strap with an uplift capacity of not less than 1,000 pounds (4,400 N) shall fasten the header to the inner studs opposite the sheathing. One anchor bolt not less than 5/8 inch (15.9 mm) diameter and installed in accordance with Section 2308.3.1 shall be provided in the center of each sill plate. The studs at each end of the panel shall have a hold-down device fastened to the foundation with an uplift capacity of not less than 4,200 pounds (18 480 N).

Where a panel is located on one side of the opening, the header shall extend between the inside face of the first full-length stud of the panel and the bearing studs at the other end of the opening. A strap with an uplift capacity of not less than 1,000 pounds (4400 N) shall fasten the header to the bearing studs. The bearing studs shall also have a hold-down device fastened to the foundation with an uplift capacity of not less than 1,000 pounds (4400 N). The hold-down devices shall be an embedded strap type, installed in accordance with the manufacturer's recommendations. The PFH panels shall be supported directly on a foundation that is continuous across the entire length of the braced wall line. This foundation shall be reinforced with not less than one No. 4 bar top and bottom. Where the continuous foundation is required to have a depth greater than 12 inches (305 mm), a minimum 12-inch by 12-inch (305 mm by 305 mm) continuous footing or turned down slab edge is permitted at door openings in the braced wall line. This continuous footing or turned down slab edge shall be reinforced with not less than one No. 4 bar top and bottom. This reinforcement shall be lapped not less than 15 inches (381 mm) with the reinforcement required in the continuous foundation located directly under the braced wall line.

When a PFH is installed at the first *story* of two-story buildings, each panel shall have a length of not less than 24 inches (610 mm).

2308.6.5.1 Cripple wall bracing in Seismic Design Category A, B and C. For the purposes of this section, cripple walls in Seismic Design Categories A, B, and C having a stud height exceeding 14 inches (356 mm) shall be considered a *story* and shall be braced in accordance with Table 2308.6(1). Spacing of edge nailing for required cripple wall bracing shall not exceed 6 inches (152mm) o.c. along the foundation plate and the top plate of the cripple wall. Nail size, nail spacing for field nailing and more restrictive boundary nailing requirements shall be as required elsewhere in the code for the specific bracing material used.

2308.6.5.2 Cripple wall bracing in Seismic Design Category D and E. For the purposes of this section, cripple walls in Seismic Design Category D and E having a stud height exceeding 14 inches (356 mm) shall be considered a story and shall be braced in accordance with Table ~~2308.6(1)~~ 2308.6.1. Where interior braced wall lines occur without a continuous foundation below, the length of parallel exterior cripple wall bracing shall be one and one-half times the lengths required by Table ~~2308.6(1)~~ 2308.6.1. Where the cripple wall sheathing type used is method WSP or DWB and this additional length of bracing cannot be provided, the capacity of WSP or DWB sheathing shall be increased by reducing the spacing of fasteners along the perimeter of each piece of sheathing to 4 inches (102 mm) o.c.

2308.6.6.1 Bottom plate connection. Braced wall line bottom plates shall be connected to joists or full-depth blocking below in accordance with Table 2304.9.1, ~~Item 6~~ or to foundations in accordance with Section ~~2308.3.3~~ 2308.3.1.

2308.6.6.2 Top plate connection. Where joists and/or rafters are used, braced wall line top plates shall be fastened over the full length of the braced wall line to joists, rafters, rim boards or blocking above in accordance with Table 2304.9.1, as applicable, based on the orientation of the joists or rafters to the braced wall line. Blocking at joists with walls above shall be equal to the depth of the joist at the braced wall line. Blocking at rafters need not be full depth but shall extend to within 2 inches (51 mm) from the roof sheathing above. Blocking shall be a minimum of 2 inches (51 mm) nominal thickness and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1~~, Item 11~~. Notching or drilling of holes in blocking in accordance with the requirements of Section ~~2308.8.2~~ 2308.4.2.4 or Section ~~2308.10.4.2~~ 2308.7.4 shall be permitted.

At exterior gable end walls braced wall panel sheathing in the top *story* shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15 240 mm).

Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall over the full length of the braced wall line by blocking of the ends of the trusses or by other *approved* methods providing equivalent lateral force transfer. Blocking shall be minimum 2 inches (51 mm) nominal thickness and shall extend to within 2 inches (51 mm) from the roof sheathing above and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1. Notching or drilling of holes in blocking in accordance with the requirements of Section 2308.4.2.4 or Section 2308.7.4 shall be permitted.

2308.6.7.1 Foundation requirements. *(no change to first sentence and Exception.)* For structures in Seismic Design Category D and E, exterior braced wall panels shall be in the same plane vertically with the foundation or the ~~braced wall line~~ portion of the structure containing the offset shall be designed in accordance with accepted engineering practice according to section 2308.1.1

For structures in *Seismic Design Category D and E,* exterior *braced wall panels* shall be in the same plane vertically with the foundation or the ~~braced wall line~~ portion of the structure containing the offset shall be designed in accordance with accepted engineering practice according to section 2308.1.1

Exceptions:

1. Exterior *braced wall panels* may be located up to 4 feet from the foundation below when supported by a floor constructed in accordance with all the following:
   - 1.1 Cantilevers or setbacks shall not exceed four times the nominal depth of the floor joists
   - 1.2. Floor joists shall be 2 inches by 10 inches (51 mm by 254 mm) or larger and spaced not more than 16 inches (406 mm) o.c.
   - 1.3. The ratio of the back span to the cantilever shall be at least 2:1.
   - 1.4. Floor joists at ends of *braced wall panels* shall be doubled.
   - 1.5. A continuous rim joist shall be connected to the ends of cantilevered joists. The rim joist is permitted to be spliced using a metal tie not less than 0.058 inch (1.47 mm) (16 galvanized gage) and 11/2 inches (38 mm) wide fastened with six 16d common nails on each side. The metal tie shall have a minimum yield stress of 33,000 psi (227 MPa).
   - 1.6. Joists at setbacks or the end of cantilevered joists shall not carry gravity loads from more than a single *story* having uniform wall and roof loads, nor carry the reactions from headers having a span of 8 feet (2438 mm) or more.
2. The end of a required braced wall panel shall be allowed to extend not more than 1 foot (305 mm) over an opening in the wall below. This requirement is applicable to *braced wall panels* offset in plane and to *braced wall panels* offset out of plane as permitted by the exception to Item 1 above in this section.

Exception: *Braced wall panels* are permitted to extend over an opening not more than 8 feet (2438 mm) in width where the header is a 4-inch by 12-inch (102 mm by 305 mm) or larger member

2308.6.7.2 Floor and roof diaphragms support in Seismic Design Category D and E. In structures assigned to *Seismic Design Category D or E,* floor and roof diaphragms shall be laterally supported by braced wall lines on all edges and connected in accordance with Section ~~2308.3.2~~ 2308.6.7 [see Figure 2308.6.7.2(1)].

> **Exception:** Portions of roofs or floors that do not support *braced wall panels* above are permitted to extend up to 6 feet (1829 mm) beyond a braced wall line [see Figure 2308.6.7.2(2)] provided that the framing members are connected to the braced wall line below in accordance with Section 2308.6.6.

2308.6.7.3 Stepped footings in Seismic Design Category B, C, D, and E. In Seismic Design Category B, C, D, and E, where the height of a required braced wall panel extending from foundation to floor above varies more than 4 feet (1219 mm), the following construction shall be used:

1. Where the bottom of the footing is stepped and the lowest floor framing rests directly on a sill bolted to the footings, the sill shall be anchored as required in Section ~~2308.3.3~~ 2308.3.
2. Where the lowest floor framing rests directly on a sill bolted to a footing not less than 8 feet (2438 mm) in length along a line of bracing, the line shall be considered to be braced. The double plate of the cripple stud wall beyond the segment of footing extending to the lowest framed floor shall be spliced to the sill plate with metal ties, one on each side of the sill and plate. The metal ties shall not be less than 0.058 inch [1.47 mm (16 galvanized gage)] by 11/2 inches (38 mm) wide by 48 inches (1219 mm) with eight 16d common nails on each side of the splice location (see Figure 2308.6.7.3(1). The metal tie shall have a minimum yield stress of 33,000 pounds per square inch (psi) (227 MPa).
3. Where cripple walls occur between the top of the footing and the lowest floor framing, the bracing requirements for a *story* shall apply.

2308.6.8 Attachment of sheathing. Fastening of braced wall panel sheathing shall not be less than that prescribed in Tables ~~2308.6(1)~~ 2308.6.1 and 2304.9.1. Wall sheathing shall not be attached to framing members by adhesives.

2308.6.9.1 Limitations of concrete and masonry veneer in Seismic Design Categories B or C. In Seismic Design Categories B and C, concrete or masonry walls and stone or masonry veneer shall not extend above a basement.

Exceptions:

1. In structures assigned to *Seismic Design Category* B, stone and masonry veneer is permitted to be used in the first two stories above grade plane or the first three stories above grade plane where the lowest story has concrete or masonry walls, provided that structural use panel wall bracing is used and the length of bracing provided is one and one-half times the required length as determined in Table ~~2308.9.3(1)~~ 2308.6.1.

2. Stone and masonry veneer is permitted to be used in the first story above grade plane or the first two stories above grade plane where the lowest story has concrete or masonry walls.

3. Stone and masonry veneer is permitted to be used in both stories of buildings with two stories above grade plane, provided the following criteria are met:

   3.1. Type of brace per Section ~~2308.9.3~~ 2308.6.1 shall be WSP and the allowable shear capacity in accordance with Section 2306.3 shall be a minimum of 350 plf (5108 N/m).

   3.2. *Braced wall panels* in the second *story* shall be located in accordance with Section ~~2308.9.3~~ 2308.6.1 and not more than 25 feet (7620 mm) on center, and the total length of braced wall panels shall be not less than 25 percent of the braced wall line length. *Braced wall panels* in the first *story* shall be located in accordance with Section ~~2308.9.3~~ 2308.6.1 and not more than 25 feet (7620 mm) on center, and the total length of *braced wall panels* shall be not less than 45 percent of the braced wall line length.
   3.3. Hold-down connectors shall be provided at the ends of each *braced wall panel* for the second *story* to first *story* connection with an allowable capacity of 2,000 pounds (8896 N). Hold-down connectors shall be provided at the ends of each *braced wall panel* for the first story to foundation connection with an allowable capacity of 3,900 pounds (17 347 N). In all cases, the hold-down connector force shall be transferred to the foundation.
   3.4. Cripple walls shall not be permitted.

2308.6.9.2 Limitations of concrete or masonry in Seismic Design Categories D and E: In Seismic Design Categories D and E, concrete or masonry walls and stone or masonry veneer shall not extend above a basement.

> **Exception**: In structures assigned to *Seismic Design Category* D, stone and masonry veneer is permitted to be used in the first story above grade plane, provided the following criteria are met:

1. Type of brace in accordance with Section ~~2308.9.3~~ 2308.6.1 shall be WSP and the allowable shear capacity in accordance with Section 2306.3 shall be a minimum of 350 plf (5108 N/m).
2. The bracing of the first *story* shall be located at each end and at least every 25 feet (7620 mm) o.c. but not less than 45 percent of the braced wall line.
3. Hold-down connectors shall be provided at the ends of braced walls for the first floor to foundation with an allowable capacity of 2,100 pounds (9341 N).

4. Cripple walls shall not be permitted.

2308.7.8 Blocking. Roof rafters and ceiling joists shall be supported laterally to prevent rotation and lateral displacement in accordance with the provisions of Section ~~2308.8.5~~ 2308.4.6 and connected to braced wall lines per Section 2308.6.6.2.

2308.7.12 Roof planking. Planking shall be designed in accordance with the general provisions of this code.

In lieu of such design, 2-inch (51 mm) tongue-and groove planking is permitted in accordance with Table ~~2308.10.9~~ 2308.7.12. Joints in such planking are permitted to be randomly spaced, provided the system is applied to not less than three continuous spans, planks are center matched and end matched or splined, each plank bears on at least one support, and joints are separated by at least 24 inches (610 mm) in adjacent pieces.

TABLE ~~2308.10.9~~ 2308.7.12
ALLOWABLE SPANS FOR 2-INCH TONGUE-AND-GROOVE DECKING

(No change to table contents)

2308.8 Design of elements. Combining of engineered elements or systems and conventionally specified elements or systems shall be permitted subject to the following limits.

2308.8.1 Elements exceeding limitations of conventional construction. When a building of otherwise conventional construction contains structural elements exceeding the limits of Section 2308.2, these elements and the supporting load path shall be designed in accordance with accepted engineering practice and the provisions of this code.

2308.8.2 Structural elements or systems not described herein. When a building of otherwise conventional construction contains structural elements or systems not described in Section 2308, these elements or systems shall be designed in accordance with accepted engineering practice and the provisions of this code. The extent of such design need only demonstrate compliance of the nonconventional elements with other applicable provisions of this code and shall be compatible with the performance of the conventionally framed system.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This public comment is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 5 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

This proposed modification to S273 addresses concerns that were raised at the Code Development Hearings. The original proposal, S273, was the product of countless hours by the Building Code Action Committee members. The proposal was not completely free of editorial errors by the deadline for submission.

The committee strongly supported the proposal and felt that it was a good reorganization of section 2308 but that it needed corrections. At the time of the Code Development Hearings in May, most, if not all, of the concerns had been identified and preliminarily addressed. This modification, the work of the BCAC members, addresses the necessary corrections and editorial changes and is submitted with the full support of the BCAC and we request approval of this modification. Due to the overall length of the original code change, this Public Comment shows only the specific items that required correction.
The inconsistencies and mistakes in the original proposal that are cleaned up by this public comment, as explained below:

Section 2308.2.3: corrects an incorrect section reference.

Section 2308.1.1 (new): location as a subsection of 2308.1, as it is in the current code, is appropriate to avoid a circular reference to 2308.2 in the text, and the more prominent location in 2308.1 is appropriate.

Section 2308.1.2 (new): This requirement for connectors and fasteners was inadvertently omitted from the code change; it is inserted here.

Section 2308.3.1: relocates two sentences as exceptions for clear application of the rest of the requirements of the section.

2308.4.4.1: Since titles are editorial the seismic design category needs to be contained in the text of the section; and clarity of wording for floor opening limitations. It is not the opening that needs to be designed but the portion of the structure containing an opening that exceeds the limitations for size.

2308.4.4.2: The Seismic Design Categories need to be named in the text, and the alternative for design of the portion of the structure containing an irregular offset in the current code should be preserved.

2308.5.3.2: This clarification is necessary due to the reorganization of the sections.

2308.5.6: Corrects an incorrect reference.

2308.6.1: Corrects an incorrect Figure number reference.

Table 2308.1: Corrects an incorrect Table number from Table 2308.1 to 2308.6.1; the text has it correct. Also, corrects the footnote "c" placement and text to reflect the current application in current Table 2308.9.3(1).

Table 2308.6.3(1): eliminating reference to items numbers of Table 2304.9.1 in the "Connection Criteria" column will preclude cross-referencing difficulties if the fastener table is changed; the item numbers are not necessary for a correct reference. Several incorrect numbers references are corrected. Also, an existing 16-inch stud spacing limitation is inserted for the Structural Fiberboard method (SFB).

Table 2308.6.3(3): deletes a non-existent section reference and replaces the other with the correct section reference.

Table 2308.6.3(5): corrects an incorrect reference.

2308.6.4: corrects an incorrect section reference.

Section 2308.6.5.2: corrects an incorrect reference.

2308.6.5.1: the Seismic Design Categories need to be named in the text since titles are editorial.

2308.6.5.2: corrects an incorrect table number in two places.

2308.6.6.1: eliminates an unnecessary use of a table item number designation to preclude correlation problems later; also corrects an incorrect reference.

2308.6.6.2: eliminates an unnecessary use of a table item number designation to preclude correlation problems later; also corrects two incorrect references.

2308.6.7.1: reworded to make it clear that it is not the braced wall line that needs to be designed but the portion of the structure containing the offset which causes the structure to be "irregular" in regard to the limitations.

2308.6.7.2: corrects an incorrect section reference.

2308.6.7.3: the Seismic Design Categories need to be named in the text since titles are editorial; also corrects an incorrect section reference.

2308.6.8: corrects an incorrect table reference.

2308.6.9.1: the Seismic Design Categories need to be named in the text since titles are editorial; also corrects incorrect references in four places.

2308.6.9.2: the Seismic Design Categories need to be named in the text since titles are editorial; also corrects an incorrect reference.

2308.7.8: corrects an incorrect reference.

2308.7.12: coordinates the number of the referenced table with the section number.

Table 2308.7.12: coordinates the number of the table with the section that references it.

2308.8 (new): This section currently appears in 2012 IBC Section but was omitted from the proposal. It addresses individual engineered elements within the building and therefore differs from proposed 2308.1.1 which addresses entire portions of structures. These provisions are important for guidance regarding engineered elements and systems within a conventionally framed structure, and should be retained.

The following renumbering to be done by staff editorial.

~~2308.6.5~~ 2308.6.6 Cripple wall bracing.
~~2308.6.5.1~~ 2308.6.6.1 Cripple wall bracing in Seismic Design Category A, B and C.
~~2308.6.5.2~~ 2308.6.6.2 Cripple wall bracing in Seismic Design Category D and E.
~~2308.6.6~~ 2308.6.7 Connections of braced wall panels.
~~2308.6.6.1~~ 2308.6.7.1 Bottom plate connection.
~~2308.6.6.2~~ 2308.6.7.2 Top plate connection.
~~2308.6.6.3~~ 2308.6.7.3 Sill anchorage.
~~2308.6.6.4~~ 2308.6.7.4 Anchorage to all-wood foundations.
~~2308.6.7~~ 2308.6.8 Braced wall line and diaphragm support.
~~2308.6.7.1~~ 2308.6.8.1 Foundation requirements.

~~2308.6.7.2~~ 2308.6.8.2 Floor and roof diaphragm support in Seismic Design Category D and E.
Figure ~~2308.6.7.2(1)~~ 2308.6.8.2(1) ROOF IN SDC D OR E NOT SUPPORTED ON ALL EDGES
Figure ~~2308.6.7.2(2)~~ 2308.6.8.2(2) ROOF EXTENSION IN SDC D OR E BEYOND BRACED WALL LINE
~~2308.6.7.3~~ 2308.6.8.3 Stepped footings in Seismic Design Category B, C, D, and E.
Figure ~~2308.6.7.3(1)~~ 2308.6.8.3(1) STEPPED FOOTING CONNECTION DETAILS
~~2308.6.8~~ 2308.6.9 Attachment of sheathing.
~~2308.6.9~~ 2308.6.10 Limitations of concrete or masonry veneer.
~~2308.6.9.1~~ 2308.6.10.1 Limitations of concrete or masonry veneer in Seismic Design Categories B or C.
~~2308.6.9.2~~ 2308.6.10.2 Limitations of concrete or masonry in Seismic Design Categories D and E.

Corresponding update, to Section references are staff edits.

Public Comment 2:

Larry Wainright, Qualtim, representing Structural Building Components Association (SBCA), requests Approval as Submitted.

Commenters Reason: While the language in not perfect as described by the committee, the proposed changes are a vast improvement in the organization and clarity of this section. Over the past several years, SBCRI has conducted a great deal of research into the requirements of the IBC, section 2308 and the design capacity of wall assemblies built to those provisions. For engineered design, section 2306, references SDPWS. The design capacities in SDPWS are those obtained from E72 type tests with full restraint at the ends of the shearwall and a load beam at the top of the wall. Section 2308 requires neither of these conditions. Full scale testing using section 2308 provisions has shown that the capacity is significantly lower and there is reliance on systems effects to achieve the assumed shear strength. The Table below is an example what the assumed system effect is once all of the buildings construction details have been completed (i.e additional strength from the addition of interior partitions, windows and doors, corner framing, interior gypsum, etc.) It is only with this type of transparency that the provisions of section 2308 make any sense. We urge your support of the proposal as written to help provide clarity for all users of the code. This is a well thought out and reasonable rewrite.

Simplified Nominal Unit Shear Capacities for Braced Wall Lines.					
Sheathing Material	**Fastener**	**Fastener Spacing**	**Any Species Stud Framing**		
			Tested capacity[1]	**System Effects Factor**	**Nominal Unit Shear capacity for use in design.**
3/8", 7/16" or 15/32" WSP @16" and 24" o.c framing.	6d (2" x 0.113" nails) or 8d (2 1/2 x 0.131"	6:12	350	1.80	630
3/8", 7/16" or 15/32" WSP @16" and 24" o.c framing (with 1/2" gypsum on interior face of wall.	6d (2" x 0.113") or 8d (2 1/2 x 0.131"nails and Types S or W drywall screws.	6:12 WSP & 16:16 for GWB	450	1.80	810
3/8", 7/16" or 15/32" WSP @16" and 24" o.c framing. - Seismic	6d (2" x 0.113" nails) or 8d (2 1/2 x 0.131"	6:12	330[2]	1.45[3]	475

[1]SBCRI full scale testing with anchor bolt restraint per section 2308 provisions.
[2]This value is based on a 5% reduction in tested capacities with Cyclic testing in accordance with research by Dolan, Toothman and Seaders.
[3]Factor to correlate SBCRI tested capacities with Anchor bolt restraint to SDPWS seismic values.

Full details of this research referenced above can be found at http://sbcri.info/bcters.php

Public Comment 3:

John Gruber, P.E., Sheppard Engineering, P.C., representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2308.1.1 Design Values. The provisions of section 2308 are based on the design values as shown in Table 2308.1.1.

Table 2308.1.1- Simplified Nominal Unit Shear Capacities for Braced Wall Lines.

Simplified Nominal Unit Shear Capacities for Braced Wall Lines.					
Sheathing Material	**Fastener**	**Fastener Spacing**	**Any Species Stud Framing**		
			Tested capacity[1]	**System Effects Factor**	**Nominal Unit Shear capacity for use in design.**
$^{3}/_{8}$", 7/16" or 15/32" WSP @16" and 24" o.c framing.	6d (2" x 0.113" nails) or 8d (2 1/2 x 0.131"	6:12	350	1.80	630
3/8", 7/16" or 15/32" WSP @16" and 24" o.c framing (with 1/2" gypsum on interior face of wall.	6d (2" x 0.113") or 8d (2 1/2 x 0.131"nails and Types S or W drywall screws.	6:12 WSP & 16:16 for GWB	450	1.80	810
$^{3}/_{8}$", 7/16" or 15/32" WSP @16" and 24" o.c framing. - Seismic	6d (2" x 0.113" nails) or 8d (2 1/2 x 0.131"	6:12	330[2]	1.45[3]	475
[1]SBCRI full scale testing with anchor bolt restraint per section 2308 provisions. [2]This value is based on a 5% reduction in tested capacities with Cyclic testing in accordance with research by Dolan, Toothman and Seaders. [3]Factor to correlate SBCRI tested capacities with Anchor bolt restraint to SDPWS seismic values.					

(Portions of proposal not shown remain unchanged)

Commenters Reason: Over the past several years, SBCRI has conducted a great deal of research into the requirements of the IBC, section 2308 and the design capacity of wall assemblies built to those provisions. For engineered design, section 2306, references SDPWS. The design capacities in SDPWS are those obtained from E72 type tests with full restraint at the ends of the shearwall and a load beam at the top of the wall. Section 2308 requires neither of these conditions. Full scale testing using section 2308 provisions has shown that the capacity is significantly lower. Table 2308.1.1 simply adds transparency to this section to show what the assumed system effect is once all of the buildings construction detail has been completed (i.e. additional strength from the addition of interior partitions, windows and doors, corner framing, interior gypsum, etc.) Full details of this research can be found at http://sbcri.info/bcters.php

S273-12

Final Action: AS AM AMPC____ D

S276-12
2308.2

Proposed Change as Submitted

Proponent: Charles S. Bajnai, Chesterfield County (bajnaic@chesterfield.gov), VA, Ed Keith, American Plywood Association, representing Chesterfield County, VA, Robert Rice, OBOA, representing Chesterfield County, VA

Revise as follows:

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the following limitations, and to further limitations of Sections 2308.11 and 2308.12.

3.1. Average dead loads shall not exceed 15 psf (718 N/m2) for combined roof and ceiling, exterior walls, floors and partitions.

Exceptions:

1. Subject to the limitations of Sections 2308.11.2 and 2308.12.2, stone or masonry veneer up to the lesser of 5 inches (127 mm) thick or 50 psf (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2438 mm) permitted for gable ends.
2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code. 3.2. Live loads shall not exceed 40 psf (1916 N/m^2) for floors.

3.2. Live loads shall not exceed 40 psf (1916 N/m^2) for floors <u>of conventional light-frame construction</u>.
3.3. Ground snow loads shall not exceed 50 psf (2395 N/m^2).

(Portions of text not shown remain unchanged)

Reason: The limitation of 40 psf live load for floors from Table 1607.1 makes Section 2308, Conventional Light- Frame Construction, essentially restricted to residential construction.

This code change proposal is intended to clarify that the 40 psf live load for floors applies to all stories constructed of conventional light-frame construction.

This new exemption would allow Section 2308, Conventional Light-Frame Construction to apply to live/work structures, and one story offices, retail spaces, assembly spaces, schools, etc

Cost Impact: The code change proposal will not increase the cost of construction

2308.2-BAJNAI-RICE.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This code change potentially extends the application of the conventional construction provisions to buildings not originally intended.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Chuck Bajnai, Chesterfield County, VA, representing ICC Building Code Action Committee requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the following limitations, and to further limitations of Sections 2308.11 and 2308.12.

3.1. Average dead loads shall not exceed 15 psf (718 N/m2) for combined roof and ceiling, exterior walls, floors and partitions.

Exceptions:

1. Subject to the limitations of Sections 2308.11.2 and 2308.12.2, stone or masonry veneer up to the lesser of 5 inches (127 mm) thick or 50 psf (2395 N/m^2) and installed in accordance with Chapter 14 is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation, with an additional 8 feet (2438 mm) permitted for gable ends.
2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this code. 3.2. Live loads shall not exceed 40 psf (1916 N/m^2) for floors.

3.2 Live loads shall not exceed 40 psf (1916 N/m^2) for floors of conventional light-frame construction. **.** <u>Floor live load shall be allowed to exceed 40 psf (1916 N/m2) where the floor is constructed on grade.</u>

3.3. Ground snow loads shall not exceed 50 psf (2395 N/m^2).

Commenter's Reason: This public comment is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 5 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

There was much commotion on the floor when this code change proposal was being discussed. The proponents and opponents were confused as to who should be testifying. After the vote, both the opponents and proponents agreed that they liked this code change because it made sense to allow Section 2308 to be more widely applicable.

The committee disapproved this proposal because they thought that easing the limitations would potentially extend the application of Section 2308 to buildings not originally intended. They were right on, but they missed the beauty of this code change. With the current limitation of 40 psf floor live load –Section 2308 is seldom used! The live load table, Table 1607.1, only allows live load of 40 psf for the following applications: catwalks, patient rooms in hospitals, cell blocks, classrooms and habitable areas and stairs in residences. The proposed code change was intended to make 2308 useable: for small commercial structures or live work structures built with first floor slab on grade.

I did intend to extend the application and make 2308 more versatile. My original intention might not have been clear enough, so this public comment comes out and says that higher live loads can only be applied to a <u>floor is constructed on grade</u>. The public comment should make it clearer that someone cannot build with 100 psf live loads on conventional light frame construction applied to the second floor.

S276-12

Final Action: AS AM AMPC____ D

S280-12
2308.2.2

Proposed Change as Submitted

Proponent: Robert Rice, C.B.O., Josephine County, OR, representing Oregon Building Officials Association (structdesigner@yahoo.com)

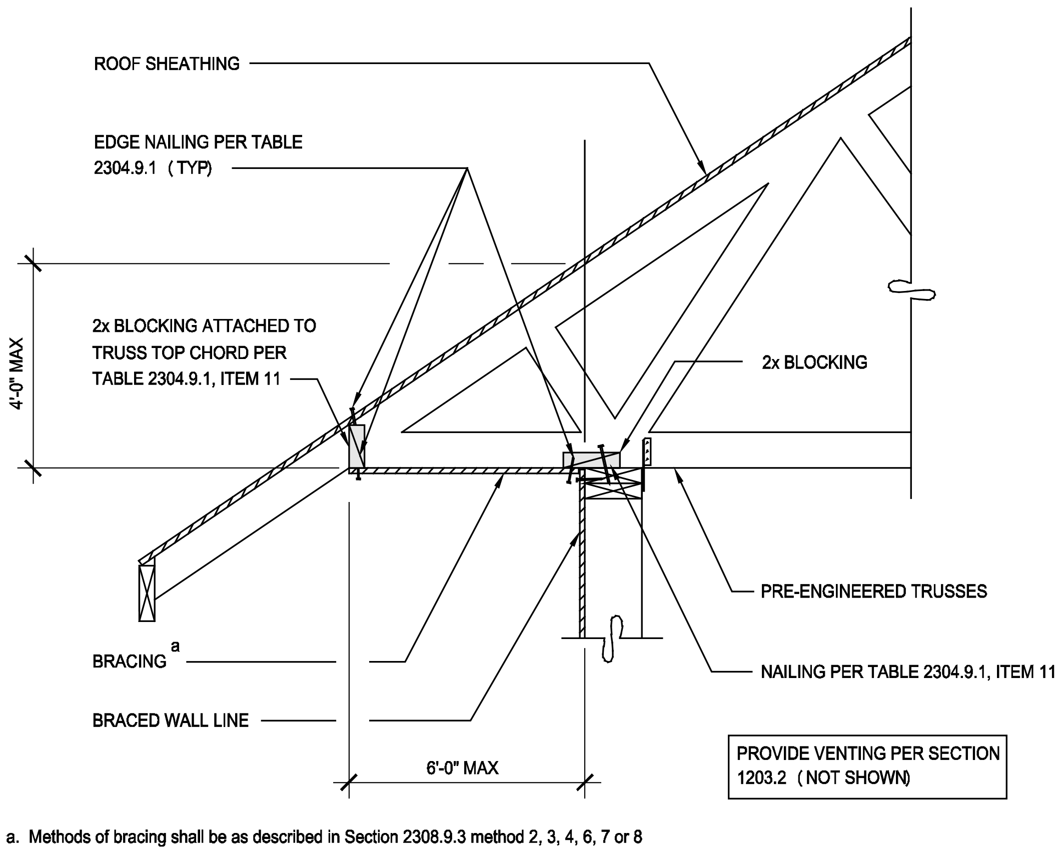
Revise as follows:

2308.3.2.2 Top plate connection. Where joists and/or rafters are used, braced wall line top plates shall be fastened over the full length of the braced wall line to joists, rafters, rimboards or blocking above in accordance with Table 2304.9.1, Items 11, 12, 15 or 19, as applicable, based on the orientation of the joists or rafters to the braced wall line. Blocking at joists with walls above shall be equal to the depth of the joist at the braced wall line. Blocking at rafters need not be full depth but shall extend to within 2 inches (51 mm) from the roof sheathing above. Blocking shall be a minimum of 2 inches (51 mm) nominal thickness and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11. Notching or drilling of holes in blocking in accordance with the requirements of Section 2308.8.2 or Section 2308.10.4.2 shall be permitted.

At exterior gable end walls braced wall panel sheathing in the top *story* shall be extended and fastened to roof framing where the spacing between parallel exterior braced wall lines is greater than 50 feet (15 240 mm).

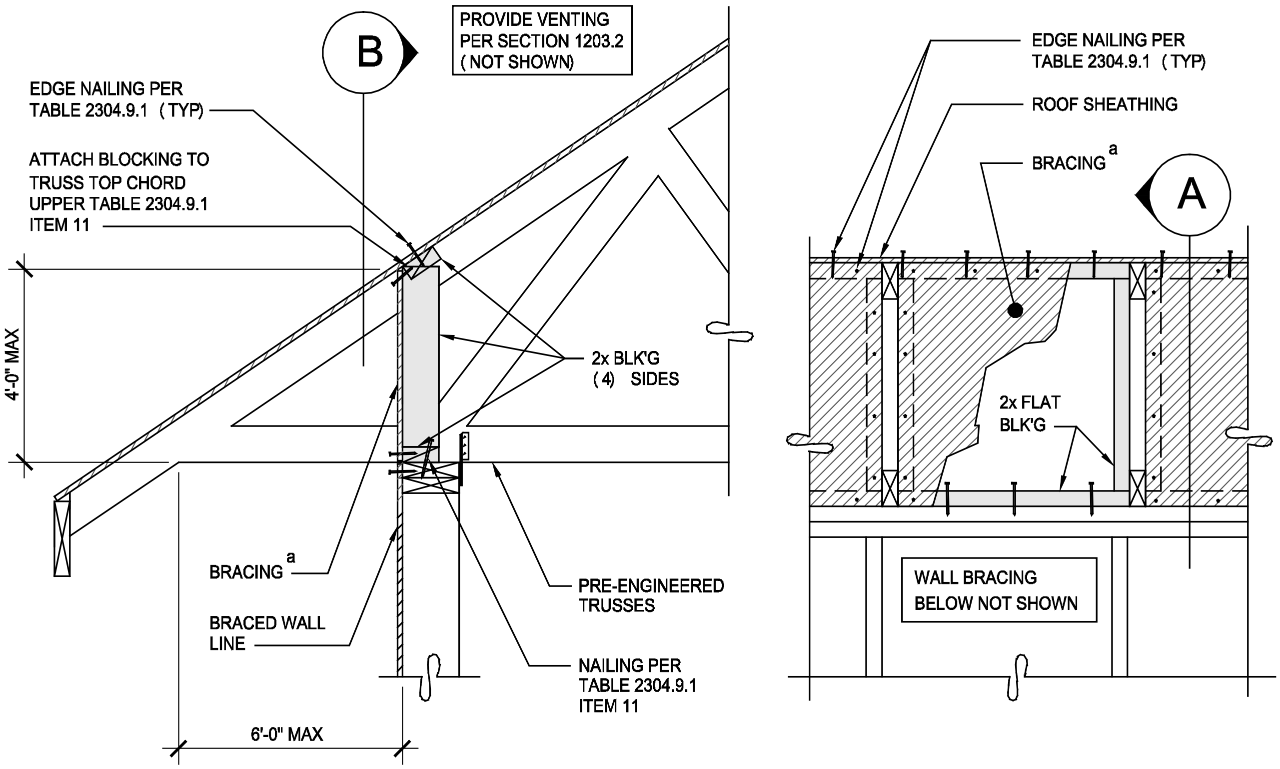
Where roof trusses are used and are installed perpendicular to an exterior braced wall line, lateral forces shall be transferred from the roof diaphragm to the braced wall over the full length of the braced wall line by blocking of the ends of the trusses or by other *approved* methods providing equivalent lateral force transfer. Blocking shall be minimum 2 inch (51 mm) nominal thickness and shall extend to within 2 inches (51 mm) from the roof sheathing above and shall be fastened to the braced wall line top plate as specified in Table 2304.9.1, Item 11. Notching or drilling of holes in blocking in accordance with the requirements of Section 2308.8.2 or Section 2308.10.4.2 shall be permitted.

> <u>**Exception**. Where the roof sheathing is greater than 9-1/4 inches (235 mm) above the top plate solid blocking is not required when the framing members are connected in accordance with one of the following methods:</u>
>
> 1. <u>In accordance with Figure 2308.3.2 (1)</u>
> 2. <u>In accordance with Figure 2308.3.2 (2)</u>
> 3. <u>With full height engineered blocking panels designed for values listed in American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM).</u>
> 4. <u>Designed in accordance with accepted engineering methods.</u>



For SI: 1 inch = 25.4 mm
a. Methods of bracing shall be as described in Section 2308.9.3, method 2,3,4,6,7 or 8

FIGURE 2308.3.2(1)
BRACED WALL LINE TOP PLATE CONNECTION



A SECTION

B ELEVATION

For SI: 1 inch = 25.4 mm
a. Methods of bracing shall be as described in Section 2308.9.3, method 2,3,4,6,7 or 8

FIGURE 2308.3.2 (2)
BRACED WALL PANEL TOP PLATE CONNECTION

TABLE 2304.9.1
FASTENING SCHEDULE

CONNECTION	FASTENING[a]	LOCATION
1. Joist to sill or girder	3 - 8d common (2 1/2" x 0.131") 3 – 3 x 0.131 nails 3 – 3" x 14 gage staples	toenail
2. Bridging or blocking to joist, rafter or truss	2 - 8d common (2 1/2" 0.131") 2 – 3 x 0.131" nails 2 – 3" x 14 gage staples	toenail each end
11. Blocking between joists, ~~or~~ rafters or truss to top plate Blocking between rafters or truss not at the wall top plate, to rafter or truss	3 - 8d common (2 1/2" x 0.131") 3 – 3" x 0.131 nails 3 – 3" 14 gage staples 2 - 8d common (2 1/2" x 0.131") 2 – 3" x 0.131" nails 2 – 3" 14 gage staples 2 - 16d common (3 1/2" x 0.162") 3 – 3" x 0.131" nails 3 – 3" x 14 gage staples	toenail toenail each end endnail

(Portions of table not shown remain unchanged)

Reason: The 2012 IBC has fairly clear wording in Section 2308.3.2 that when the Conventional Light-Frame Construction provisions are used that the diaphragms need to be connected to the braced wall line to resist wind and seismic (lateral) forces and states.

The prescriptive provisions of "conventional light-frame construction" as provided for in section 2308 are very limited in scope. In section 2308.2 they are limited to:

1. Three stories max (two stories max in SDC C, one story in SDC D and above)
2. Max floor to floor height of 11'-7"
3. Max dead loads of 15 psf
4. Floor live load of 40 psf max
5. Ground snow of 50 psf max
6. Wind speeds of 100 max
7. Roof truss span of 40 feet max between vertical supports
8. Not allowed to be used for Occupancy Category IV buildings in SDC B,C,D,E

9 More restrictive requirements for SDC B,C, D and E defined in 2308.11.

10 Even more restrictive requirements specifically for SDC D and E

11. Limited by "irregular structures" definitions in 2308.12.6
12. Braced wall line spacing 35 feet max each direction, each floor.
13. In SDC D and E max spacing is 25 feet. (IRC allow exception up to 50 feet)

In other words, due to the limitations listed above as well as the other limitations in the code not listed here, the structures that are built with the provisions of section 2308 are small, light-framed buildings that do not have the significant lateral loading that other buildings do.

The alternate provisions in the exceptions are intended to address the increasingly common occurrence of cantilevered/high-heel trusses. This occurs due to insulation requirements and to provide a cantilevered portion of roof to be an exterior covered porch. The current provisions of this section of code do not cover this common condition. The current code language requires that "Blocking shall be a minimum of 2 inches (51 mm) nominal thickness…" This does not work for heights greater than what a 2x 10 or 2x 12 will accommodate.

The current code text (IBC) states the intention of connecting the braced wall line to the roof or floor diaphragm above in section 2308.3.2. A similar version of this proposal was adopted as an Oregon amendment in 2006 for the adoption of the 2006 IBC and has worked well for many years and two more code cycles Since then, countless hours have gone into developing proposals for both the IRC and the IBC code development process. The IRC proposal was approved in Minneapolis for the 2009 code. During the process of resolving concerns and developing a consensus changes were made to the proposal. Based on engineering reports and historical data, an exception was made for low heel connections (9 ¼") in lower wind and seismic zones to not require the blocking.

This proposal does not add additional requirements to the code. This proposal clarifies that the connection needs to occur and provides prescriptive solutions when solid blocking, per the current text, is not possible or is impractical..

Per accepted engineering practice for lateral design loads, the floor and roof diaphragms transmit wind and seismic loads into the braced walls (engineered shearwalls or prescriptive braced panels). The fact that the diaphragm needs to be connected to the braced wall line to complete the load path is often not fully understood by plans examiners, inspectors and contractors. The typical requirement that is intended by the code is that full height solid blocking occur at this connection with edge nailing to the blocking and the blocking connected to the top plate of the wall to transfer the diaphragm (plf) force to the wall top plates. This is evidenced in the IBC by the exception to irregular structures stating, *"..lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses.."*. In order for the forces to be transferred there has to be a connection capable of transferring the diaphragm shear evenly to the top plates.

Without this clarification of the text it is a connection that may or may not occur based on what I have seen in the field and have discussed with code officials. The blocking that is called for in the code serves three functions. It provides closure to prevent animals, birds, etc. from entering the attic space, it prevents the trusses or rafters from "rolling over" and it transfers the diaphragm forces to the wall. Most code officials, inspectors and contractors understand the first two objectives. However, the latter is a concept that is often not fully understood. This needs to be perceived, understood and implemented in a uniform way.

In addition, rather than identify a problem without providing a solution, my proposal includes two details to accomplish this connection simply. The solutions are, in principle, fundamentally extending the roof diaphragm sheathing to the wall top plates either vertically in the truss bays or horizontally through the soffit. No design is required since it is just completing the load path with the already defined sheathing and nailing.

Without prescriptive provisions in the current code this condition would require engineering or, as stated in 2308.3.2, Exception to item 1 "..by other approved methods." would be left up to the Authority Having Jurisdiction to determine what is acceptable without any guidance or uniformity between jurisdictions.

Typically, the engineering solution would provide details similar to those included in this proposal. Therefore, the solution and construction costs would not change. Costs would be reduced by eliminating additional costs for engineering where these prescriptive solutions work.

Cost Impact: The code change proposal will not increase the cost of construction.

2308.3.2.2-S-RICE.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproval is based on a number of deficiencies in the proposed figures, including nailing, panel uplift and continuous vent effect on load path. It would require the connections along braced wall lines that are preferred at braced wall panels only.

Assembly Action: **None**

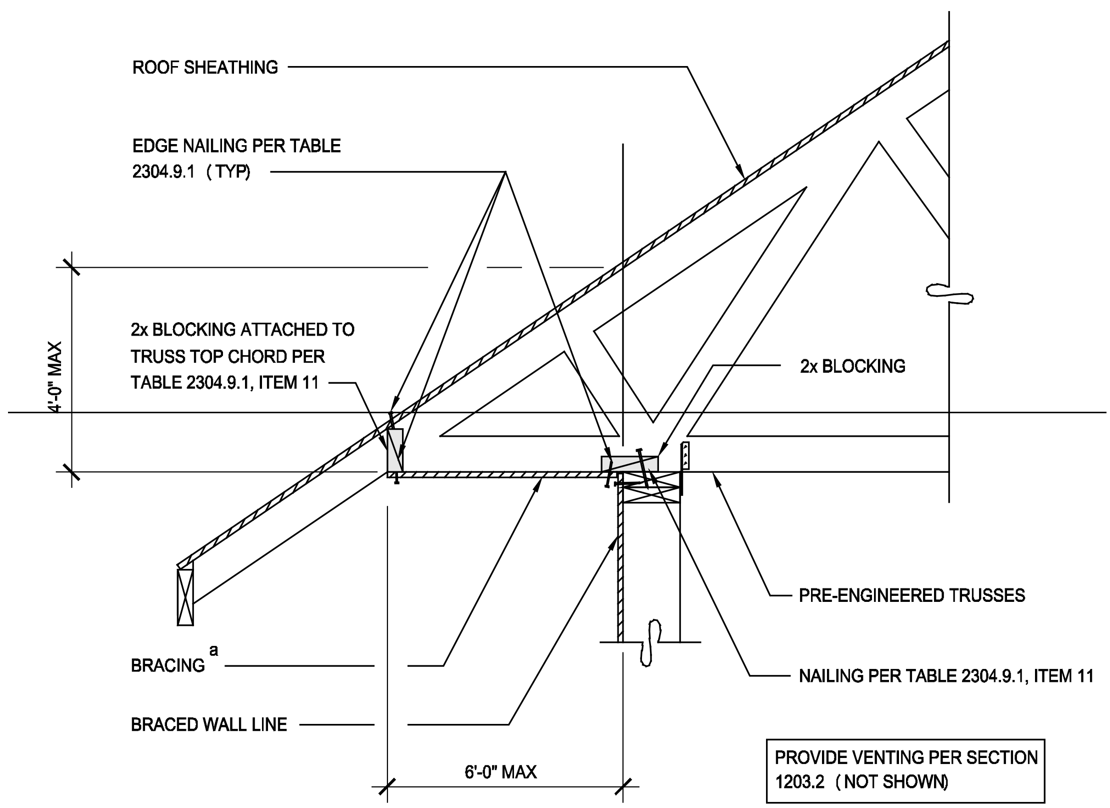
Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Robert Rice, Josephine County Oregon representing Oregon Building Officials Association and J. Daniel Dolan representing FEMA Code Resource Support Committee, requests Approval as Modified by this Public Comment.

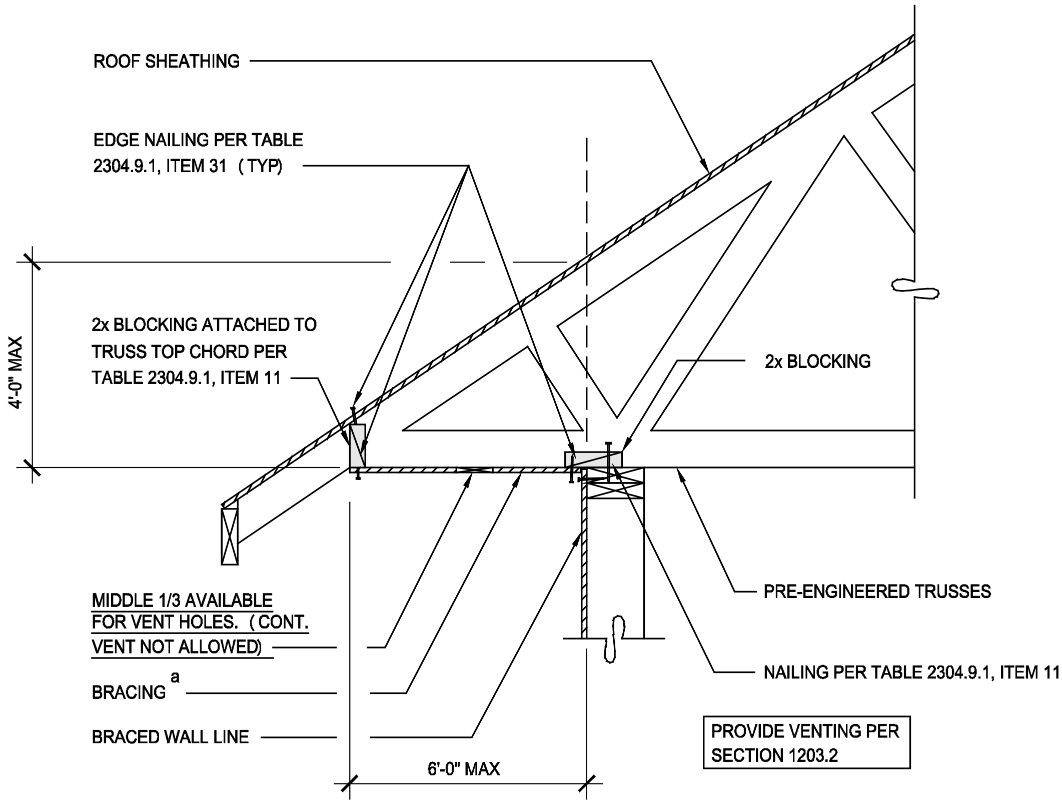
Modify the proposal as follows:



a. Methods of bracing shall be as described in Section 2308.9.3 method 2, 3, 4, 6, 7 or 8

~~For SI: 1 inch = 25.4 mm~~
~~a. Methods of bracing shall be as described in Section 2308.9.3, method 2,3,4,6,7 or 8~~

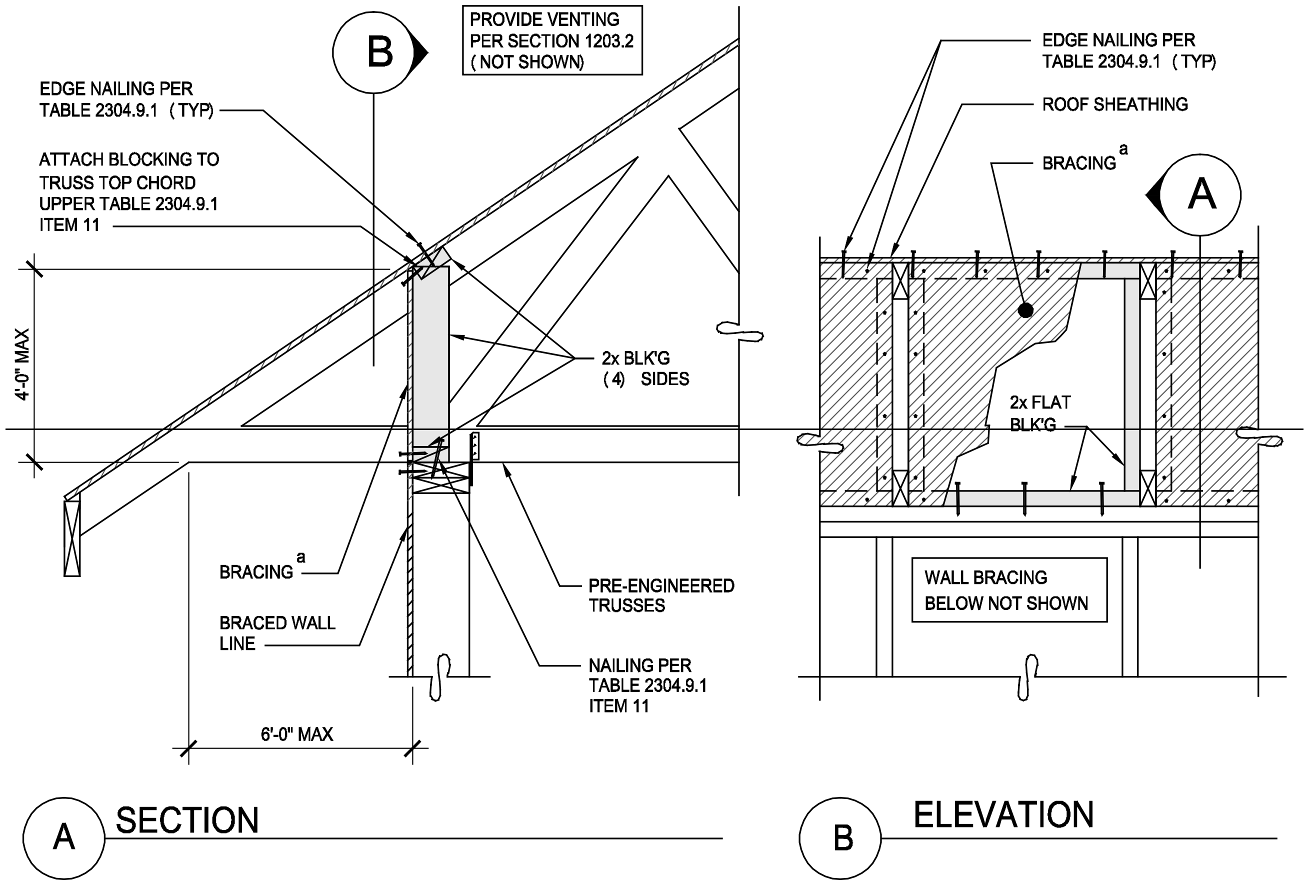
~~FIGURE 2308.3.2(1)~~
~~BRACED WALL LINE TOP PLATE CONNECTION~~



a. Methods of bracing shall be as described in Section 2308.9.3 methods 2, 3, 4, 6, 7 or 8

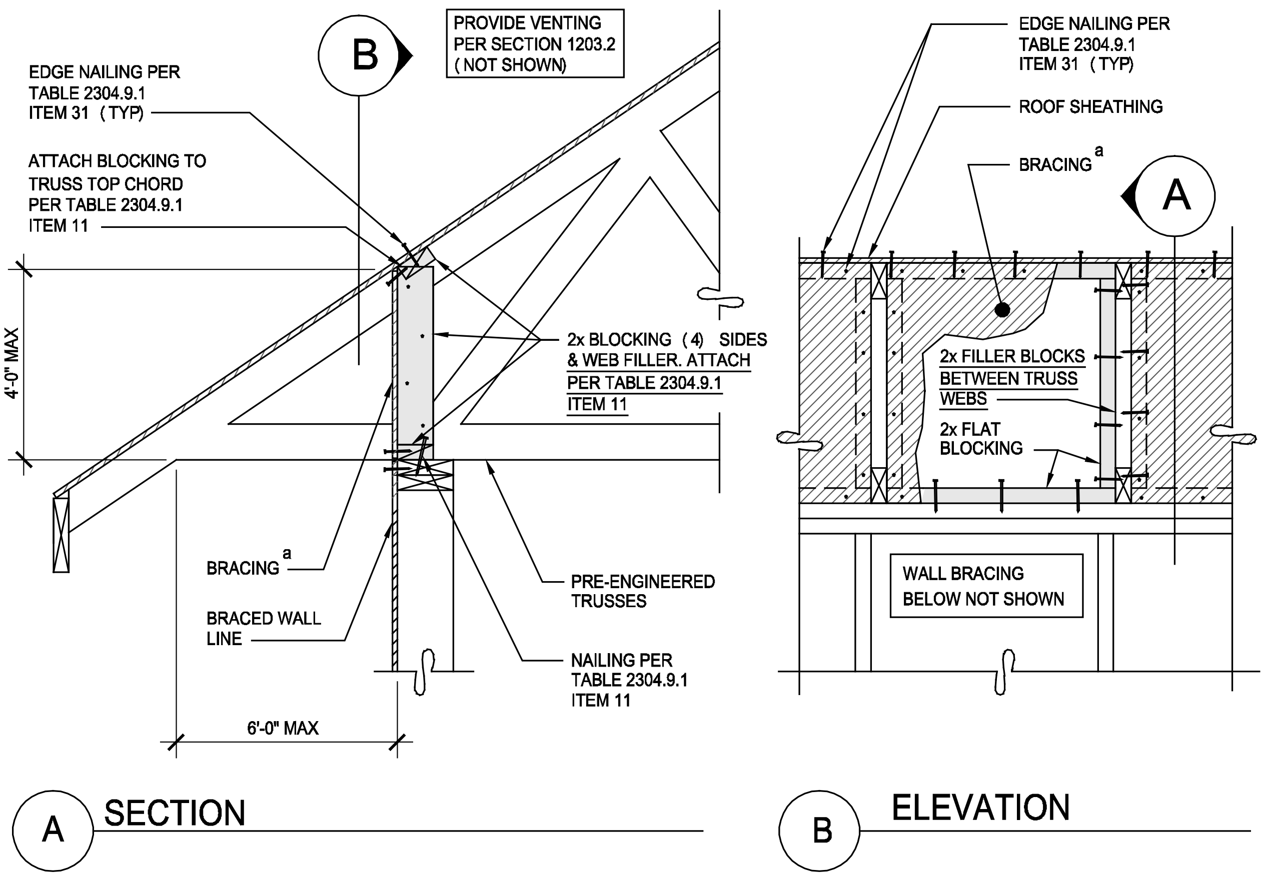
For SI: 1 inch = 25.4 mm

FIGURE 2308.3.2(1)
BRACED WALL LINE TOP PLATE CONNECTION



~~For SI: 1 inch = 25.4 mm~~
~~a. Methods of bracing shall be as described in Section 2308.9.3, method 2,3,4,6,7 or 8~~

~~FIGURE 2308.3.2 (2)~~
~~BRACED WALL PANEL TOP PLATE CONNECTION~~



a. Methods of bracing shall be as described in Section 2308.9.3 methods 2, 3, 4, 6, 7 or 8

For SI: 1 inch = 25.4 mm

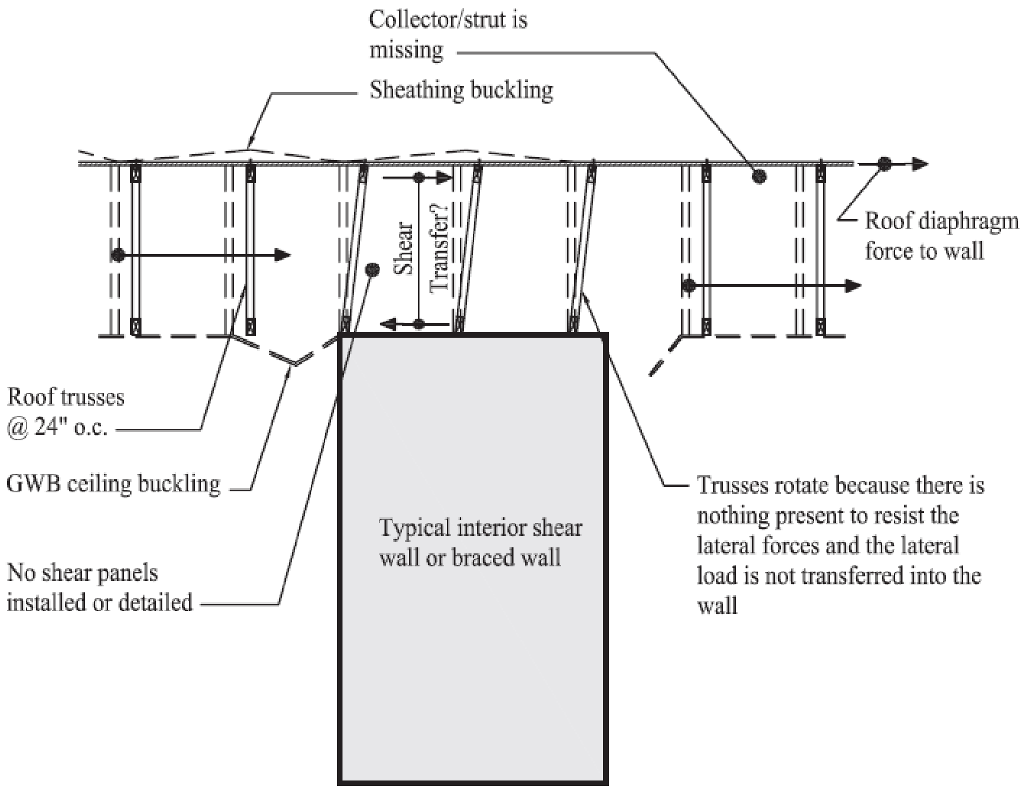
FIGURE 2308.3.2 (2)
BRACED WALL PANEL TOP PLATE CONNECTION

TABLE 2304.9.1
FASTENING SCHEDULE

CONNECTION	FASTENING[a]	LOCATION
11. Blocking between joists, rafters or truss to top plate	3 - 8d common (2 1/2" x 0.131") 3 – 3" x 0.131 nails 3 – 3" 14 gage staples	toenail
Blocking between rafters or truss not at the wall top plate, to rafter or truss	2 - 8d common (2 1/2" x 0.131") 2 – 3" x 0.131" nails 2 – 3" 14 gage staples	toenail each end
	2 - 16d common (3 1/2" x 0.162") 3 – 3" x 0.131" nails 3 – 3" x 14 gage staples	endnail
Flat blocking to truss and web filler	16d common (3 1/2" x 0.162") @ 6" o.c. 3" x 0.131" nails @ 6" o.c. 3" x 14 gage staples @ 6" o.c.	face nail

(Portions of Table and proposal not shown remain unchanged)

Commenter's Reason: The original proposal, as submitted, addresses a construction condition that is becoming much more common with an increase in the use of cantilevered and high-heel trusses. Cantilevered trusses are often incorporated to create a covered entry way for a portion of a wall line. Additionally, high-heel stub trusses are becoming more common to accommodate deeper attic insulation to meet increased energy-efficiency requirements. The concern regarding the lack of load path from the roof diaphragm to the braced wall line is illustrated in the example below from the publication, *Analysis of Irregular Shaped Structures: Diaphragms and Shearwalls, McGraw/Hill – ICC 2011,*



The details shown in the original proposal, and further modified by this public comment, provide the necessary load path from the roof diaphragm to the braced wall line. Reality is, this condition often occurs without consideration of the incomplete load path either by the plans examiner or the inspector. IBC Section 2308, *Conventional Light-Frame Construction,* is very limited in scope and only applies to smaller, lightly loaded structures with additional restrictions for structures in seismic design categories B, C, D and E as noted in the original proposals reason statement. The prescriptive details from the original proposal as modified by this public comment will ensure that the condition is addressed and provide sufficient connection for structures within the scope of section 2308.

Further, these details are consistent with engineering reports addressing light-framed wood structures such as ATC-7 *Proceedings of a Workshop on Design of Horizontal Wood Diaphragms, November 19-20, 1979* - Applied Technology Council and ICC 600-2008, *Standard for Residential Construction in High-wind Regions.* The figures shown below from those two publications essentially provide the same detail and have been used and considered accepted engineering practice for many decades.

.

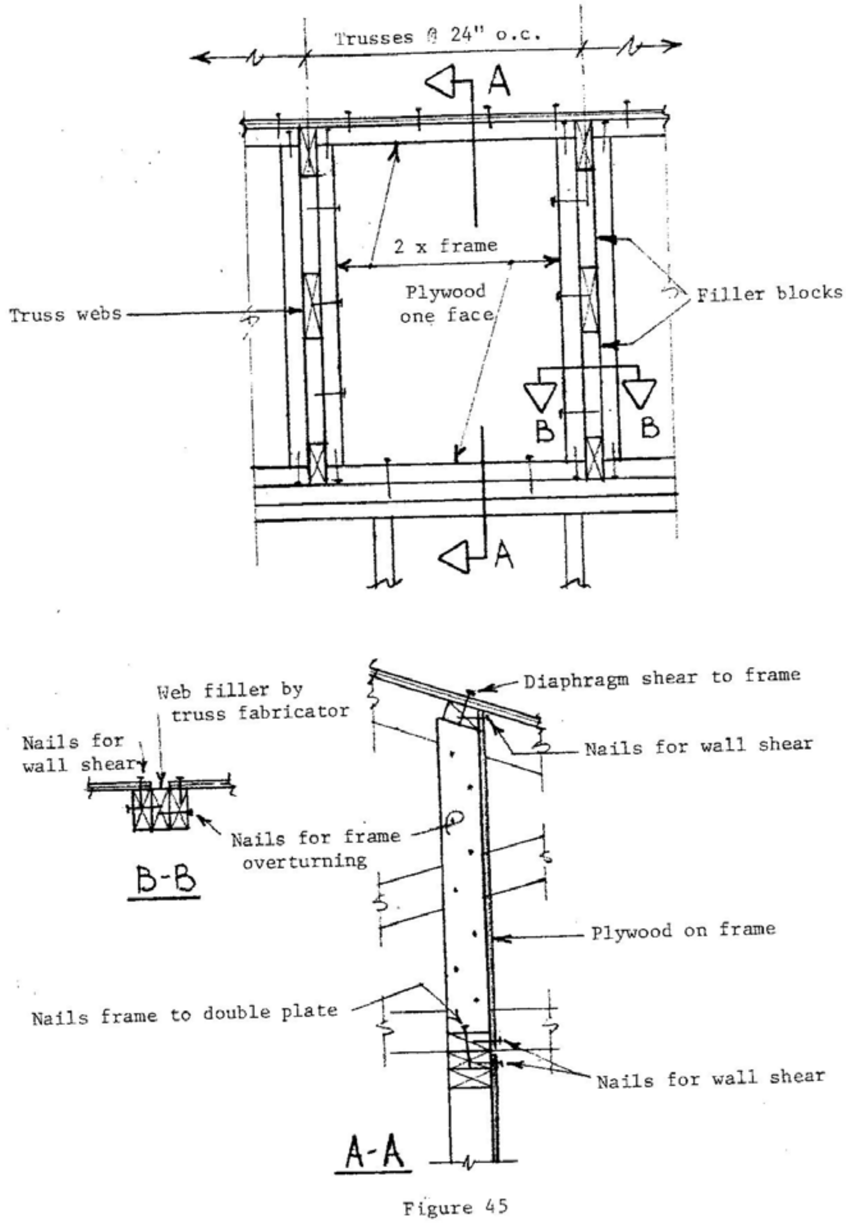


Figure 45 from ATC-7. *Proceedings of a Workshop on Design of Horizontal Wood Diaphragms, November 19-20, 1979 -* Applied Technology Council

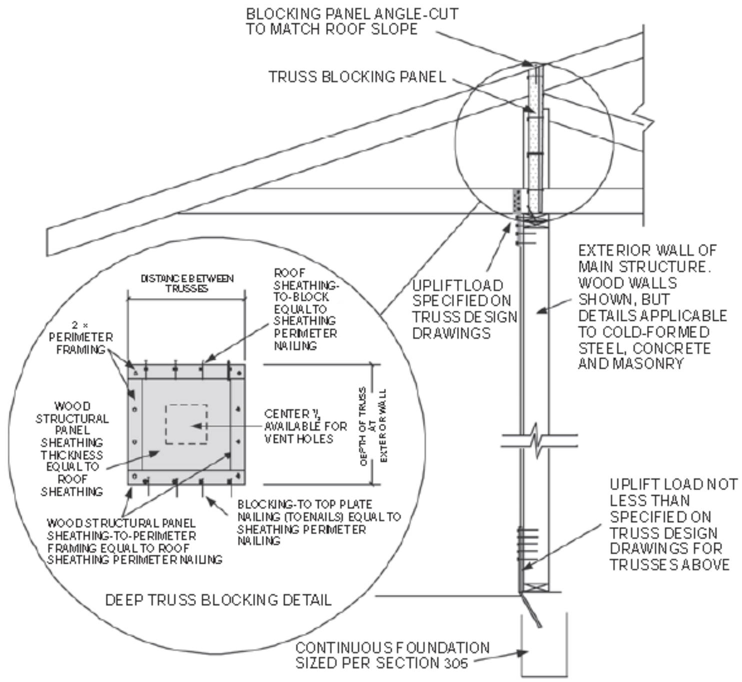


FIGURE 308(3)
SECTION A-A—OVERHANG UPLIFT RESISTANCE DESIGNED ROOF TRUSS

STANDARD FOR RESIDENTIAL CONSTRUCTION IN HIGH-WIND REGIONS—2008

Figure 308(3) from ICC 600-2008, *Standard for Residential Construction in High-wind Regions, ICC*

As stated in the original proposal, structures built per section 2308 have the following limitations;

1. *Three stories max (two stories max in SDC C, one story in SDC D and above)*
2. *Max floor to floor height of 11'-7"*
3. *Max dead loads of 15 psf*
4. *Floor live load of 40 psf max*
5. *Ground snow of 50 psf max*
6. *Wind speeds of 100 max*
7. *Roof truss span of 40 feet max between vertical supports*
8. *Not allowed to be used for Occupancy Category IV buildings in SDC B,C,D,E*
9 *More restrictive requirements for SDC B,C, D and E defined in 2308.11.*
10 *Even more restrictive requirements specifically for SDC D and E*
11. *Limited by "irregular structures" definitions in 2308.12.6*
12. *Braced wall line spacing 35 feet max each direction, each floor.*
13. *I n SDC D and E max spacing is 25 feet*

At the Code Development Hearings (CDH), concern was expressed about panel uplift at the individual panels when resisting lateral forces. This could be a concern especially if the panels or blocking only occurred at the individual *Braced Wall Panels.* IBC Section 2308.3.2.2 requires that *"….lateral forces shall be transferred from the roof diaphragm to the braced wall* ***over the full length of the braced wall line*** *by blocking of the ends of the trusses or by other approved methods providing equivalent lateral force transfer."* As shown below in a sample (Figure 9.19) from the publication, *Analysis of Irregular Shaped Structures: Diaphragms and Shearwalls*, McGraw/Hill – ICC 2012, when the panels occur continuously the net uplift force at each panel is zero as the adjacent panels counteract with a downward force. This is accomplished by adequate connection between adjacent panels and has been addressed in this public comment by the addition of 2x web filler and nailing that was not specified in the original proposal.

Figure 2308.3.2(2) has been modified in this public comment to include specific nailing requirements for the vertical blocking and calls for truss web infill blocking. The fasteners required for this connection have been added to the fastener table, Table 2304.9.1

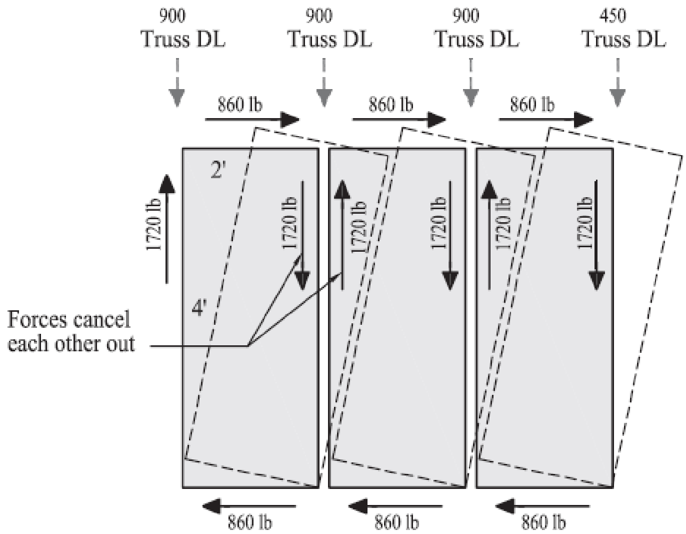


Figure 9.19 Individual shear panel forces.

Figure 9.19 from the publication*, Analysis of Irregular Shaped Structures: Diaphragms and Shearwalls,* McGraw/Hill – ICC 2012,

The details provided in this proposal, as with the already-required 2x solid blocking at lower depth heel areas, will satisfy the requirement of the code and the details would provide "..*equivalent lateral force transfer".*

It is important to note that, in addition to the details provided for prescriptive solutions, the text (2308.3.2.2 exceptions 3 and 4) also provide allowance for the option of engineered blocking panels provided by the truss manufacturer as well as a design in accordance with accepted engineering methods. In other words, these details are just prescriptive options. There are other options available to the code user

Another issue raised at the CDH was that, *"It would require the connections along **braced wall lines** that are preferred at **braced wall panels** only.* This is nearly opposite of the other concerns expressed and implied that it would be too strict and demanding. This concern is a moot point since, as stated above, section 2308.3.2.2 already requires that *"….lateral forces shall be transferred from the roof diaphragm to the braced wall over the **full length of the braced wall line**….*and no change in that requirement is proposed. Without these prescriptive solutions the solution to provide a complete load path would require engineering in every case. The result of the engineering would likely mimic these details.

Question arose at the CDH regarding the venting in figure 2308.3.2(1). There was concern that the figure, as shown in the original proposal, would allow a continuous vent in the soffit which would disrupt the continuity of the sheathing and may reduce the sheathings capacity to transfer the required shear force to the wall line. The modified figure in this public comment defines the allowed area for vent holes and specifically prohibits continuous venting without an engineered design.

As a footnote, the figures in this proposal refer to the current tables and bracing methods in the 2012 IBC. Upon passage of S273, the figures in this proposal that will be submitted to ICC will reflect the new table numbers and bracing methods. S273 does not change the technical requirements. Only the table and method numbers and names have changed. Both proposals have been developed by the same group of interested parties and upon approval, they will be coordinated with ICC staff to work seamlessly together.

This proposal, as amended by this public comment, adequately addresses the issues of providing a complete load path with prescriptive solutions that would other wise require additional engineering services and, in most cases, produce the same or similar details.

Bibliography:

1. Malone, R. Terry, and Robert W. Rice. *Analysis of Irregular Shaped Structures: Diaphragms and Shearwalls,* Washington DC: McGraw/Hill 2012 (Co-branded with International Code Council)
2. ATC. *Proceedings of a Workshop on Design of Horizontal Wood Diaphragms,* Redwood City, CA: Applied Technology Council.
3. ICC. ICC 600-2008, *Standard for Residential Construction in High-wind Regions.* Washington DC: International Code Council

S280-12

Final Action: AS AM AMPC____ D

S281-12
2308.7, 2308.9.1, 2308.9.5.1, 2308.9.5.2, 2308.9.6, Table 2308.9.5, Table 2308.9.6

Proposed Change as Submitted

Proponent: Paul Coats, PE, CBO, American Wood Council (pcoats@awc.org)

Revise as follows:

2308.7 Girders. Girders for single-story construction or girders supporting loads from a single floor shall not be less than 4 inches by 6 inches (102 mm by 152 mm) for spans 6 feet (1829 mm) or less, provided that girders are spaced not more than 8 feet (2438 mm) o.c. ~~Spans for built-up 2-inch (51 mm) girders shall be in accordance with Table 2308.9.5 or 2308.9.6. Other girders~~ Girders shall be designed to support the loads specified in this code. Girder end joints shall occur over supports. Where a girder is spliced over a support, an adequate tie shall be provided. The ends of beams or girders supported on masonry or concrete shall not have less than 3 inches (76 mm) of bearing.

2308.9.1 Size, height and spacing. The size, height and spacing of studs shall be in accordance with Table 2308.9.1 except that utility-grade studs shall not be spaced more than 16 inches (406 mm) o.c., or support more than a roof and ceiling, or exceed 8 feet (2438 mm) in height for exterior walls and load-bearing walls or 10 feet (3048 mm) for interior nonload-bearing walls. Studs shall be continuous from a support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

> **Exception:** Jack studs, trimmer studs and cripple studs at openings in walls that comply with ~~Table 2308.9.5~~ Section 2308.9.5.2.

2308.9.5.1 Headers. Headers shall be provided over each opening in exterior-bearing walls. ~~The spans in Table 2308.9.5 are permitted to be used for one- and two-family *dwellings*.~~ Headers ~~for other buildings~~ shall be designed in accordance with Section 2301.2, Item 1 or 2. Headers shall be of two or more pieces of nominal 2-inch (51 mm) framing lumber set on edge ~~as permitted by Table 2308.9.5~~ and nailed together in accordance with Table 2304.9.1 or of solid lumber of equivalent size.

2308.9.5.2 Header support. Wall studs shall be designed to support the ends of the header ~~in accordance with Table 2308.9.5~~. Each end of a lintel or header shall have a length of bearing of not less than $1^1/_2$ inches (38 mm) for the full width of the lintel.

2308.9.6 Openings in interior bearing partitions. Headers shall be provided over each opening in interior bearing partitions as required in Section 2308.9.5. ~~The spans in Table 2308.9.6 are permitted to be used.~~ Wall studs shall support the ends of the header in accordance with ~~Table 2308.9.5 or 2308.9.6, as appropriate~~ Section 2308.9.5.2.

~~TABLE 2308.9.5~~
~~HEADER AND GIRDER SPANS[a] FOR EXTERIOR BEARING WALLS~~
~~(Maximum Spans for Douglas Fir-Larch, Hem-Fir, Southern Pine and Spruce-Pine-Fir[b] and Required Number of Jack Studs)~~

~~TABLE 2308.9.6~~
~~HEADER AND GIRDER SPANS[a] FOR INTERIOR BEARING WALLS~~
~~(Maximum Spans for Douglas Fir-Larch, Hem-Fir, Southern Pine and Spruce-Pine-Fir[b] and Required Number of Jack Studs)~~

Reason: Deletion of Table 2308.9.5 and Table 2308.9.6 without replacement is proposed because of limited applicability of the tabulated header spans resulting from the exclusion of detached one- and two-family dwellings from the scope of 2308 and the live load limitation of 40 psf per 2308.2. In addition, the species-based header spans are subject to being dated should design values change. Design value-based prescriptive engineered options for header spans are available from other sources. For example, header spans for conditions covered by Table 2308.9.5 and Table 2308.9.6, as well as support of headers by use of jack studs providing full bearing, can be found in the WFCM.

Specific reference to "one- and two- family dwellings" from 2308.9.5.1 is deleted to coordinate with the exclusion of detached one-and two-family dwellings from the scope of 2308. Other text sections are revised to coordinate with removal of the Tables.

Cost Impact: The code change proposal will not increase the cost of construction.

2308.7-S-COATS.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee believes that the header span tables are needed in the conventional construction provisions. Outside of Southern Pine, there was no testimony to justify the removal of other wood species. Where there are problems the committee would like to see them fixed. Also adding requirements for "to be designed" is not appropriate for conventional construction.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Paul D. Coats, American Wood Council, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

2308.7 Girders. Girders for single-story construction or girders supporting loads from a single floor shall not be less than 4 inches by 6 inches (102 mm by 152 mm) for spans 6 feet (1829 mm) or less, provided that girders are spaced not more than 8 feet (2438 mm) o.c. ~~Spans for built-up 2-inch (51 mm) girders shall be in accordance with Table 2308.9.5 or 2308.9.6.~~ Other girders shall be designed to support the loads specified in this code. Girder end joints shall occur over supports. Where a girder is spliced over a support, an adequate tie shall be provided. The ends of beams or girders supported on masonry or concrete shall not have less than 3 inches (76 mm) of bearing.

2308.7.1 Allowable girder spans. The allowable spans of girders fabricated of dimension lumber shall not exceed the values set forth in Tables 2308.9.5 and 2308.9.6

TABLE 2308.9.5

~~**HEADER AND GIRDER SPANS[a] FOR EXTERIOR BEARING WALLS**~~

~~**(Maximum Spans for Douglas Fir-Larch, Hem-Fir, Southern Pine and Spruce-Pine-Fir[b] and Required Number of Jack Studs)**~~

GIRDER SPANS[a] AND HEADER SPANS[a] FOR EXTERIOR BEARING WALLS (Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[b] and required number of jack studs)

EXTRACT TABLE R502.5(1) (except 70 psf snow load columns) of the International Residential Code

TABLE 2308.9.6

~~**HEADER AND GIRDER SPANS[a] FOR INTERIOR BEARING WALLS**~~

~~**(Maximum Spans for Douglas Fir-Larch, Hem-Fir, Southern Pine and Spruce-Pine-Fir[b] and Required Number of Jack Studs)**~~

GIRDER SPANS[a] AND HEADER SPANS[a] FOR INTERIOR BEARING WALLS (Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[b] and required number of jack studs)

EXTRACT entire TABLE R502.5(2) of the International Residential Code

Commenter's Reason: The spans in the girder tables in the IBC and IRC are identical, and buildings that qualify for conventional construction in the IBC have loading limitations commensurate with residential buildings--buildings within the scope of the IRC. It is also our intent to propose adjustments to spans in the IRC code which will automatically update the spans in these tables in the IBC.

In this way species-specific spans for girder and headers will be automatically correlated between the two codes, even though the codes themselves are developed in separate code change cycles.

To facilitate the maintenance of these tables by the IRC committee, a new section of charging text, identical to the charging text for these tables in IRC Section R502.5, has been added and the existing charging text in 2308.7 has been deleted.

Further information about this change is posted at: http://www.awc.org/Code-Officials/2012-IBC-Challenges.

Analysis. The result of this public comment if successful would be to extract the span tables from the 2012 IRC and, in order to achieve consistency between the IBC and IRC, would also include any changes made to the subject IRC span tables during the 2013 Code Change Cycle. Any changes to code change committee responsibilities in future code development cycles are not part of this code change, but are the responsibility of the ICC Code Correlation Committee.

S281-12

Final Action: AS AM AMPC____ D

S283-12

2308.8, Table 2308.8(1), Table 2308.8(2), 2308.10.2, Table 2308.10.2(1), Table 2308.10.2(2), 2308.10.3, Table 2308.10.3(1), Table 2308.10.3(2), Table 2308.10.3(3), Table 2308.10.3(4), Table 2308.10.3(5), Table 2308.10.3(6)

Proposed Change as Submitted

Proponent: Paul Coats, P.E. CBO, American Wood Council (pcoats@awc.org)

Revise as follows:

2308.8 Floor joists. Spans for floor joists shall be in accordance with ~~Table 2308.8(1) or 2308.8(2). For other grades and or species, refer to~~ the *AF&PA Span Tables for Joists and Rafters*.

~~TABLE 2308.8(1)~~
~~FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES~~
~~(Residential Sleeping Areas, Live Load = 30 psf, L/Δ = 360)~~

~~TABLE 2308.8(2)~~
~~FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES~~
~~(Residential Living Areas, Live Load = 40 psf, L/Δ = 360)~~

2308.10.2 Ceiling joist spans. Allowable spans for ceiling joists shall be in accordance with ~~Table 2308.10.2(1) or 2308.10.2(2). For other grades and species, refer to~~ the ~~*AF&PA*~~ <u>*AWC*</u> *Span Tables for Joists and Rafters*.

~~TABLE 2308.10.2(1)~~
~~CEILING JOIST SPANS FOR COMMON LUMBER SPECIES~~
~~(Uninhabitable Attics Without Storage, Live Load = 10 pounds psf, L/Δ = 240)~~

~~TABLE 2308.10.2(2)~~
~~CEILING JOIST SPANS FOR COMMON LUMBER SPECIES~~
~~(Uninhabitable Attics With Limited Storage, Live Load = 20 pounds per square foot, L/Δ = 240)~~

2308.10.3 Rafter spans. Allowable spans for rafters shall be in accordance with ~~Table 2308.10.3(1), 2308.10.3(2), 2308.10.3(3), 2308.10.3(4), 2308.10.3(5) or 2308.10.3(6). For other grades and species, refer to the *AF&PA*~~ <u>the *AWC*</u> *Span Tables for Joists and Rafters*.

~~TABLE 2308.10.3(1)~~
~~RAFTER SPANS FOR COMMON LUMBER SPECIES~~
~~(Roof Live Load = 20 pounds per square foot, Ceiling Not Attached to Rafters, L/Δ = 180)~~

~~TABLE 2308.10.3(2)~~
~~RAFTER SPANS FOR COMMON LUMBER SPECIES~~
~~(Roof Live Load = 20 pounds per square foot, Ceiling Attached to Rafters, L/Δ = 240)~~

~~TABLE 2308.10.3(3)~~
~~RAFTER SPANS FOR COMMON LUMBER SPECIES~~
~~(Ground Snow Load = 30 pounds per square foot, Ceiling Not Attached to Rafters, L/Δ = 180)~~

~~TABLE 2308.10.3(4)~~
~~RAFTER SPANS FOR COMMON LUMBER SPECIES~~
~~(Ground Snow Load = 50 pounds per square foot, Ceiling Not Attached to Rafters, L/Δ = 180)~~

~~**TABLE 2308.10.3(5)**~~
~~**RAFTER SPANS FOR COMMON LUMBER SPECIES**~~
~~**(Ground Snow Load = 30 pounds per square foot, Ceiling Attached to Rafters, L/Δ = 240)**~~

~~**TABLE 2308.10.3(6)**~~
~~**RAFTER SPANS FOR COMMON LUMBER SPECIES**~~
~~**(Ground Snow Load = 50 pounds per square foot, Ceiling Attached to Rafters, L/Δ = 240)**~~

Reason: Species- and grade-specific span tables are subject to becoming dated if design values for specific species or grades change, and therefore it is proposed to directly reference the AWC Span Tables for Joists and Rafters. The design value format of the tabulated spans in Span Tables for Joists and Rafters is not sensitive to design value changes for specific species and grades. Span Tables for Joists and Rafters is currently included as a reference in IBC 2306.

Cost Impact: The code change proposal will not increase the cost of construction.

2308.8-S-COATS.do

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Similar to S281-12 if there is a problem with the span table, the committee feels it should be fixed rather than removed since Sectin2308 should be a cook book approach.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Paul D. Coats, American Wood Council, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

2308.8 Floor joists. Spans for floor joists shall be in accordance with Table 2308.8(1) or 2308.8(2). For other grades and or species, refer to the *~~AF&PA~~* *AWC* *Span Tables for Joists and Rafters*.

Table 2308.8(1) ~~**FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES (Residential Sleeping Areas, Live Load = 30 psf, L/Δ = 360**~~ **FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES (Residential Sleeping Areas, Live Load = 30 psf, L/Δ = 360** ~~**)**~~
EXTRACT Table R502.3(1) from the International Residential Code (do not extract footnote a)

Table 2308.8(2) ~~**FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES (Residential Living Areas, Live Load = 40 psf, L/Δ = 360)**~~ **FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES (Residential living areas, live load = 40 psf, L/Δ = 360)**
EXTRACT Table R502.3(2) from the International Residential Code (do not extract footnote b)

2308.10.2 Ceiling joist spans. ~~Allowable s~~Spans for ceiling joists shall be in accordance with Table 2308.10.2(1) or Table 2308.10.2(2). For other grades and species, and for other loading conditions, refer to the *~~AF&PA~~* *AWC* Span Tables for Joists and Rafters.

Table 2308.10.2(1) ~~**CEILING JOIST SPANS FOR COMMON LUMBER SPECIES (Uninhabitable Attics Without Storage, Live Load = 10 pounds psf, L/Δ = 240)**~~ **CEILING JOIST SPANS FOR COMMON LUMBER SPECIES (Uninhabitable attics without storage, live load = 10 psf, L/Δ = 240)**
EXTRACT Table R802.4(1) from the International Residential Code

Table 2308.10.2(2) ~~**CEILING JOIST SPANS FOR COMMON LUMBER SPECIES (Uninhabitable Attics With Limited Storage, Live Load = 20 pounds per square foot, L/Δ = 240)**~~ **CEILING JOIST SPANS FOR COMMON LUMBER SPECIES (Uninhabitable attics with limited storage, live load = 20 psf, L/Δ = 240)**
EXTRACT Table R802.4(2) from the International Residential Code

2308.10.3 Rafter spans. ~~Allowable s~~Spans for rafters shall be in accordance with Table 2308.10.3(1), 2308.10.3(2), 2308.10.3(3), 2308.10.3(4), 2308.10.3(5) or 2308.10.3(6). For other grades and species and for other loading conditions, refer to the ~~*AF&PA*~~ *AWC Span Tables for Joists and Rafters*. The span of each rafter shall be measured along the horizontal projection of the rafter.

TABLE 2308.10.3(1) ~~RAFTER SPANS FOR COMMON LUMBER SPECIES (Roof Live Load = 20 pounds per square foot, Ceiling Not Attached to Rafters, L/Δ = 180)~~ RAFTER SPANS FOR COMMON LUMBER SPECIES (Roof live load = 20 psf, ceiling not attached to rafters, L/Δ = 180)
EXTRACT Table R802.5.1(1) from the International Residential Code

TABLE 2308.10.3(2) ~~RAFTER SPANS FOR COMMON LUMBER SPECIES (Roof Live Load = 20 pounds per square foot, Ceiling Attached to Rafters, L/Δ = 240)~~ RAFTER SPANS FOR COMMON LUMBER SPECIES (Roof Live Load = 20 psf, ceiling attached to rafters, L/Δ = 240)
EXTRACT Table R803.5.1(2) from the International Residential Code

TABLE 2308.10.3(3) ~~RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground Snow Load = 30 pounds per square foot, Ceiling Not Attached to Rafters, L/Δ = 180)~~ RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground Snow Load = 30 psf, ceiling not attached to rafters, L/Δ = 180)
EXTRACT Table R802.5.1(3) from the International Residential Code

TABLE 2308.10.3(4) ~~RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground Snow Load = 50 pounds per square foot, Ceiling Not Attached to Rafters, L/Δ = 180)~~ RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground Snow Load = 50 psf, ceiling not attached to rafters, L/Δ = 180)
EXTRACT Table R802.5.1(4) from the International Residential Code

TABLE 2308.10.3(5) ~~RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground Snow Load = 30 pounds per square foot, Ceiling Attached to Rafters, L/Δ = 240)~~ RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground Snow Load = 30 psf, ceiling attached to rafters, L/Δ = 240)
EXTRACT Table R803.5.1(5) from the International Residential Code

TABLE 2308.10.3(6) ~~RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground Snow Load = 50 pounds per square foot, Ceiling Attached to Rafters, L/Δ = 240)~~ RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground Snow Load = 50 psf, ceiling attached to rafters, L/Δ = 240)
EXTRACT Table R802.5.1(6) from the International Residential Code

Commenter's Reason: The spans for joists and rafters in the conventional construction provisions of the IBC and IRC are identical, and buildings that qualify for conventional construction in the IBC have loading limitations commensurate with residential buildings--buildings within the scope of the IRC. It is also our intent to propose adjustments to spans in the IRC code which will automatically update the spans in these tables in the IBC. In this way species-specific spans for joists and rafters will be automatically correlated between the two codes, even though the codes themselves are developed in separate code change cycles.

To facilitate the maintenance of these tables by the IRC committee, the sections containing the charging text have been modified to read exactly like the corresponding sections in the IRC. Footnotes to the IRC tables that would not apply will not be extracted, as indicated in the public comment.

Further information about this change is posted at: http://www.awc.org/Code-Officials/2012-IBC-Challenges.

Analysis. The result of this public comment if successful would be to extract the span tables from the 2012 IRC and, in order to achieve consistency between the IBC and IRC, would also include any changes made to the subject IRC span tables during the 2013 Code Change Cycle. Any changes to code change committee responsibilities in future code development cycles are not part of this code change, but are the responsibility of the ICC Code Correlation Committee.

S283-12

Final Action: AS AM AMPC____ D

S287-12

202 (New), 2302, 2308.9.3 (New), 2304.6, Table 2304.6, 2304.6.1, 2304.6.2

Proposed Change as Submitted

Proponent: Paul Coats, American Wood Council, (pcoats@awc.org)

Add new text as follows:

SECTION 202
DEFINITIONS

GABLE. The triangular portion of the wall beneath a dual-slope, pitched, or mono-slope roof.

Revise as follows:

2302.1 Definitions. For the purposes of this chapter, and as used elsewhere in this code the following terms are defined in Chapter 2:

GABLE

2304.6 Exterior wall sheathing. ~~Except as provided for in Section 1405 for weatherboarding or where stucco construction that complies with Section 2510 is installed, enclosed buildings shall be sheathed with one of the materials of the nominal thickness specified in Table 2304.6 or any other *approved* material of equivalent strength or durability~~ Wall sheathing on the outside of exterior walls, including gables, and the connection of sheathing to framing shall be designed in accordance with the general provisions of this code and shall be capable of resisting wind pressures in accordance with Section 1609..

2304.6.1 Wood structural panel sheathing. Where wood structural panel sheathing is used as the exposed finish on the outside of exterior walls, it shall have an exterior exposure durability classification. Where wood structural panel sheathing is used elsewhere, but not as the exposed finish, it shall be of a type manufactured with exterior glue (Exposure 1 or Exterior). ~~Wood structural panel wall sheathing or siding used as structural sheathing shall be capable of resisting wind pressures in accordance with Section 1609. Maximum wind speeds for wood~~ Wood structural panel sheathing ~~used to resist wind pressures~~, connections, and framing spacing shall be in accordance with Table 2304.6.1 for the applicable wind speed and exposure category when used with enclosed buildings with a mean roof height not greater than 30 feet (9144 mm) and a topographic factor (K_{zt}) of 1.0.

~~**2304.6.2**~~ **2304.7 Interior paneling.** Softwood wood structural panels used for interior paneling shall conform to the provisions of Chapter 8 and shall be installed in accordance with Table 2304.9.1. Panels shall comply with DOC PS 1, DOC PS 2 or ANSI/APA PRP 210. Prefinished hardboard paneling shall meet the requirements of CPA/ANSI A135.5. Hardwood plywood shall conform to HPVA HP-1.

2308.9.3 Exterior wall sheathing. Except where stucco construction that complies with Section 2510 is installed, the outside of exterior walls, including gables, of enclosed buildings shall be sheathed with one of the materials of the nominal thickness specified in Table 2308.9.3. with fasteners in accordance with requirements of 2304.9 or fasteners designed in accordance with accepted engineering practice.

TABLE ~~2304.6~~ 2308.9.3
MINIMUM THICKNESS OF WALL SHEATHING

SHEATING TYPE	MINIMUM THICKNESS	MAXIMUM WALL STUD SPACING
Wood boards	5/8 inch	24 inches on center
Fiberboard	1/2 inch	16 inches on center
Wood structural panel	In accordance with Tables 2308.9.3(2) and 2308.9.3(3)	--
M-S “Exterior Glue” and M-2 “Exterior Glue” Particleboard	In accordance with Section 2306.3 and Table 2308.9.3(4)	--
Gypsum sheathing	½ inch	16 inches on center
~~Gypsum wallboard~~	~~½ inch~~	~~24 inches on center~~
Reinforced cement mortar	1 inch	24 inches on center

For SI: 1 inch = 25.4 mm.

Reason: (2308.9.3) This new section comes from existing Section 2304.6. The content of the current section is moved to 2308.9.3 because it contains prescriptive minimum sheathings more suitable for wind speeds in accordance with limitations of 2308. The section is clarified as being applicable to exterior wall sheathing. The term “gable” is included to clarify that exterior wall sheathing recommendations are equally applicable to the gable.

Table 2304.6 is moved and renumbered as Table 2308.9.3. Gypsum wallboard is removed from the table to make it clear the table applies to exterior wall sheathing, in accordance with the proposed Section 2308.9.3.

Section 2304.6 is rewritten to establish minimum structural performance requirements and clarify that wall sheathing on the outside of exterior walls, as well as connection of sheathing to framing, must be capable of resisting wind pressures in accordance with Section 1609. The term “gable” is included to clarify that exterior wall sheathing recommendations for out of plane wind resistance are equally applicable to the gable.

Revisions to 2304.6.1 coordinate with the minimum structural performance requirements added in the new 2304.6. Prior language covering design for out of plane wind resistance is deleted because it is addressed in new section 2304.6. Reference to Table 2304.6.1 is revised to clarify that several factors are critical for determination of the applicable maximum wind speed including fastener schedule and stud spacing.

This renumbers Section 2304.6.2 to 2304.7 to separate provisions for Interior Paneling from 2306.6 which would contain new provisions applicable to exterior wall sheathing but not to interior paneling.

A definition is added for “gable” used in proposed revisions in Item #1 and #2 to clarify that gables should be sheathed in accordance with provisions for walls.

Cost Impact: The code change proposal will not increase the cost of construction.

2308.9.3 (NEW)-S-COATS.doc

Public Hearing Results

Committee Action: Approved as Modified

Modify proposal as follows:

2308.9.3 Exterior wall sheathing. Except where stucco construction that complies with Section 2510 is installed, the outside of exterior walls, including gables, of enclosed buildings shall be sheathed with one of the materials of the nominal thickness specified in Table 2308.9.3 with fasteners in accordance with requirements of 2304.9 or fasteners designed in accordance with accepted engineering practice. Alternatively, sheathing materials and fasteners complying with Section 2304.6 shall be permitted.

(Portions of proposal not shown are unchanged)

Committee Reason: This change clarifies the details of exterior wall sheathing. The modification recognizes that sheathing meeting the performance requirements should be a permitted alternative.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Gary J. Ehrlich, P.E., National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

SECTION 202
DEFINITIONS

GABLE. The triangular portion of a ~~the~~ wall beneath the end of a dual-slope, pitched, or mono-slope roof or portion thereof and above the top plates of the story or level of the ceiling below.

2308.9.3 Exterior wall sheathing. Except where stucco construction that complies with Section 2510 is installed, the outside of exterior walls, including gables, of enclosed buildings shall be sheathed with one of the materials of the nominal thickness specified in Table 2308.9.3 with fasteners in accordance with requirements of 2304.9 or fasteners designed in accordance with accepted engineering practice. Alternatively, sheathing materials and fasteners complying with Section 2304.6 shall be permitted.

TABLE 2308.9.3
MINIMUM THICKNESS OF WALL SHEATHING

SHEATHING TYPE	MINIMUM THICKNESS	MAXIMUM WALL STUD SPACING
Diagonal w~~W~~ood boards	5/8 inch	24 inches on center
Structural f~~F~~iberboard	1/2 inch	16 inches on center
Wood structural panel	In accordance with Tables 2308.9.3(2) and 2308.9.3(3)	--
M-S “Exterior Glue” and M-2 “Exterior Glue” Particleboard	In accordance with Section 2306.3 and Table 2308.9.3(4)	--
Gypsum sheathing	½ inch	16 inches on center
Reinforced cement mortar	1 inch	24 inches on center
Hardboard panel siding	In accordance with Tables 2308.9.3(5)	--

(portions of proposal not shown remain unchanged)

Commenter’s Reason: The purpose of this public comment is to address NAHB’s concerns as identified in our testimony against the proposal.

Under Section 2308.9.3, Item #5, gypsum board sheathing a minimum of ½ inch in thickness used as bracing is permitted when attached to studs up to 24 inches on center. Table 2308.9.3(1) limits the stud spacing to 16” for the bottom story of a 3-story house in Seismic Design Category A and B, and the bottom of a two-story house in Seismic Design Category C, but otherwise 24” in spacing is permitted. There is no limit under Table 2308.12.4 for gypsum sheathing used as bracing on a one-story house in Seismic Design Categories D and E.

The definition of Gable is flawed. As written, it is not clear the end of a gambrel (“barn-shaped”) roof on a Dutch Colonial house is a gable. The shape of the end wall is actually an irregular pentagon, not a triangle. Also, if the structure is balloon-framed, the definition technically makes the entire end wall of the structure a “gable”, even the portions of the wall that are associated with the story or stories below.

Finally, Table 2308.9.3 needs to be revised to reflect all of the permitted structural sheathing methods on exterior walls and coordinate with the revisions to the wall bracing portions of Section 2308 under S273.

S287-12

Final Action: AS AM AMPC____ D

S288-12
2308.9.3

Proposed Change as Submitted

Proponent: Paul Coats, P.E., CBO, American Wood Council (pcoats@awc.org)

Revise as follows:

2308.9.3 Bracing. Braced wall lines shall consist of braced wall panels that meet the requirements for location, type and amount of bracing as shown in Figure 2308.9.3, specified in Table 2308.9.3(1) and are in line or offset from each other by not more than 4 feet (1219 mm). Braced wall panels shall start not more than 12 1/2 feet (3810 mm) from each end of a braced wall line. Braced wall panels shall be clearly indicated on the plans. Construction of braced wall panels shall be by one of the following methods:

1. Nominal 1-inch by 4-inch (25 mm by 102 mm) continuous diagonal braces let into top and bottom plates and intervening studs, placed at an angle not more than 60 degrees (1.0 rad) or less than 45 degrees (0.79 rad) from the horizontal and attached to the framing in conformance with Table 2304.9.1.
2. Wood boards of 5/8 inch (15.9 mm) net minimum thickness applied diagonally on studs spaced not over 24 inches (610 mm) o.c.
3. Wood structural panel sheathing with a thickness not less than 3/8 inch (9.5 mm) for 16-inch (406 mm) or 24-inch (610 mm) stud spacing in accordance with Tables 2308.9.3(2) and 2308.9.3(3).
4. Fiberboard sheathing panels not less than 1/2 inch (12.7 mm) thick applied vertically or horizontally on studs spaced not over 16 inches (406 mm) o.c. where installed with fasteners in accordance with ~~Section 2306.6 and Table 2306.6~~ Table 2304.9.1.
5. Gypsum board [sheathing 1/2-inch-thick (12.7 mm) by 4-feet-wide (1219 mm) wallboard or veneer base] on studs spaced not over 24 inches (610 mm) o.c. and nailed at 7 inches (178 mm) o.c. ~~with nails as required by Table 2306.7~~ along panel edges (including top and bottom plates) and 7" o.c. in the field with 5d (0.086 inch diameter) cooler nails.
6. Particleboard wall sheathing panels where installed in accordance with Table 2308.9.3(4).
7. Portland cement plaster on studs spaced 16 inches (406 mm) o.c.installed in accordance with Section 2510.
8. Hardboard panel siding where installed in accordance with Section 2303.1.6 and Table 2308.9.3(5).

For cripple wall bracing, see Section 2308.9.4.1. For Methods 2, 3, 4, 6, 7 and 8, each panel must be at least 48 inches (1219 mm) in length, covering three stud spaces where studs are spaced 16 inches (406 mm) apart and covering two stud spaces where studs are spaced 24 inches (610 mm) apart.

For Method 5, each panel must be at least 96 inches (2438 mm) in length where applied to one face of a panel and 48 inches (1219 mm) where applied to both faces. All vertical joints of panel sheathing shall occur over studs and adjacent panel joints shall be nailed to common framing members. Horizontal joints shall occur over blocking or other framing equal in size to the studding except where waived by the installation requirements for the specific sheathing materials. Sole plates shall be nailed to the floor framing and top plates shall be connected to the framing above in accordance with Section 2308.3.2. Where joists are perpendicular to braced wall lines above, blocking shall be provided under and in line with the braced wall panels.

Reason: In the 2012 code, some provisions for fasteners in Chapter 23 were removed and the AF&PA Special Design Provisions for Wind and Seismic was referenced instead. This proposed change cleans up some references to tables that are no longer applicable, while retaining prescriptive guidance in the code for conventional wall bracing methods. For fiberboard sheathing attachment, Section 2306.6 and Table 2306.6 are no longer applicable. In the 2012 IBC, Table 2304.9.1 would be an appropriate reference for fastener size for attachment of fiberboard sheathing. Table 2306.7 is no longer the correct reference in the 2012 IBC for gypsum wallboard attachment. The appropriate fastener, 5d cooler nails, is proposed for consistency with Table 2308.12.4 which addresses nail size for gypsum wallboard bracing used in Seismic Design Category D and E.

Cost Impact: The code change proposal will not increase the cost of construction.

2308.9.3-S-COATS.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: Agreement with the proponent's reason which indicates that the changes clean up references to tables that are no longer appropriate. It also coordinates the bracing requirements with other code sections on gypsum board.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Paul D. Coats, P.E., CBO, American Wood Council, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2308.9.3 Bracing. Braced wall lines shall consist of braced wall panels that meet the requirements for location, type and amount of bracing as shown in Figure 2308.9.3, specified in Table 2308.9.3(1) and are in line or offset from each other by not more than 4 feet (1219 mm). Braced wall panels shall start not more than 121/2 feet (3810 mm) from each end of a braced wall line. Braced wall panels shall be clearly indicated on the plans. Construction of braced wall panels shall be by one of the following methods:

1. Nominal 1-inch by 4-inch (25 mm by 102 mm) continuous diagonal braces let into top and bottom plates and intervening studs, placed at an angle not more than 60 degrees (1.0 rad) or less than 45 degrees (0.79 rad) from the horizontal and attached to the framing in conformance with Table 2304.9.1.
2. Wood boards of 5/8 inch (15.9 mm) net minimum thickness applied diagonally on studs spaced not over 24 inches (610 mm) o.c.
3. Wood structural panel sheathing with a thickness not less than 3/8 inch (9.5 mm) for 16-inch (406 mm) or 24-inch (610 mm) stud spacing in accordance with Tables 2308.9.3(2) and 2308.9.3(3).
4. Fiberboard sheathing panels not less than 1/2 inch (12.7 mm) thick applied vertically or horizontally on studs spaced not over 16 inches (406 mm) o.c. where installed with fasteners in accordance with Table 2304.9.1.
5. Gypsum board [sheathing 1/2-inch-thick (12.7 mm) or 5/8-inch thick (15.9 mm) by 4-feet-wide (1219 mm) wallboard or veneer base] on studs spaced not over 24 inches (610 mm) o.c. and ~~nailed~~ fastened to studs at 7 inches (178 mm) o.c. ~~along panel edges (including top and bottom plates) and 7" o.c. in the field with 5d (0.086 inch diameter) cooler nails.~~ in the field of the board and at board edges with nails or screws complying with Section 2506.2. Nails shall be 5d annular ringed (1 5/8 inch x 0.086 inch diameter) cooler nails and screws shall be not less than 1 ¼ inches in length.
6. Particleboard wall sheathing panels where installed in accordance with Table 2308.9.3(4).
7. Portland cement plaster on studs spaced 16 inches (406 mm) o.c. installed in accordance with Section 2510.
8. Hardboard panel siding where installed in accordance with Section 2303.1.6 and Table 2308.9.3(5).

For cripple wall bracing, see Section 2308.9.4.1. For Methods 2, 3, 4, 6, 7 and 8, each panel must be at least 48 inches (1219 mm) in length, covering three stud spaces where studs are spaced 16 inches (406 mm) apart and covering two stud spaces where studs are spaced 24 inches (610 mm) apart.

For Method 5, each panel must be at least 96 inches (2438 mm) in length where applied to one face of a panel and 48 inches (1219 mm) where applied to both faces. All vertical joints of panel sheathing shall occur over studs and adjacent panel joints shall be nailed to common framing members. Horizontal joints shall occur over blocking or other framing equal in size to the studding except where waived by the installation requirements for the specific sheathing materials. Sole plates shall be nailed to the floor framing and top plates shall be connected to the framing above in accordance with Section 2308.3.2. Where joists are perpendicular to braced wall lines above, blocking shall be provided under and in line with the braced wall panels.

Commenter's Reason: This comment combines the original changes to item 5 made by S288 and S289 which were both approved by the Structural Committee, and is necessary for the clear wording of the section resulting from both approvals. It also adds the correct nail length (1 5/8-inch) for the 5d cooler nail. Screw dimensions other than the minimum length are specified in the standards listed in Section 2506.2 for screws used with gypsum.

S288-12

Final Action: AS AM AMPC____ D

S291-12
2308.9.3.2, Figure 2308.9.3.2

Proposed Change as Submitted

Proponent: Edward L. Keith, P.E., APA – The Engineered Wood Association (ed.keith@apawood.org)

Revise as follows:

2308.9.3.2 Alternate bracing wall panel adjacent to a door or window opening. Any bracing required by Section 2308.9.3 is permitted to be replaced by the following when used adjacent to a door or window opening with a full-length header:

1. In one-story buildings, each panel shall have a length of not less than 16 inches (406 mm) and a height of not more than 10 feet (3048 mm). Each panel shall be sheathed on one face with a single layer of 3/8 inch (9.5 mm) minimum thickness wood structural panel sheathing nailed with 8d common or galvanized box nails in accordance with Figure 2308.9.3.2. The wood structural panel sheathing shall extend up over the solid sawn or glued-laminated header and shall be nailed in accordance with Figure 2308.9.3.2. A built-up header consisting of at least two 2 × 12s and fastened in accordance with Item 24 of Table 2304.9.1 shall be permitted to be used. A spacer, if used, shall be placed on the side of the built-up beam opposite the wood structural panel sheathing. The header shall extend between the inside faces of the first full-length outer studs of each panel. The clear span of the header between the inner studs of each panel shall be not less than 6 feet (1829 mm) and not more than 18 feet (5486 mm) in length. A strap with an uplift capacity of not less than 1,000 pounds (4,400 N) shall fasten the header to the inner studs opposite the sheathing. One anchor bolt not less than 5/8 inch (15.9 mm) diameter and installed in accordance with Section 2308.6 shall be provided in the center of ach sill plate. The studs at each end of the panel shall have a tie-down device fastened to the foundation with an uplift capacity of not less than ~~4,200~~ <u>3,500</u> pounds (~~18 480~~ <u>15 570</u> N).

   Where a panel is located on one side of the opening, the header shall extend between the inside face of the first full-length stud of the panel and the bearing studs at the other end of the opening. A strap with an uplift capacity of not less than 1,000 pounds (4400 N) shall fasten the header to the bearing studs. The bearing studs shall also have a tie-down device fastened to the foundation with an uplift capacity of not less than 1,000 pounds (4400 N).

   The tie-down devices shall be an embedded strap type, installed in accordance with the manufacturer's recommendations. The panels shall be supported directly on a foundation that is continuous across the entire length of the braced wall line. This foundation shall be reinforced with not less than one No. 4 bar top and bottom.

   Where the continuous foundation is required to have a depth greater than 12 inches (305 mm), a minimum 12-inch by 12-inch (305 mm by 305 mm) continuous footing or turned down slab edge is permitted at door openings in the braced wall line. This continuous footing or turned down slab edge shall be reinforced with not less than one No. 4 bar top and bottom. This reinforcement shall be lapped not less than 15 inches (381 mm) with the reinforcement required in the continuous foundation located directly under the braced wall line.

2. In the first *story* of two-story buildings, each wall panel shall be braced in accordance with Item 1 bove, except that each panel shall have a length of not less than 24 inches (610 mm).

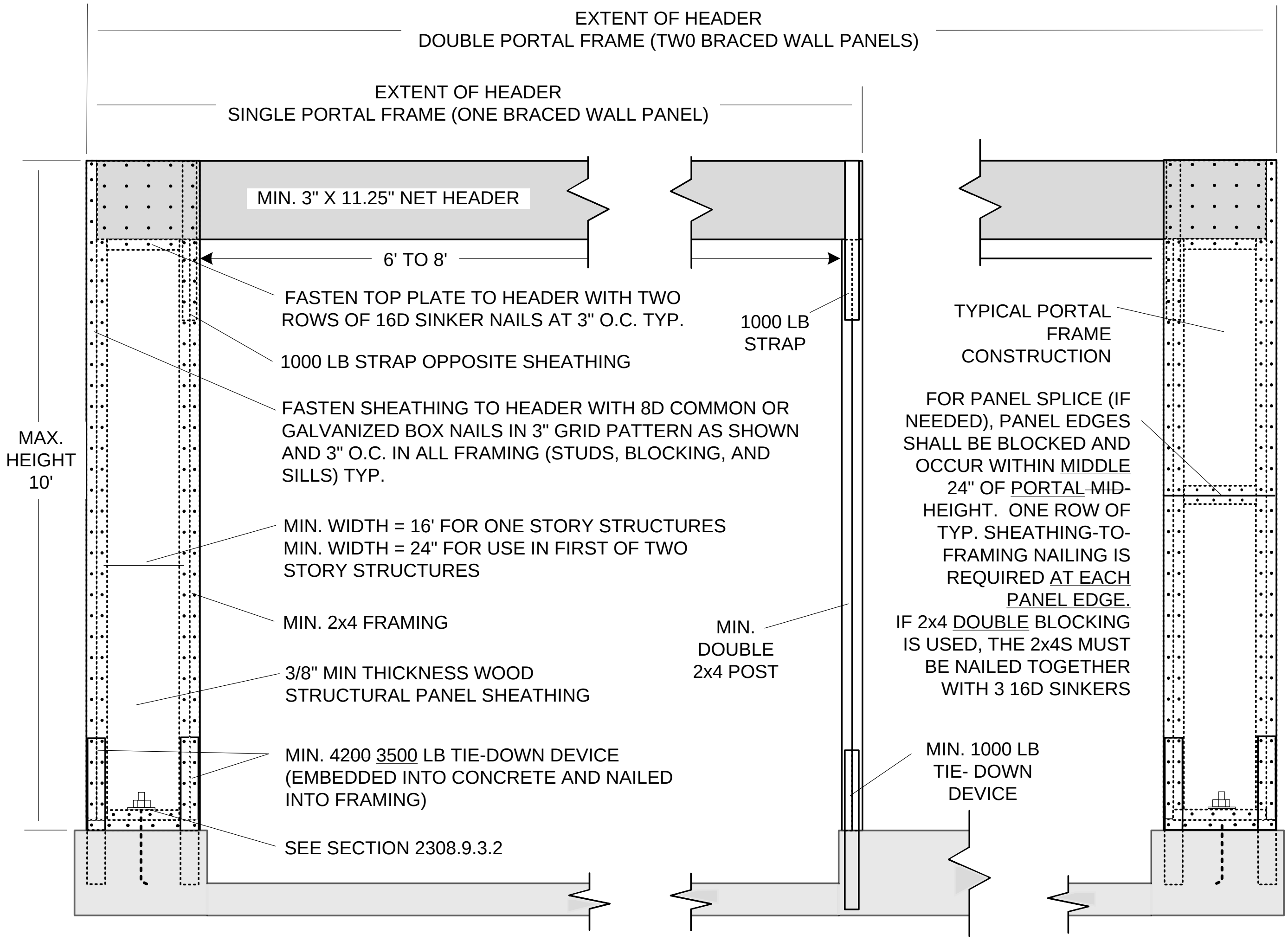


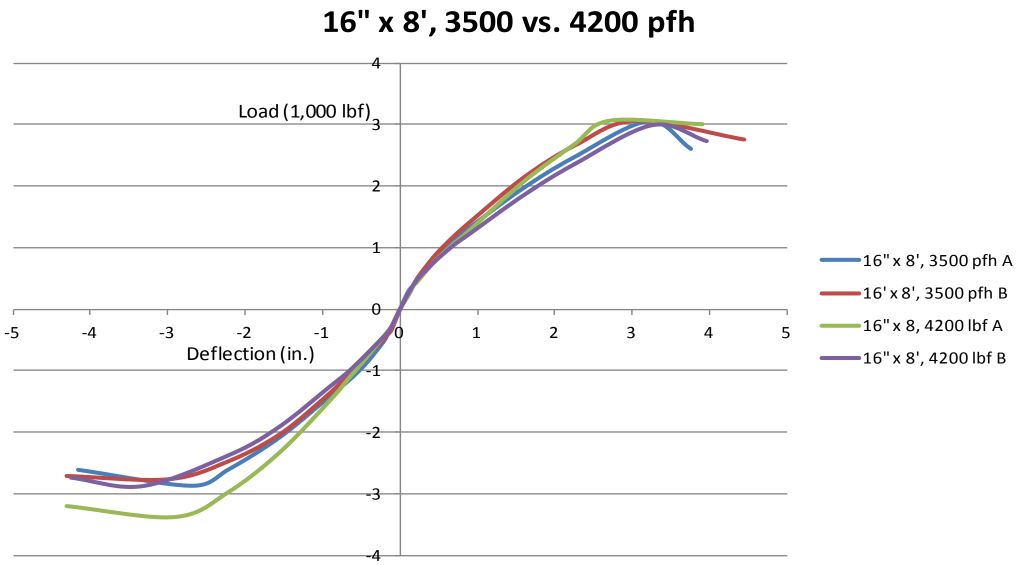
FIGURE 2308.9.3.2
ALTERNATE BRACED WALL PANEL ADJACENT TO A DOOR OR WINDOW OPENING

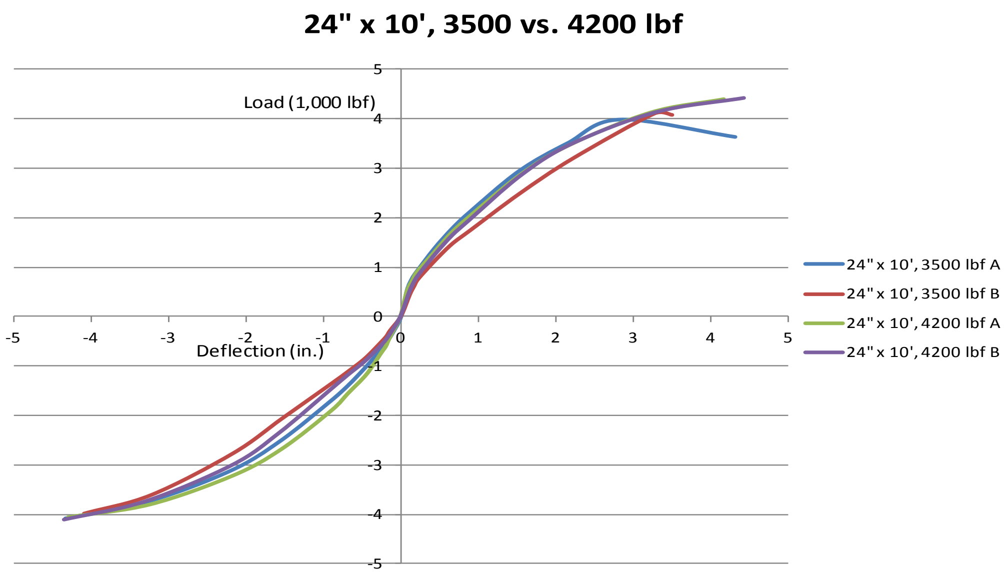
Reason: 1) There are a couple of types of changes to Figure 2308.9.3.2 proposed. There are both technical changes and editorial changes.

Technical changes: The two technical changes made to the figure are the reduction of the capacity of the portal frame leg tie-down devices from 4200 lbf to 3500 lbf and the removal of the third bottom plate at the portal frame leg. (Note that the third bottom plate we propose to delete is NOT shown in the figure above. The normal strikethrough and underline procedures are difficult to apply to figure changes.)

A. The first technical change is the reduction of the tie-down from 4200 lbf to 3500 lbf. The initial testing was conducted on the portal frames utilizing the 4200 lbf hold down because that was what was readily available and in common use by the construction industry. At the time of initial testing, no attempt was made to determine the sensitivity of the system to such a reduction in tie-down capacity. As the initial prescriptive parameters of the portal frame were based on testing, there was no latitude for determining the impact of the industry wide reduction to such tie-downs in response to the cracked-concrete provisions of ACI 318. As such, retesting of the portal frames with both 4200 lbf and 3500 lbf tie-downs was necessary to determine the impact on the performance of the system, if any. Portals with 16” wide legs x 8 ft height as well as 24” wide x 10 ft high were recently retested by APA. Pairs of each size were tested with 4200 lbf tie-downs and then retested with 3500 lbf tie-downs. The results of these tests showed that the system was relatively insensitive to the reduction in tie-down capacity from 4200 lbf to 3500 lbf. No attempt was made to determine how low the tie-down capacity could be reduced before an impact on the performance of the portal frames could be seen.

These tests were conducted using the CUREe method, as described in ASTM E2126, with a frequency of 0.5 Hz. The following charts show the backbone curves for the Method PFH portal frames tested with 3500 lbf and 4200 lbf tie-downs at both the 16” wide leg portals 8’ high as well as the 24” wide portals 10’ high.





Free PDF Copies of the full lab report on this testing program entitled APA Report T2011-15, *Bracing Method PFH (Portal Frame with Hold down) – Alternative Attachment,* can be obtained at http://www.apawood.org.

B. The second technical change is the removal of the third bottom plate. As mentioned above the original testing was conducted with the third plate in place. The third plate causes numerous difficulties in the field, not the least of which is that the normal length threaded anchors are too short to accommodate the third plate and provide the required depth of penetration into the foundation. This results in inadequate anchor depth-of-embedment or the use of threaded sleeves and all-thread to extend the bolt length to accommodate the third plate. When investigating the change to the 3500 lbf hold down, we utilized this opportunity to run the tests with only double bottom plates. All subsequent testing was done without the third bottom plate. The results of this testing indicated that the third bottom plate has negligible impact on the performance of the portal frames.

Non-technical changes:

1. The intent of the note concerning the location of the portal-leg sheathing-splice, when present, is to place the splice butt joint within the middle 24" of the portal frame height. As currently written "within 24" of mid height" means the splice could be placed within 24 inches either above or below of mid height, or within a band 48" wide. This was never the intent. The proposed language is clearer that the joint must "occur within the middle 24" of portal height", where portal height is illustrated in the figure.
2. At the splice plate, the current wording requires a single row of nailing. The proposed change required this at each panel edge at the splice as was the original intent.
3. In the same annotation, a provision is provided that would permit the splice to be made over a pair of 2x4s as long as they are spliced together. The proposal changes "blocking" to "double blocking" to clarify the intent.

2) The revision to Section 2308.9.3.2 is as explained above.

Cost Impact: The code change proposal will not increase the cost of construction.

F2308.9.3.2-S-KEITH.doc

Public Hearing Results

Modify proposal as follows:

2308.9.3.2 Alternate bracing wall panel adjacent to a door or window opening. Any bracing required by Section 2308.9.3 is permitted to be replaced by the following when used adjacent to a door or window opening with a full-length header:

1. In one-story buildings, each panel shall have a length of not less than 16 inches (406 mm) and a height of not more than 10 feet (3048 mm). Each panel shall be sheathed on one face with a single layer of 3/8 inch (9.5 mm) minimum thickness wood structural panel sheathing nailed with 8d common or galvanized box nails in accordance with Figure 2308.9.3.2. The wood structural panel sheathing shall extend up over the solid sawn or glued-laminated header and shall be nailed in accordance with Figure 2308.9.3.2. A built-up header consisting of at least two 2 × 12s and fastened in accordance with Item 24 of Table 2304.9.1 shall be permitted to be used. A spacer, if used, shall be placed on the side of the built-up beam opposite the wood structural panel sheathing. The header shall extend between the inside faces of the first full-length outer studs of each panel. The clear span of the header between the inner studs of each panel shall be not less than 6 feet (1829 mm) and not more than 18 feet (5486 mm) in length. A strap with an uplift capacity of not less than 1,000 pounds (4,400 N) shall fasten the header to the inner studs opposite the sheathing. One anchor bolt not less than 5/8 inch (15.9 mm) diameter and installed in accordance with Section 2308.6 shall be provided in the center of ach sill plate. The studs at each end of the panel shall have a tie-down device fastened to the foundation with an uplift capacity of not less than 4,200 ~~3,500~~ pounds (18 480 ~~15 570~~ N).

   Where a panel is located on one side of the opening, the header shall extend between the inside face of the first full-length stud of the panel and the bearing studs at the other end of the opening. A strap with an uplift capacity of not less than 1,000 pounds (4400 N) shall fasten the header to the bearing studs. The bearing studs shall also have a tie-down device fastened to the foundation with an uplift capacity of not less than 1,000 pounds (4400 N).

   The tie-down devices shall be an embedded strap type, installed in accordance with the manufacturer's recommendations. The panels shall be supported directly on a foundation that is continuous across the entire length of the braced wall line. This foundation shall be reinforced with not less than one No. 4 bar top and bottom.

   Where the continuous foundation is required to have a depth greater than 12 inches (305 mm), a minimum 12-inch by 12-inch (305 mm by 305 mm) continuous footing or turned down slab edge is permitted at door openings in the braced wall line. This continuous footing or turned down slab edge shall be reinforced with not less than one No. 4 bar top and bottom. This reinforcement shall be lapped not less than 15 inches (381 mm) with the reinforcement required in the continuous foundation located directly under the braced wall line.

2. In the first *story* of two-story buildings, each wall panel shall be braced in accordance with Item 1 above, except that each panel shall have a length of not less than 24 inches (610 mm).

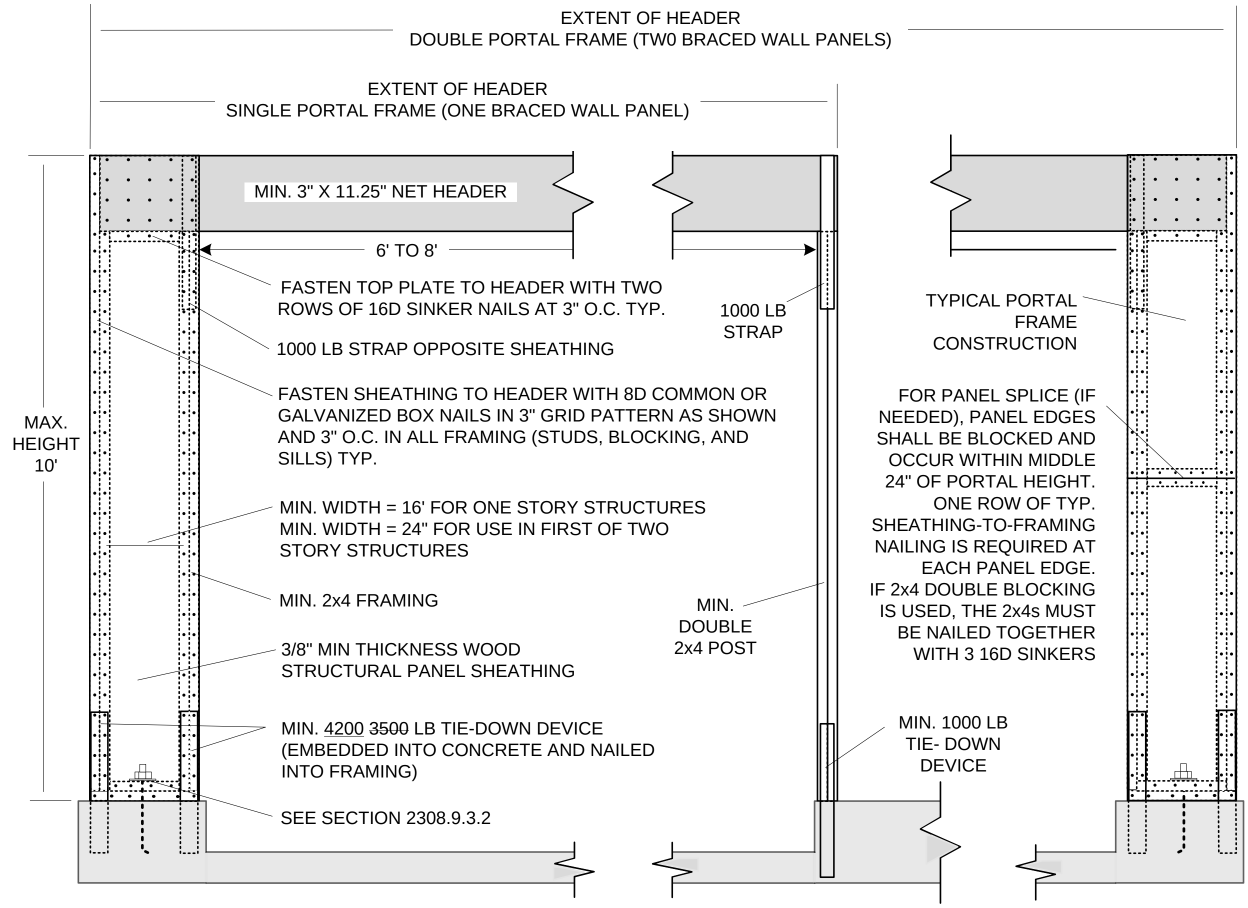


FIGURE 2308.9.3.2
ALTERNATE BRACED WALL PANEL ADJACENT TO A DOOR OR WINDOW OPENING

Committee Reason: This proposal updates the prescriptive portal frame bracing alternative. The modification is acknowledges that the hold-down capacity needs to remain 4200 pounds.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Edward L. Keith, representing APA – The Engineered Wood Association, requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

2308.9.3.2 Alternate bracing wall panel adjacent to a door or window opening. Any bracing required by Section 2308.9.3 is permitted to be replaced by the following when used adjacent to a door or window opening with a full-length header:

1. In one-story buildings, each panel shall have a length of not less than 16 inches (406 mm) and a height of not more than 10 feet (3048 mm). Each panel shall be sheathed on one face with a single layer of 3/8 inch (9.5 mm) minimum thickness wood structural panel sheathing nailed with 8d common or galvanized box nails in accordance with Figure 2308.9.3.2. The wood structural panel sheathing shall extend up over the solid sawn or glued-laminated header and shall be nailed in accordance with Figure 2308.9.3.2. A built-up header consisting of at least two 2 × 12s and fastened in accordance with Item 24 of Table 2304.9.1 shall be permitted to be used. A spacer, if used, shall be placed on the side of the built-up beam opposite the wood structural panel sheathing. The header shall extend between the inside faces of the first full-

length outer studs of each panel. The clear span of the header between the inner studs of each panel shall be not less than 6 feet (1829 mm) and not more than 18 feet (5486 mm) in length. A strap with an uplift capacity of not less than 1,000 pounds (4,400 N) shall fasten the header to the inner studs opposite the sheathing. One anchor bolt not less than 5/8 inch (15.9 mm) diameter and installed in accordance with Section 2308.6 shall be provided in the center of ach sill plate. The studs at each end of the panel shall have a tie-down device fastened to the foundation with an uplift capacity of not less than ~~4,200~~ 3,500 pounds (~~18 480~~ 15 570 N).

Where a panel is located on one side of the opening, the header shall extend between the inside face of the first full-length stud of the panel and the bearing studs at the other end of the opening. A strap with an uplift capacity of not less than 1,000 pounds (4400 N) shall fasten the header to the bearing studs. The bearing studs shall also have a tie-down device fastened to the foundation with an uplift capacity of not less than 1,000 pounds (4400 N).

The tie-down devices shall be an embedded strap type, installed in accordance with the manufacturer's recommendations. The panels shall be supported directly on a foundation that is continuous across the entire length of the braced wall line. This foundation shall be reinforced with not less than one No. 4 bar top and bottom.

Where the continuous foundation is required to have a depth greater than 12 inches (305 mm), a minimum 12-inch by 12-inch (305 mm by 305 mm) continuous footing or turned down slab edge is permitted at door openings in the braced wall line. This continuous footing or turned down slab edge shall be reinforced with not less than one No. 4 bar top and bottom. This reinforcement shall be lapped not less than 15 inches (381 mm) with the reinforcement required in the continuous foundation located directly under the braced wall line.

2. In the first *story* of two-story buildings, each wall panel shall be braced in accordance with Item 1 above, except that each panel shall have a length of not less than 24 inches (610 mm).

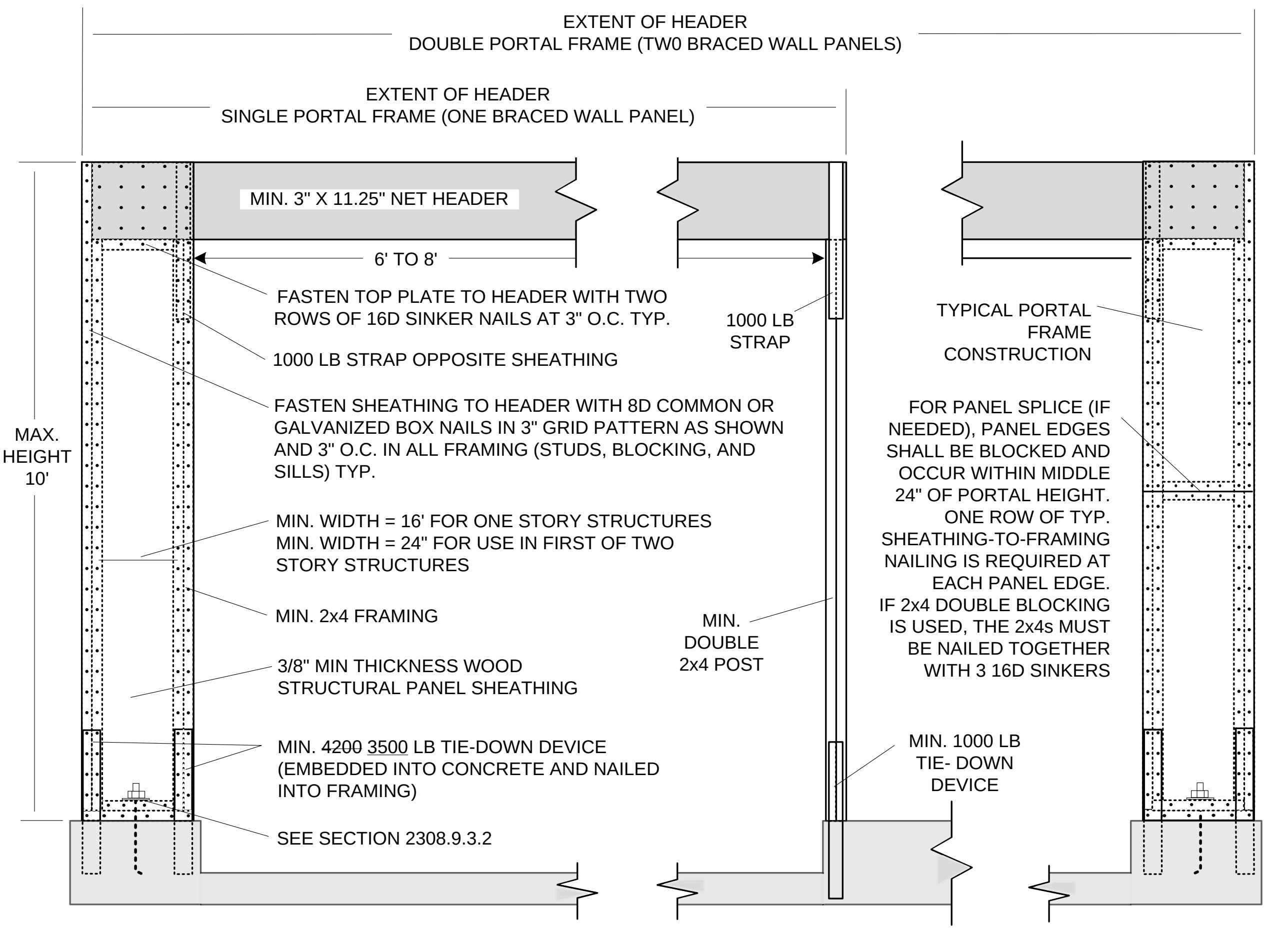
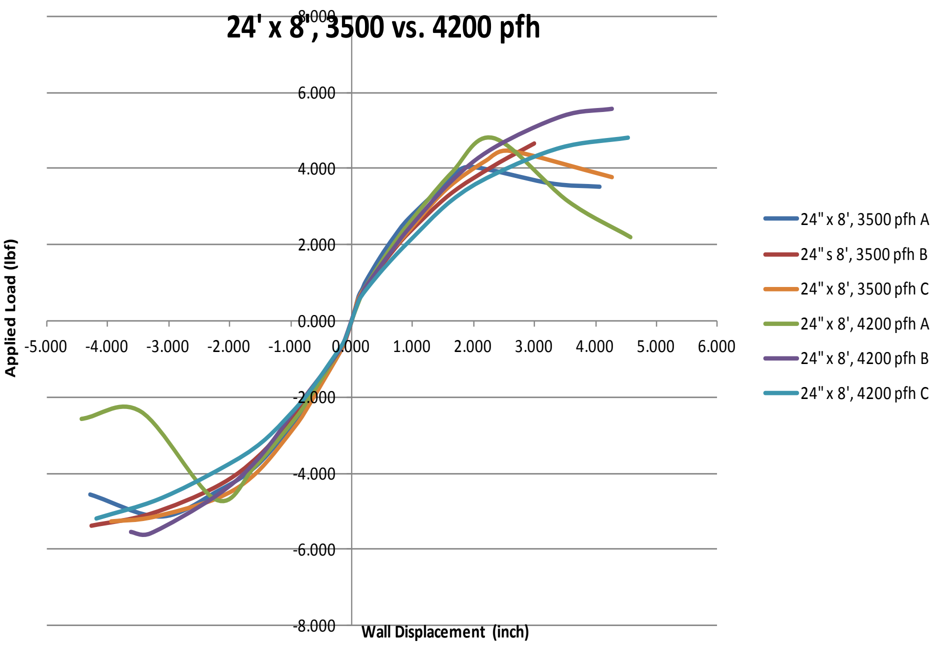


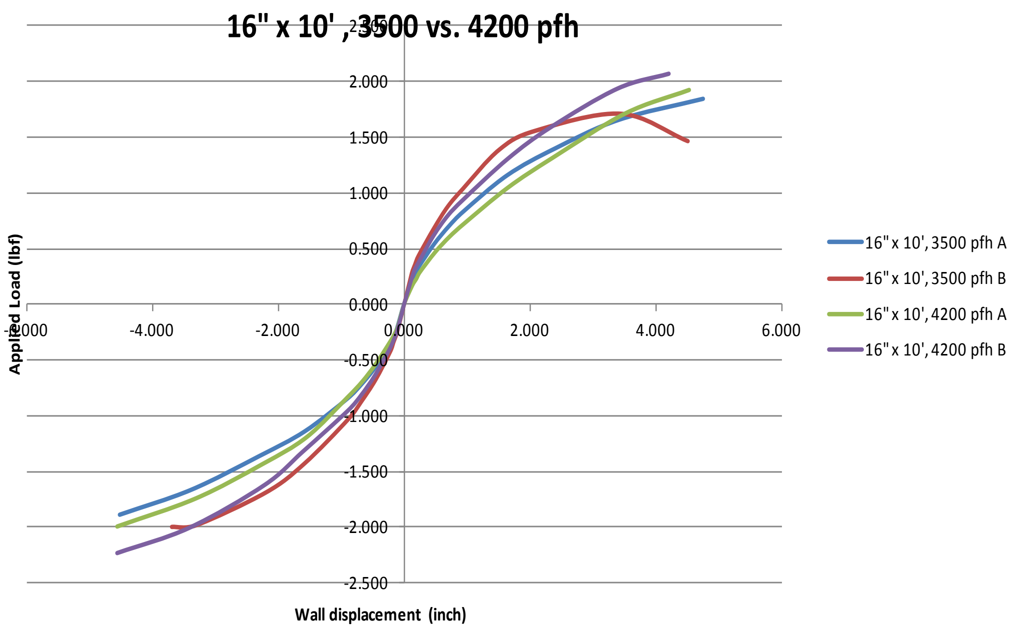
FIGURE 2308.9.3.2
ALTERNATE BRACED WALL PANELADJACENT TO A DOOR OR WINDOW OPENING

Commenter's Reason: The original proposal as submitted included a proposed change for the hold-down capacity in Section 2308.9.3.2 and Figure 2308.9.3.2 from 4,200 lbf to 3,500 lbf along with a number of other minor changes. This change in hold-down capacity was based on some preliminary research done at APA Research Center that was incomplete at the time the proposal was heard by the Committee. At the time, Simpson Strong-Tie was also in the process of developing a 4,200 lbf hold-down solution for such applications. Anticipating the success of Simpson's testing program, APA worked with Simpson to develop a floor modification to return the hold-down capacity to the original 4,200 lbf capacity. This floor modification was accepted and the original proposal was recommended for approval as modified.

Subsequent to the Code Development Hearings, those specific hold-down solutions that Simpson Strong-Tie was testing were unable to develop a 4,200 lbf hold-down capacity at a foundation end (immediately adjacent to a door opening). As there was insufficient time to develop and test additional hold-down solutions, APA, with assistance from Simpson's technical staff, completed a testing program verifying that reducing the recommended hold-down capacity from 4,200 to 3,500 lbf resulted in no appreciable difference in the performance of the hold down.

In addition to the geometries previously tested and reported in the original code change proposal, as reproduced below, two additional geometries were tested by APA. The results of these two geometries can be seen in the load deflection backbone curves shown below. The legends for the plots indicate the leg width of the portal x the height of the portal, the hold-down capacity, and replication letter.





It is clear from the plots below and those provided in the original reason statement, also provided below, that the reduction in the capacity of the hold-down strap from 4,200 to 3,500 lbf has no significant impact on the performance of the portal frame. As such, we request that by this public comment, the reference to the hold-down capacity be changed from 4,200 to 3,500 lbf in both the figure and corresponding text.

A free copy of *APA Report T2012L-24 - Alternative Attachment (IBC), Portal Frame with Hold Downs (Bracing Method PFH) (IRC) – Hold-Down Strap Capacity Variations* is available at http://www.apawood.org/pdfs/TSD/T-Reports/T2012L-24.pdf

S291-12

Final Action: AS AM AMPC____ D

S292-12
2308.11.3.3

Proposed Change as Submitted

Proponent: Robert Rice, C.B.O., Josephine County, OR, representing Oregon Building Officials Association (structdesigner@yahoo.com), R. Terry Malone, P.E., S.E.

Revise as follows:

2308.11.3.3 Openings in horizontal diaphragms. Horizontal diaphragms with openings having dimension perpendicular to the joist that is greater than 4 feet (1219 mm) shall be designed in accordance with accepted engineering practice. Openings in horizontal diaphragms with a dimension perpendicular to the joist that is not greater than 4 feet (1219 mm) shall be constructed ~~in accordance with the following:~~ with metal ties and blocking in accordance with this section and Figure 2308.11.3.3.

~~1. Blocking shall be provided beyond headers.~~

~~2.~~ Metal ties shall not be less than 0.058 inch thick [1.47 mm (16 galvanized gage)] by $1^1/_2$ inches (38 mm) wide and shall have a minimum yield strength of 33,000 psi (227 MPa). Blocking shall extend 2 feet minimum beyond headers. Ties shall be attached to blocking with eight 16d common nails on each side of the header-joist intersection ~~shall be provided (see Figure 2308.11.3.3). The metal ties shall have a minimum yield of 33,000 psi (227 MPa)~~.

Reason: This proposal re-arranges the existing text to read more clearly, corrects an error in the code and clarifies the requirements and limitations of openings in diaphragms in structures assigned to Seismic Design Category B, C, D and E. The text of the current code is intended to provide a prescriptive solution for diaphragm openings, in high seismic design categories, that are 4 feet or less. The current code is missing the word "not" which would make this section correct. The commentary for this code section correctly states,

Horizontal diaphragms are floor and roof assemblies that are usually clad with structural wood sheathing panels, such as plywood or OSB. Though more complicated and difficult to visualize, lateral forces that are applied to a building from wind or seismic events follow a load path that distributes and transfers shear and overturning forces from the lateral loads. When openings are built into the diaphragm, they disrupt the continuity of load across the diaphragm and they must be reinforced to compensate. Another concern is the stiffness of the diaphragm. These provisions are a prescriptive solution for openings not greater than 4 feet (1219 mm) in dimension and provide a general means for a load path in these specific cases in lieu of an engineered design.- 2009 IBC Commentary, International Code Council

Cost Impact: The code change proposal will not increase the cost of construction.

2308.11.3.3-S-RICE.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There is confusion over this proposal to revise the provision on openings in horizontal diaphragms and the source document [NEHRP] for this requirement. The committee would like to see better justification for this change.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Robert Rice, Josephine County, OR, representing Oregon Building Officials Association and R. Terry Malone, P.E. S.E representing self, requests Approval as Modified by this Public Comment.

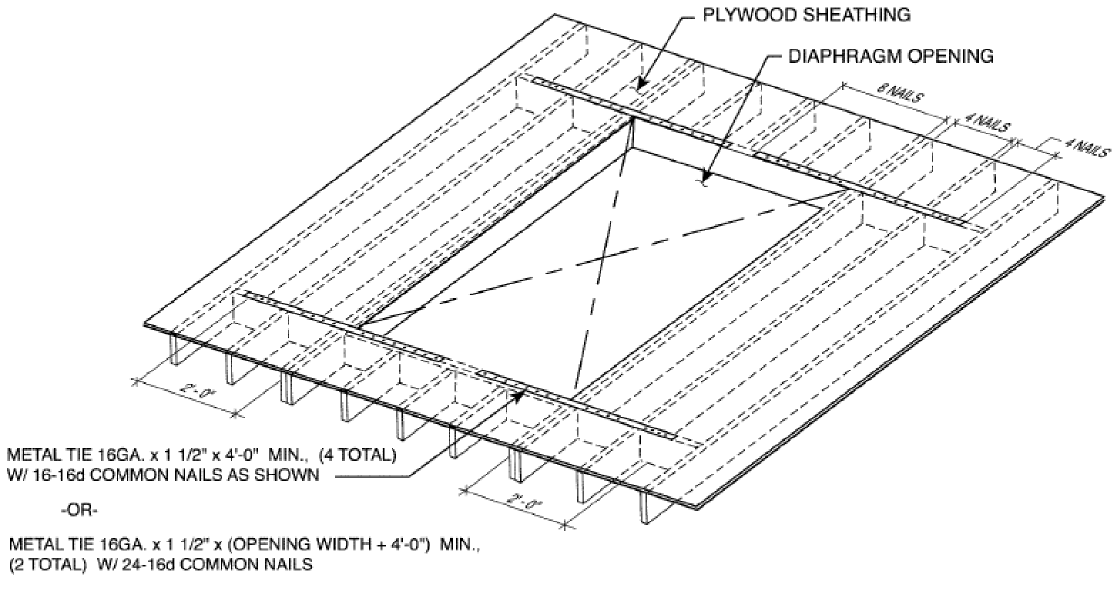
Modify the proposal as follows:

2308.11.3.3 Openings in horizontal diaphragms. ~~Horizontal diaphragms with openings having a dimension perpendicular to the joist that is greater than 4 feet (1219mm) shall be designed in accordance with accepted engineering practice.~~ Openings in horizontal diaphragms with a dimension perpendicular to the joist that is ~~not~~ greater than 4 feet (1219 mm) shall be constructed with metal ties and blocking in accordance with this section and Figure 2308.11.3.3.

Metal ties shall not be less than 0.058 inch thick [1.47 mm (16 galvanized gage)] by 11/2 inches (38 mm) wide and shall have a minimum yield strength of 33,000 psi (227 MPa). Blocking shall extend 2 feet minimum beyond headers. Ties shall be attached to blocking with eight 16d common nails on each side of the header-joist intersection.

Commenter's Reason: The original proposal attempted to accomplish two goals. First, the existing code language read poorly and necessary information for the treatment of openings was in the referenced figure, Figure 2308.11.3.3 as shown below, but not in the text. So, one goal of the original proposal was to rearrange the text for clarity to add the requirements from the figure into the text.

The second intent of the original proposal was to clarify that this prescriptive solution was originally intended for openings in higher SDC's up to four feet but not over four feet. This Public Comment is a proposed modification that deletes the change to applicability and addresses only the first goal in rearrangement of the text and including the information from the figure. This Public Comment modification does not add anything to the code that is not already there and removes the portion of the original proposal that would have resulted in a change.



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 2308.11.3.3
OPENINGS IN HORIZONTAL DIAPHRAGMS

2012 INTERNATIONAL BUILDING CODE® **513**

Public Comment 2:

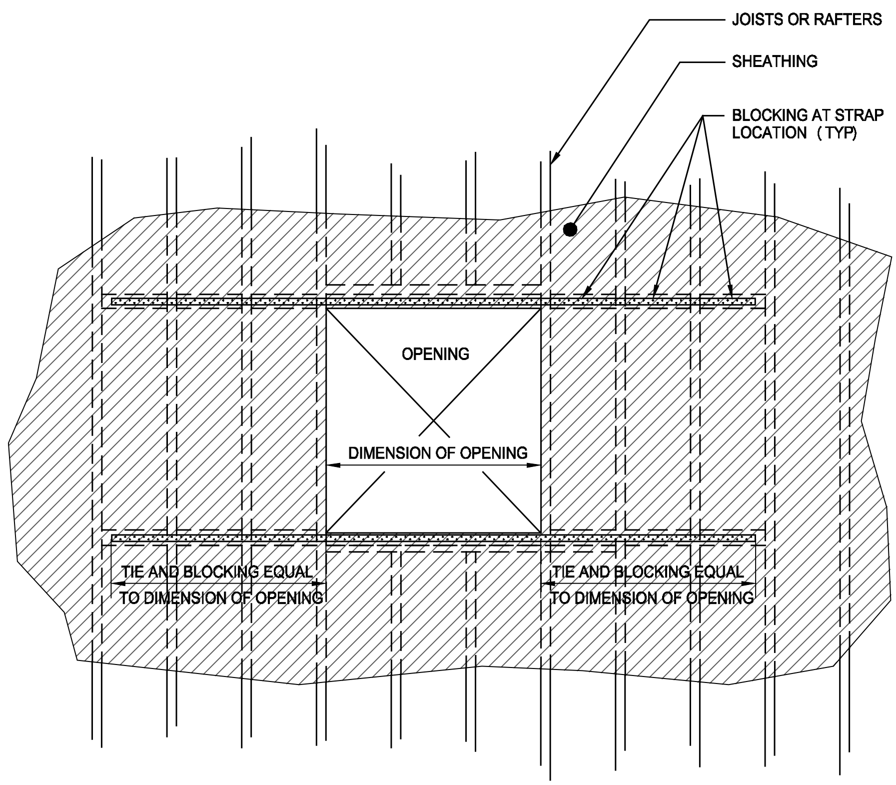
Robert Rice, Josephine County, OR, representing Oregon Building Officials Association and R. Terry Malone, P.E. S.E., representing self and Dr. J. Daniel Dolan, P.E representing self, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2308.11.3.3 Openings in horizontal diaphragms. ~~Horizontal diaphragms with openings having a dimension perpendicular to the joist that is greater than 4 feet (1219 mm) shall be designed in accordance with accepted engineering practice.~~ Openings in horizontal diaphragms with a dimension ~~perpendicular to the joist~~ that is ~~not~~ greater than 4 feet (1219 mm) shall be constructed with metal ties and blocking in accordance with this section and Figure 2308.11.3.3.

Metal ties shall not be less than 0.058 inch thick [1.47 mm (16 galvanized gage)] by 1-1/2 inches (38 mm) wide and shall have a minimum yield strength of 33,000 psi (227 MPa). Blocking shall extend ~~2 feet minimum beyond headers~~ <u>not less than the dimension of the opening in the direction of the tie and blocking</u>. Ties shall be attached to blocking <u>in accordance with the manufacturer's instructions but with not less than</u> ~~with~~ eight 16d common nails on each side of the header-joist intersection.

Replace figure as shown:



<u>**FIGURE 2308.11.3.3**</u>
<u>**OPENINGS IN HORIZONTAL DIAPHRAGMS**</u>

Commenter's Reason: The original proposal attempted to accomplish two goals. First, the existing code language read poorly and the necessary information for the treatment of openings was in the referenced figure (Figure 2308.11.3.3) but not in the text. One goal of the original proposal was to rearrange the text for clarity to add the requirements from the figure into the text. A separate Public Comment has been submitted to address those portions of the original proposal.

The second intent of the original proposal was to clarify that this prescriptive solution was not incorporated into the IBC as originally intended by the supporting background reports and documents and was actually in direct conflict with the description in the IBC commentary. The current IBC text says that this prescriptive detail is to be used for openings **over** 4 feet in SDC B, C, D and E. The commentary says that the detail can be used as a prescriptive solution **up to 4 feet** in those SDC's. The language and implication of the commentary would require an engineered design when the opening is greater than 4 feet.

The commentary reads;

Horizontal diaphragms are floor and roof assemblies that are usually clad with structural wood sheathing panels, such as plywood or OSB. Though more complicated and difficult to visualize, lateral forces that are applied to a building from wind or seismic events follow a load path that distributes and transfers shear and overturning forces from the lateral loads. When openings are built into the diaphragm, they disrupt the continuity of load across the diaphragm and they must be reinforced to compensate. Another concern is the stiffness of the diaphragm. ***These provisions are a prescriptive solution for openings not greater than 4 feet (1219 mm) in dimension and provide a general means for a load path in these specific cases in lieu of an engineered design.*** *- 2009 IBC Commentary, International Code Council*

Despite efforts to research the source of this code provision, it wasn't until after submission of the proposal for the Code Development Hearings in Dallas that the background for this became more clear. In the 2003 NEHRP; The detail is required for openings greater than 4 feet in all SDC's and for **all openings in SDC D and E** .

The 2003 NEHRP provisions state;

"12.4.3.7 Detailing for openings in diaphragms. For openings with a dimension greater than 4 ft (1.2m), or openings in structures assigned to Seismic Design Category D or E, the following minimum detail shall be provided. Blocking beyond headers and metal ties not less than 0.058 in (16 gauge; 2 mm) thick by 1.5 in. (38 mm) wide by 48 in. (1220 mm) long with eight 16d (0.162 by 3.5 in.; 4 by 89 mm) common nails on each side of the header-joist intersection shall be provided (see Figure 12.4-11). Steel used shall have a minimum yield of 33,000 psi (228 MPa) such as ASTM A 653 SS, Grade 33, ASTM A 792 SS, Grade 33, or ASTM A 875 SS, Grade 33."

Further, APA Research Report 138 states,

"The forces generated by the opening may be calculated by applying the principles of statics. …..However, ***when openings are relatively small****, chord forces do not increase significantly and it is usually sufficient simply to reinforce perimeter framing and assure that it is continuous. Continuous framing should extend from each corner of the opening both directions into the diaphragm,* ***a distance equal to the largest dimension of the opening****."*

As stated in the book, *Analysis of Irregular Shaped Structures, McGraw/Hill (Malone/Rice),* for small openings, *"ATC 7 and Diekmann recommend that at* ***small openings*** *minimal reinforcing at the corners of the opening should extend* ***a minimum distance equal to the depth or width of the opening*** *in the direction under consideration. In other words, the minimum distance left and right would be equal to the width "w" of the opening, and the minimum distance above and below the opening would be equal to the depth "d"."*

An example of what is meant, or not meant, in APA 138 by the term, *"…when openings are* ***relatively small****….",* is given further in the document when in the design considerations of Diaphragm No. 4 in APA report 138 it states, *"The 8-ft x 8-ft openings,* ***very large relative*** *to the size of the diaphragm, removed 50% of the plywood from the high shear areas near each reaction."*

While no definition of a "large opening" is given, it is clear that the force transfer around openings is a critical design feature to ensure a complete load path for wind and seismic loads. As with many requirements in the code, the true effect of inadequate load paths often are not realized until a significant load event occurs. The connection at openings in diaphragms is a critical element in the overall structural integrity of a building and the minimal cost and effort of installing the appropriate strapping and blocking required by this section is justified.

References:

APA The Engineered Wood Association. Rev. 2000 *Research Report 138 – Plywood Diaphragms,* APA, Tacoma, WA.

S292-12

Final Action: AS AM AMPC____ D

S298-12
2406.4.7

Proposed Change as Submitted

Proponent: Tim Pate, City & County of Broomfield Building Division, representing self

Revise as follows:

2406.4.7 Glazing adjacent to the bottom stair landing. Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 36 inches (914 mm) above the landing and within a 60 inch~~es~~ (1524 mm) horizontall~~y of~~ arc less than 180 degrees from the bottom tread shall be considered a hazardous location.

> **Exception:** Glazing that is protected by a guard complying with Sections 1013 and 1607.8 where the plane of the glass is greater than 18 inches (457 mm) from the guard.

Reason: Previous editions of the IBC before the 2012 required glazing that is 60" horizontally in any direction to be approved safety glazing. It is not clear why this requirement was changed in the 2012. The previous editions had the additional wording "in any direction" when applying the 60" horizontal rule. This is due to the "splay" factor for when someone gets to the last tread and falls. The tendency is for someone to flail out in any direction. This added wording will make this section apply to any glazing that is in a wall that is less than 180 degrees from the bottom tread. This will make it very clear what the intent was and still is with this section.

Cost Impact: The code change proposal will increase the cost of construction.

2406.4.7#2-S-PATE.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This code change does not clarify the requirements for glazing adjacent to the bottom stair landing. The term arc is not necessary and an illustration in the reason could help clarify the intent of this revision.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Tim Pate, City & County of Broomfield Building Department, representing Colorado Chapter Code Change Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2406.4.7 Glazing adjacent to the bottom stair landing. Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 36 inches (914 mm) above the landing and within a 60 inch (1524 mm) horizontal arc less than 180 degrees from the bottom tread nosing shall be considered a hazardous location.

> **Exception:** Glazing that is protected by a guard complying with Sections 1013 and 1607.8 where the plane of the glass is greater than 18 inches (457 mm) from the guard.

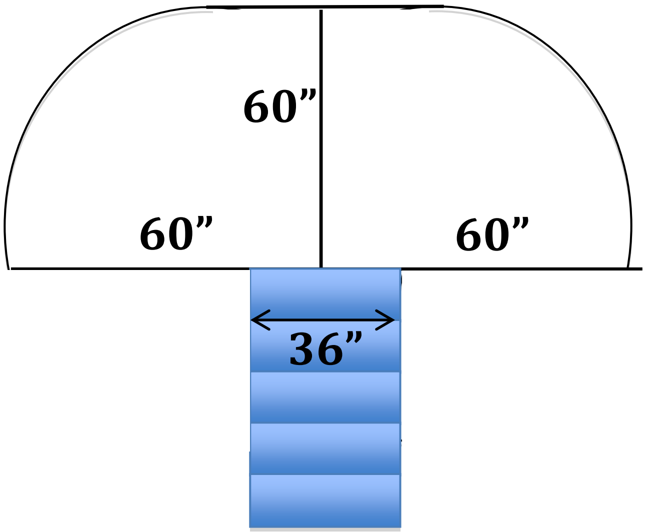
Commenter's Reason: This code change does not clarify the requirements for glazing adjacent to the bottom stair landing. The term arc is not necessary and an illustration in the reason could help clarify the intent of this revision.

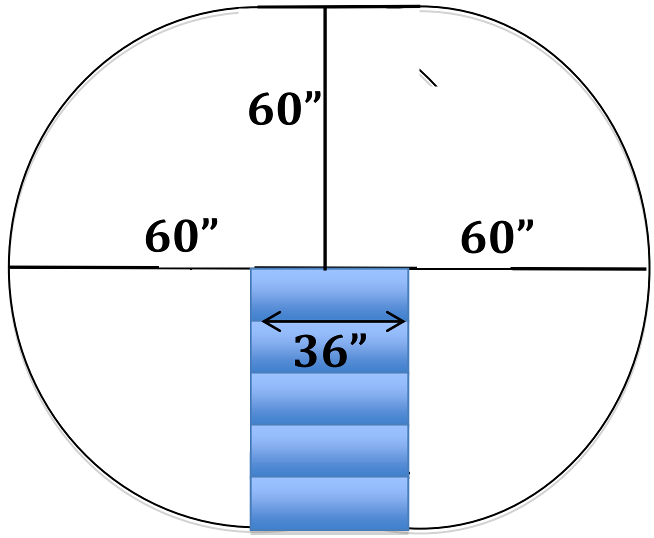
Previous editions of the IBC before the 2012 required glazing that is 60" horizontally in any direction to be approved safety glazing. It is not clear why this requirement was changed in the 2012. The previous editions had the additional wording "in any direction" when applying the 60" horizontal rule. This is due to the "splay" factor for when someone gets to the last tread and falls. The tendency is for someone to flail out in any direction.

This added wording will make this section only apply to any glazing that is in a wall that is less than 180 degrees from the bottom tread nosing. I believe that adding the wording which would limit the area needing safety glazing to any glazing that falls within a 180 degree arc from bottom tread nosing and extending out 60" makes more sense since it is extremely unlikely that someone will fall out and backwards. I have added an illustration which should help everyone see what this changed wording will do.

Please note that there is still a requirement to provide approved safety glazing when located within 36" horizontally of the sides of the stairs.

The new code language will incorporate the areas shown on the left diagram while the current code language covers the areas on the right diagram.





S298-12
Final Action: AS AM AMPC____ D

S299-12
2407.1.2

Proposed Change as Submitted

Proponent: Anthony Leto, The Wagner Companies

Revise as follows:

2407.1.2 Support. Each handrail or *guard* section shall be supported by a minimum of three glass balusters or shall be otherwise supported to remain in place should one baluster panel fail. Glass balusters shall not be installed without an attached ~~handrail or *guard*~~ top rail.

> **Exception:** A top rail shall not be required where the glass balusters are laminated glass with two or more glass plies of equal thickness and the same glass type when *approved* by the *building official*. The panels shall be designed to withstand the loads specified in Section 1607.8.

Reason: While the ICC opinion on top railing requirements for monolithic glass baluster guards has remained consistent, we continue to see installations without the required top rail. Where is the disconnect?

The confusion begins with *IBC Section 2407.1.1.2 Support*. There are three issues:

1. **The term *guard* is used improperly at the end of the second sentence.**
   The ICC defines *guard* as being in place to stop accidental falls and refers to the full assembly not the guard top. The word *guard* should be replaced with the words *top rail* as is noted in the *Exception*.
2. **In a glass baluster handrail, the handrail and top rail are the same component.**
   A glass baluster being used only as a handrail (i.e. a stair where there is less than a 30 inch drop from the top step) will require a handrail which must meet the dimensional and clearance requirements for handrail. It should be noted, that under the strict definition of handrail clearance, a handrail placed directly on top of a glass baluster does not meet code as the glass would be considered a 100% obstruction. The handrail would need to be attached to the glass baluster with brackets to provide code compliant clearance. The handrail would be the top most portion of the assembly, therefore the handrail would also serve as the top rail.
3. **Misinterpretation of the phrase, *Glass balusters shall not be installed without an attached handrail or guard.***
   Handrail is required on stairs and is located 34 to 38 inches above the stair nosing. A guard is required when there is a 30 inch drop. The IBC minimum for a guard is 42 inches above the walking surace. If a stair has a drop of greater than 30 inches, it would be required to have both a handrail and a guard. However, if the stair height does not exceed 30 inches, only a handrail is required.
   There are some who interpret that *Section 2407.1.1.2* allows a glass baluster guard to be installed with *either* a handrail or a guard (top rail).

   However, the section's intention is that a glass baluster *handrail* must have an attached *handrail* and that a glass baluster *guard* must have an attached *guard* (top rail). **The presence of a *handrail* on a *guard* does not eliminate the need for a top railing.** This interpretation is supported by:

   A. **The ICC**
      In 2008, Todd Daniel of the National Ornamental and Miscellaneous Metals Association (NOMMA) asked the following question of the International Code Council (ICC):

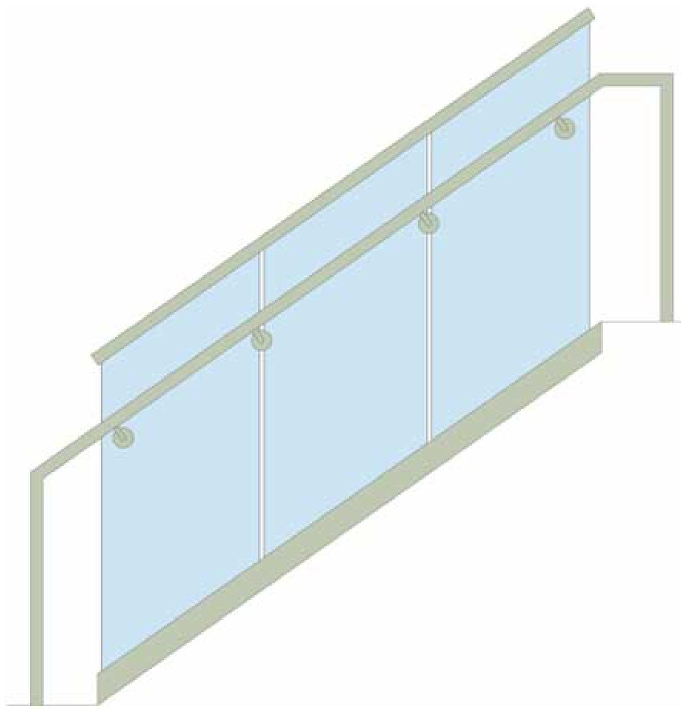
      Can a glass rail system be installed without a guard on top of the glass IF there is a handrail attached to the glass. In other words...no cap, exposed top edge of glass at 42 inch height with a handrail mounted on the side of the glass at handrail heights.
      ICC Staff Opinion: No
      Reason: The application you describe can only be allowed if the glass can withstand the loads for guards and handrails in Section 1607.7

   B. **The 2009 IBC Exception**
      The ICC approved an exception in 2009 that a top railing was not required if laminated glass is used that meets the load requirements and is approved by the building official. If this is the exception to the rule, then it should be understood that a top railing is required in all other situations.

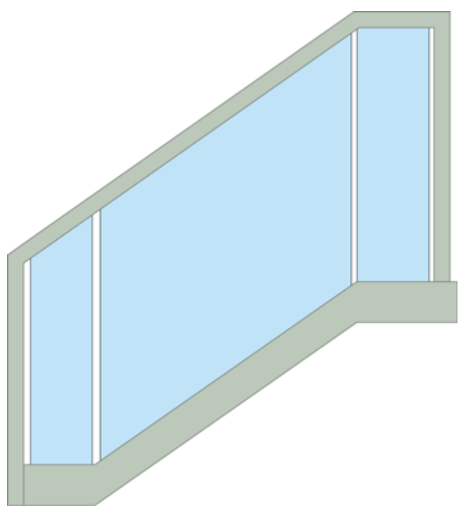
   C. **The Load Requirements**
      Section 2407.1.1 requires that glass baluster handrails and guards must meet the load requirements of 1607.7 with a safety factor of four.
      In a required guard, the loads must be applied to the *top* of the guard -- not the top of the handrail. Having a 42 inch guard with an attached handrail at between 34 and 38 inches will not meet the load requirement unless it is laminated tempered glass or the monolithic, tempered glass is of significant thickness.

Standard 1/2 inch monolithic, tempered glass edges are highly susceptable to rupture under load. Directing an 800 pound concentrated load (200 lbs multiplied by a safety factor of four) to that bare edge will most likely result in failure.

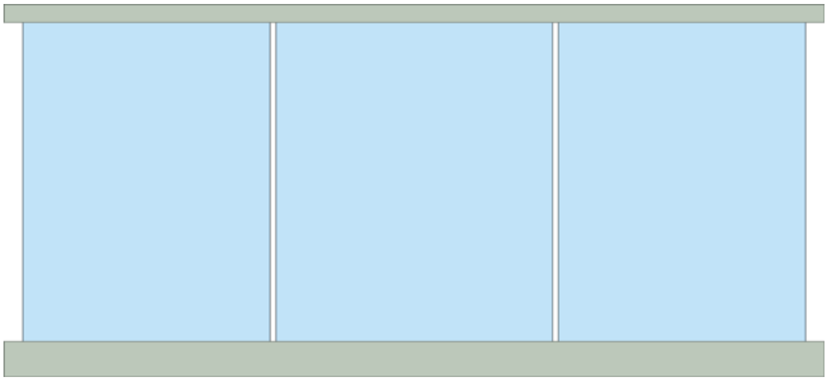
In 2011, there were numerous cases of glass railing failures across the US and Canada. An article relating these failuures was published this past October by US Glass Magazine (http://www.usglassmag.com/digital/2011/Oct2011.pdf). While most cases were likely the result of nickel sulfide inclusions in the glass, the consulting engineering firm brought in to determine the reasons for failure of glass railings at the W Hotel in Austin, TX noted that in one event, the failure was related to debris from above striking a bare edge of a glass panel.



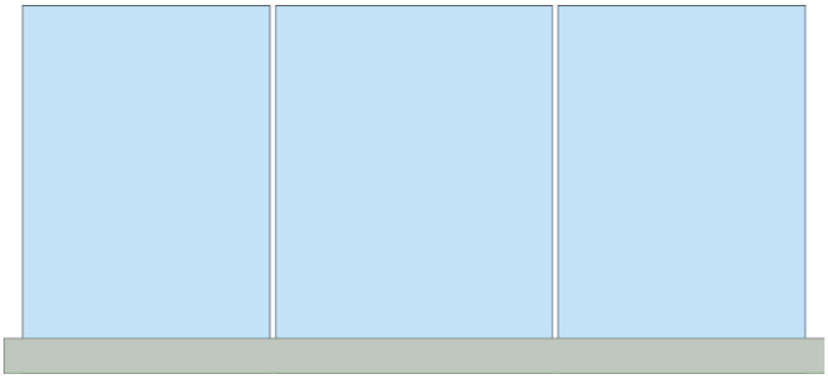
Stair with required guard and attached handrail.



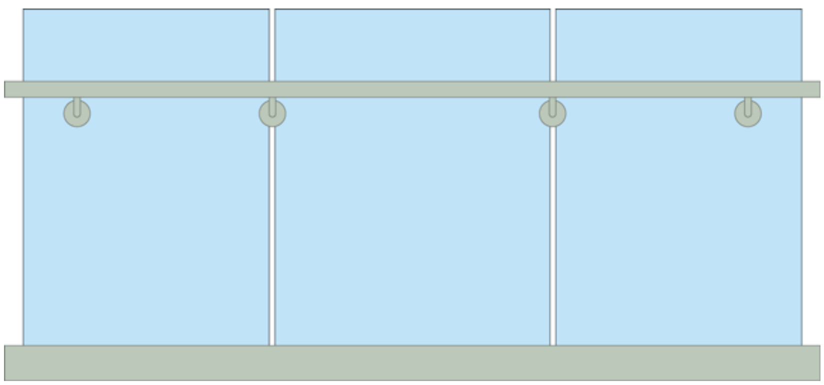
Required handrail for stair when a guard is not required.



Guard with top railing



Guard without top railing. Per ICC staff opinion, permitted only when used with laminated, tempered glass or if the glass meets the structural requirements of 1607.7



Guard with non-required handrail -- handrail is in place in an attempt to meet the requirements of an attached handrail or guard. However, the requirement is that the guard be able to withstand the load at the top of the guard. The handrail is not the top of the guard therefore the load must be met by the top edge of glass -- by a safety factor of four.

Cost Impact: There should be no cost impact since this change is to clarify and eliminate misinterpretation whereby glass railings are being installed without a top rail. In reality there will be long term savings as there are now situations where, as part of due diligence during a building purchase, consulting engineers are pointing out that glass rails without a top rail are not code compliant. Building owners in turn are requiring engineers/architects of record to have the railing redesigned to be code compliant.

2407.1.2-S-LETO.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent requested disapproval, indicating the need to work on the wording and submit a public comment.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Todd Daniel, National Ornamental & Miscellaneous Metals Association, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2407.1.2 Support. Each handrail or guard section shall be supported by a minimum of three glass balusters or shall be otherwise supported to remain in place should one baluster panel fail. Glass balusters shall not be installed without an attached <u>handrail or</u> top rail.

> **Exception:** A top rail shall not be required where the glass balusters are laminated glass with two or more glass plies of equal thickness and the same glass type when approved by the building official. The panels shall be designed to withstand the loads specified in Section 1607.8

Commenter's Reason: The term "guard" is incorrectly used in this passage. Substituting "top rail" provides greater clarity and accuracy.

The 2012 IBC defines a guard as "a building component or a system of building components located near the open sides of elevated walking surfaces that minimizes the possibility of a fall from the walking surface to the lower level." Following this definition, the word "guard" has been improperly used in the code.

S299-12

Final Action: AS AM AMPC____ D

S300-12
2407.1, 2407.1.1

Proposed Change as Submitted

Proponent: Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee (tzaremba@ralaw.com)

Revise as follows:

2407.1 Materials. Glass used ~~as~~ in a handrail ~~assembly~~ , guardrail or a *guard* section shall be laminated glass constructed of ~~either single fully tempered glass, laminated~~ fully tempered glass or ~~laminated~~ heat-strengthened glass and shall comply with Category II of CPSC 16 CFR Part 1201 or Class A of ANSI Z97.1. Glazing in railing in-fill panels shall be of an *approved* safety glazing material that conforms to the provisions of Section 2406.1.1. For all glazing types, the minimum nominal thickness shall be 1/4 inch (6.4 mm). ~~Fully tempered glass and laminated glass shall comply with Category II of CPSC 16 CFR Part 1201 or Class A of ANSI Z97.1.~~

> **Exception:** Single fully tempered glass complying with Category II of CPSC 16 CFR Part 1201 or Class A of ANSI Z97.1 may be used in handrails and guardrails if there is no walking surface beneath them or the walking surface is permanently protected from the risk of falling glass.

2407.1.1 Loads. The panels and their support system shall be designed to withstand the loads specified in Section 1607.8. A ~~safety~~ design factor of four shall be used for safety.

Reason: Several recent incidents involving spontaneous breakage of fully tempered glass in handrail or guardrail systems on high rise balconies has prompted the Glazing Industry Code Committee to seek this change which, if adopted, will make mandatory the use of the retentive characteristics of laminated glass in these applications unless there is no walking surface below or it is permanently protected from falling glass, in which case, fully tempered glass meeting the safety criteria of Cat. II of CPSC 16 CFR 1201 or Class A of ANSI Z97.1 would be permitted. Additionally, the proposal adds the term "guardrail" to section 2407.1 since that term is also used in various locations throughout the I-codes in connection with these types of systems.

Finally, proposal changes Section 2407.1.1 are intended to make it clear that a "design" factor of four is required "for safety." The intent of this section is to use a "design" factor of four when determining the loads of these panels and their support systems. Using the word "safety" in the way it is currently found in this section is ambiguous and may or may not achieve the section's intended purpose.

Cost Impact: The code change proposal will increase the cost of construction.

2407.1-S-ZAREMBA.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Disapproval is due to confusing testimony on this code change. A cited incident was in an exterior guard yet the proposal would also affect interior installations. No documentation of failures was provided for committee review.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Thomas S. Zaremba, Roetzel & Andress, representing Glazing Industry Code Committee, requests Approval as Submitted.

Commenter's Reason: Starting last summer, panes of tempered glass in guard and handrail assemblies on balconies in 13 different buildings in Toronto and Montreal, Canada spontaneously broke dropping broken tempered glass onto the ground below. See photo below showing a broken tempered pane in a guardrail.

In June of this year, several tempered glass guard and handrail assemblies on balconies on a high rise hotel and residence in Austin, Texas spontaneously broke and fell to the ground.

In September of last year, several tempered glass guard and handrail assemblies on balconies in a Four Season's Hotel in Seattle, Washington spontaneously failed.

Fortunately, no one was injured in any of these events. However, they have resulted in the replacement of thousands of glass guard and handrail assemblies. The fully tempered glass assemblies that were originally installed are being replaced either with fully tempered laminated glass assemblies or heat strengthened laminated glass assemblies.

July 2012 - Broken tempered glass assembly 15th floor condo at 33 Mill Street, in Toronto.

S300-12 was submitted by the Glazing Industry Code Committee in direct response to these glass guard and handrail failures. While fully tempered glass is a safety glazing appropriate for use in many hazardous locations, it is not appropriate for use in guard and handrail assemblies unless it is laminated or walking surfaces below them are permanently protected from the risk of falling glass. If adopted, that is exactly what S300-12 would require.

At the hearings in Dallas, opponents testified that the cost of laminating glass guard and handrail assemblies would increase their cost and that, while the proposed change would apply to glass guard and handrail assemblies in both exterior and interior locations, Proponent failed to come forward with any specific evidence of an interior glass guard or handrail failure.

It is true that laminating glass used in guards and handrails will increase their cost. However, the increased cost is justified by the life safety issue addressed by S300-12, namely, the risk of unexpectedly being struck by falling glass from a fully tempered glass guard or handrail assembly located above a walking surface.

It is also true that Proponent did not come forward with any specific instances of interior failures. However, the cause of the failures at issue has nothing to do with whether the glass guards or handrails are located on the inside or on the outside of buildings.

Fully tempered glass on rare occasion may suffer spontaneous breakage due to nickel sulfide inclusions or other impurities in the glass which are undetectable when they are present. However, if they exist, they may cause fully tempered glass to spontaneously break at one point during its useful life. That breakage may occur sooner, later or not at all. In short, it has nothing to do with whether the glass is used inside or outside of the building.

If a pane of tempered glass in a guard or handrail does break spontaneously, the entire pane of tempered glass will fracture into many, small particles (typically less than the size of a dime), many of which may fall from the frame. The photo above shows a fractured pane of tempered glass where some of the particles had fallen from the opening. These particles can fall as individual particles or as clusters of loosely joined particles. If people happen to be standing or walking below a tempered glass guard or handrail when it spontaneously breaks, it is possible they may be hit by individual particles or clusters of broken glass.

If, on the other hand, a laminated pane of tempered or heat strengthened glass breaks, the plastic used to laminate the glass will tend to hold the broken pieces together so that they won't fall out of the frame. Other than lamination, the only other way to protect against the risk of falling glass from such installations is to require walking surfaces below the glass guards or handrails to be permanently protected from falling glass.

S300-12 presents a life safety issue. The glass industry constantly strives through the ICC code development process and otherwise to ensure that the "right glass is used in the right application." Fully tempered glass that is not laminated is not the right glass for use in guard and handrail locations unless any walking surface below it is permanently protected from the risk of falling glass.

The Glazing Industry Code Committee urges you to support the adoption of S300-12 as submitted. This will require you to vote against the standing motion to disapprove S300-12 and to vote in favor of a subsequent motion to approve S300-12 as submitted.

S300-12

Final Action: AS AM AMPC____ D

S302-12
202 (New), 1710.6, 2410 (New), 2410.1 (New), 2410.2 (New)

Proposed Change as Submitted

Proponent: Timothy Burgos, InterCode Incorporated, representing 3M Company

Add new text as follows:

SECTION 202
DEFINITIONS

SUNLIGHT DELIVERY SYSTEM (SDS). A unit primarily designed to transmit daylight from an exterior surface to an interior space via a reflective duct or conduit. The basic unit consists of an exterior solar collecting device, a daylight-transmitting duct or conduit with a reflective interior surface, and an interior-ceiling device such as a translucent ceiling panel. The unit can be factory assembled, or field-assembled from a manufactured kit.

Revise as follows:

1710.6 Skylights ~~and~~ sloped glazing, and sunlight delivery systems. Unit skylights ~~and tubular daylighting devices (TDDs)~~ shall comply with the requirements of Section 2405. Sunlight delivery systems (SDS's) and tubular daylighting devices (TDDs) shall comply with the requirements of Section 2410. All other skylights and sloped glazing shall comply with the requirements of Chapter 24.

Add new text as follows:

SECTION 2410
SUNLIGHT DELIVERY SYSTEMS AND TUBULAR DAYLIGHTING DEVICES

2410.1 General. Sunlight delivery systems and tubular daylighting devices shall comply with the requirements of this code and be installed per the manufacturer's specifications.

2410.2 Definition. The following terms are defined in Chapter 2:

SUNLIGHT DELIVERY SYSTEM.

TUBULAR DAYLIGHTING DEVICE.

Reason: The purpose of this proposed edit is to create a more expansive definition of the tubular daylighting device. While tubular daylighting devices are a common implementation of the principles of reflective daylighting, new advancements in the field are available worldwide and should be included in the next edition of the International Building Code. Having a more expansive definition in the International Building Code for sunlight delivery systems will open up new technologies that can introduce natural sunlight into the interior areas that do not have windows or natural light entering that room. A sunlight delivery system provides designers with a new method of daylighting that offers significantly greater capabilities than existing alternatives. Traditional daylighting methods, such as skylights or tubular daylighting devices, are limited. These systems can require multiple entry points and are often limited to top floor applications. An example of a sunlight delivery system can be found in the pictures at the end of this reason statement.

The widespread use of electrical lighting in the 20th century changed the design of buildings but often made it impossible to illuminate internal rooms with daylight, thus requiring the use of artificial light in internal spaces. The use of artificial light currently makes up as much as 45% of the energy use in commercial and industrial buildings and up to 35% in residential buildings.

Sunlight delivery systems can significantly reduce energy costs for illumination. In a paper presented to LuxEuropa in 2009 entitled *Hybrid Lighting systems: a feasibility study for Europe* by Mohammed S. Mayhoub and David Carter, energy savings ranging from 28% to 85% (in latitudes ranging from 60^{o} North (Oslo, Norway) to 36^{o} North (Khania, Greece) were reported when a variety of sunlight delivery systems were tested. These locations correlate to locations in the United States as follows: Oslo, Norway is similar in latitude to Juneau and Anchorage, AK and Khania, Greece is similar to Virginia Beach, VA; Las Vegas, NV; and Nashville, TN.

The study showed that the greatest savings were realized in the Southern most latitudes (in the Northern Hemisphere) but still showed the possibility that 50% savings could be realized at 60^0 North with the most advanced systems. Because the study was limited to European Union countries, no analysis was conducted in more southern latitudes similar to the southernmost portion of the United States where cities such as Tampa, San Antonio, and New Orleans are located. In fact, most of the land mass of the contiguous 48 United States lies well below 50^0 North indicating that greater savings could be realized in the United States than those projected in Europe.

An abundance of research and knowledge shows not only that the preferred light source in buildings is natural daylight but also that lack of exposure to daylight can lead to biological issues, lack of productivity, higher levels of stress, sleep difficulties and a variety of other human response issues. Studies suggest that creating healthy indoor lighting by providing day-lighting and natural lighting cycles can be a simple form of preventative medicine and can lead to higher production and overall better mental and physical health for the inhabitants. The health benefits that a sunlight delivery device provides is one of the reasons for this code change to be approved.

Roof top solar collecting devices used in a sunlight delivery system.

Sunlight being delivered to the interior space in an open ceiling (on the left) and in a dropped ceiling (on the right) by way of a sunlight duct system.

Cost Impact: The code change proposal will not increase the cost of construction.

202-SDS-S-BURGOS

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This code change proposes a definition of sunlight delivery systems and requires them to installed per the manufacturers specifications which does not truly add anything to the code. They still have to be treated as alternative methods and this is available currently without being added to the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Vickie Lovell, InterCode Incorporated, representing 3M Company, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

Sunlight Delivery System. A unit designed to transmit daylight from an exterior surface to an interior space by means of a reflective duct or conduit. The unit consists of an exterior solar collecting device, a reflective duct or conduit, and an interior ceiling device such as a translucent ceiling panel.

SECTION 1210
SUNLIGHT DELIVERY SYSTEMS

1210.1 General. Sunlight delivery systems shall comply with the requirements of this code for duct construction and shall be installed per the manufacturer's specifications.

1210.2 Definition. The following term~~s~~ are defined in Chapter 2:

SUNLIGHT DELIVERY SYSTEM.

Commenter's Reason: Sunlight delivery systems are an existing worldwide technology, but are new to this code. The committee disapproved the original code change proposal stating that SDSs do not belong in Chapter 24. We agree, however, there is no section or chapter that addresses this technology. It was suggested to us by a committee member that language for SDSs should be included in Chapter 12 of the International Building Code and that is what this public comment does.

S302-12
Final Action: AS AM AMPC____ D

S305-12
202, 2102.1 (New), 2502.1 (New)

Proposed Change as Submitted

Proponent: John Mulder, Intertek Testing Services NA, Inc., representing International Standards Organization Technical Committee 77, *Products in Fibre-reinforced Cement* and self

Revise as follows:

SECTION 202
DEFINITIONS

FIBER-CEMENT ~~SIDING~~ PRODUCTS. ~~A~~ Manufactured, ~~fiber-reinforcing product made with an inorganic hydraulic or calcium silicate binder formed by chemical reaction and reinforced with discrete organic or inorganic nonasbestos fibers, or both. Additives that enhance manufacturing or product performance are permitted.~~ thin section composites of hydraulic cementitious matrices and discrete non-asbestos fibers. Fiber-cement backer board products have either a smooth or textured face and are normally installed to wall or ceiling framing over which paint, wallpaper, resilient flooring, tile, natural stone or dimensioned stone *veneer* are applied. Fiber-cement underlayment products have either a smooth or textured face and are installed on a wood subfloor over which resilient flooring, tile, natural stone or dimensioned stone *veneer* are applied. Fiber-cement lap or panel siding, soffit, and trim products have either smooth or textured faces and are intended for *exterior wall* and related applications.

Add new text as follows:

2102.1 General. For the purposes of this chapter and as used elsewhere in this code, the following terms are defined in Chapter 2:

FIBER-CEMENT PRODUCTS

Add new text as follows:

2502.1 Definitions. The following terms are defined in Chapter 2:

FIBER-CEMENT PRODUCTS

Reason: The current definition is limited to fiber-cement siding products. The proposal corrects the definition to that published in ASTM C1154-06, *Standard Terminology for Non-Asbestos Fiber-reinforced Cement Products* (see attached copy of ASTM C1154-06), for "fiber-cement products". Additional text describes types of fiber-cement products to include also fiber-cement backer board, underlayment, soffit and trim products currently recognized in the Code (IBC Sections 1404.10, 1405.16, and 2509.2). The proposed code change eliminates a barrier to trade by including other fiber-cement products currently permitted by the Code.

A revision to Section 2103 (new Section 2103.15) is proposed to include "fiber-cement backer board and underlayment". The term "fiber-cement products" is proposed to be included in the definitions here consistent with the definition published in the Terminology Standard ASTM C1154-06, *Standard Terminology for Non-Asbestos Fiber-Reinforced Cement Products* (see attached Standard).

"Fiber-cement backer board is currently permitted for use in Section 2509.2. A new term is added to reference the permitted backer board material now defined in proposed new TABLE 2509.2, where all 3 permitted products are now listed and the proposed revision to Section 202 to include "fiber-cement products".

Cost Impact: The code change proposal will not increase the cost of construction because the change simply corrects the current definition to be consistent with the National Standard and provides examples of the types of products covered by the definition.

202-FIBER-CEMENT SIDING-S-MULDER.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt the language proposed for the definition was confusing and the committee was not convinced on the need to change "fiber-cement siding" to "fiber-cement products".

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Mulder representing Intertek Testing Services NA, Inc. and self, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

FIBER-CEMENT (BACKER BOARD, SIDING, SOFFIT, TRIM, AND UNDERLAYMENT) PRODUCTS. ~~A~~ M~~m~~anufactured thin section composites of hydraulic cementitious matrices and discrete non-asbestos fibers.~~, fiber-reinforced products made with an inorganic hydraulic or calcium silicate binder formed by chemical reaction and reinforced with discrete organic or inorganic nonasbestos fibers, or both. Additives that enhance manufacturing or product performance are permitted.~~

Commenter's Reason: The current definition is limited to fiber-cement siding products. The proposal corrects the definition to that published in ASTM C1154-06, *Standard Terminology for Non-Asbestos Fiber-reinforced Cement Products* (see attached copy of ASTM C1154-06), for "fiber-cement products". Additional text describes types of fiber-cement products to include also fiber-cement backer board, soffit, trim and underlayment products currently recognized in the Code (IBC Sections 1404.10, 1405.16, Table 2304.7(4) a., and 2509.2). The proposed code change eliminates a barrier to trade by including other fiber-cement products currently permitted by the Code.

Cost Impact: The code change proposal will not increase the cost of construction because the change simply corrects the current definition to be consistent with the National Standard and provides examples of the types of products covered by the definition.

S305-12
Final Action: AS AM AMPC____ D

S308-12
2509.3

Proposed Change as Submitted

Proponent: Michael Gardner, Gypsum Association (mgardner@gypsum.org)

Revise as follows:

2509.3 Limitations. Water-resistant gypsum backing board shall not be used in the following locations:

1. Over a vapor retarder in shower or bathtub compartments.
2. Where there will be direct exposure to water or in areas subject to continuous high humidity.
3. ~~On ceilings where frame spacing exceeds 12 inches (305 mm) o.c. for 1/2-inch thick (12.7 mm) water-resistant gypsum backing board and more than 16 inches (406 mm) o.c. for 5/8-inch thick (15.9 mm) water-resistant gypsum backing board.~~

Reason: Concurrent language necessitating the addition of supplemental framing members when water-resistant ceiling board is installed on a ceiling has been or is being removed from the code-referenced gypsum board and panel application standards, GA-216 and ASTM C 840.

Testing has shown that water-resistant gypsum board, as presently manufactured, has better sag resistance than regular core board of the same thickness. As a consequence, the supplemental framing limitation is no longer necessary.

Cost Impact: The code change proposal will reduce the cost of construction.

2509.3-S-GARDNER

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee believes that there was no justification given for removing this provision for supplemental framing when installing water-resistant ceiling board.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael Gardner, representing Gypsum Association, requests Approval as Submitted

Commenter's Reason: The requirement to install supplemental framing when water-resistant gypsum board is applied to a ceiling was introduced into the Uniform Building Code many decades ago when the emulsions added during manufacturing to waterproof the core of the board were heavier in weight than those used today. The added weight of the emulsions led to concerns about board sag in an installed environment.

The water-resistive additives now used to manufacture water-resistant gypsum board are significantly lighter in weight. They also produce board with a stiffer core. As a consequence, contemporary water-resistant gypsum board is less susceptible to sag than its predecessor.

Both of the gypsum board application standards, ASTM C840 and GA-216, referenced by the IBC have been modified to eliminate any prescriptive requirements mandating the installation of supplemental framing support members when water-resistant gypsum board is applied to a ceiling. The ASTM C 840 standard is a consensus standard and reflects the input of manufacturers, contractors, and other interested parties. The intent of the original proposal is to make the IBC consistent with the referenced standards.

Both standard wallboard and water-resistant gypsum board are manufactured to the same standard, ASTM C1396. The humidified deflection and flexural strength tolerances for both products are identical. On the basis of the manufacturing standard, water-resistant gypsum board is no more susceptible to sag than is standard wallboard.

The supplemental framing requirement has historically been an often-overlooked catch-point for contractors and inspectors. It has become irrelevant and should be deleted from the code.

S308-12

Final Action: AS AM AMPC____ D

S310-12
2510.6, Chapter 35 (New)

Proposed Change as Submitted

Proponent: Theresa Weston, DuPont Building Innovation (theresa.a.weston@usa.dupont.com)

Revise as follows:

2510.6 Water-resistive barriers. *Water-resistive barrier*s shall be installed as required in Section 1404.2 and, where applied over wood-based sheathing, shall include a water-resistive vapor-permeable barrier with a performance at least equivalent to two layers of ~~Grade D paper~~ water-resistive barrier complying with ASTM E 2556 Type 1**.** The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing (installed in accordance with Section 1405.4) intended to drain to the water-resistive barrier is directed between the layers.

> **Exception:** Where the *water-resistive barrier* that is applied over wood-based sheathing has a water resistance equal to or greater than that of ~~60-minute Grade D paper~~ a water-resistive barrier complying with ASTM E 2556 Type II and is separated from the stucco by an intervening, substantially nonwater-absorbing layer or drainage space.

Add new standard to Chapter 35 as follows:

ASTM

E 2556 - Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment

Reason: The proposal updates the water-resistive barrier reference to the most recent consensus standard. ASTM E2556 includes house wrap materials, building papers and felt, instead of just building paper and therefore is more representative of the state of the industry. Within ASTM E2556 Grade D paper is a Type I WRB and 60 minute Grade D paper is a Type II WRB. ASTM E2556 is consistent with the current ICC-ES acceptance criteria for water-resistive barriers (AC-38) and therefore should not limit the use of current WRBs.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, [IBC] with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2012.

2510.6-S-WESTON.doc

Public Hearing Results

Note: For staff analysis of the content of ASTM E 2556 relative to CP#28, Section 3.6, please visit: http://www.iccsafe.org:8888/cs/codes/Documents/2012-13cycle/Proposed-A/00a_updates.pdf

Committee Action: **Approved as Submitted**

Committee Reason: This proposal replaces Grade D paper which is not defined with a new material referenced standard which will clarify Section 2510.6. The committee concluded that this is strictly a material issue and that the reference to chapter 14 takes care of installation and performance required for a weather-resistive barrier.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jay H. Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2510.6 Water-resistive barriers. A w~~W~~*ater-resistive barrier*~~s~~ complying with ~~shall be installed as required in~~ Section 1404.2 shall be provided and, where applied over wood-based sheathing, shall ~~include a water-resistive vapor-permeable barrier with a performance at least equivalent to~~ comply with one of the following methods or an approved design:

1. T~~t~~wo layers of paper-based ~~water-resistive~~ barrier (Grade D paper) complying with ASTM E 2556 Type I~~. The individual layers~~ shall be installed independently such that each layer provides a separate continuous plane and any flashing (installed in accordance with Section 1405.4) intended to drain to the water-resistive barrier is directed between the layers.
2. Two layers of felt-based barrier or polymer-based barrier material complying with ASTM E 2556 Type I installed as required in method #1.
3. ~~**Exception:**~~ A single layer ~~Where the~~ *water-resistive barrier* that is vapor permeable or not vapor permeable and that ~~applied over wood-based sheathing~~ has a water resistance equal to or greater than that of 60 minute Grade D paper ~~a water-resistive barrier~~ complying with ASTM E 2556 Type II. The single layer water-resistive barrier shall be ~~and is~~ separated from the stucco by an intervening, substantially nonwater-absorbing layer or drainage space.

2510.6.1 Water vapor control. Where the vapor permeability of a vapor-permeable water-resistive barrier material is greater than that of 60 minute Grade D paper complying with ASTM E2556 Type II, the water-resistive barrier manufacturer's installation instruction or an approved design shall identify appropriate use limitations, if any, with respect to climate conditions that cause inward vapor transmission through the vapor-permeable water-resistive barrier material. Where the water-resistive barrier material is not vapor-permeable, the water-resistive barrier manufacturer's installation instruction or an approved design shall identify appropriate use limitations, if any, with respect to climate conditions and vapor retarder applications in accordance with Section 1405.3.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This public comment addresses the code development committee's desire to reference material performance requirements included in ASTM E 2556, but makes some necessary improvements and clarifications to the original S310 proposal as approved at the first hearing. This PC makes the requirements more transparent with respect to the vapor-permeable material scope of ASTM E2556 and more clearly distinguishes conditions applicable to water-resistive barriers that are not considered to be vapor permeable. The public comment also explicitly retains the familiar Grade D paper practice (Method 1), transparently describes other materials included in ASTM E2556 that can be used (Method 2), and clarifies that the exception (now Method 3) applies to water-resistive barrier materials that are vapor permeable and not vapor permeable (i.e., are not within the scope of ASTM E2556). The limited scope of ASTM 2556 has necessitated these changes to avoid confusion and misinterpretation of acceptable water-resistive barrier properties, including vapor-permable and non-vapor-permeable types.

The second part of this proposal, proposed new Section 2510.6, addresses a problem inherent to the ASTM E2556 standard in that it applies only to vapor-permeable water-resistive barrier materials and establishes vapor permeability as a minimum requirement with no maximum value. However, products which have a significantly greater permeability than the minimum requirement (or Grade D paper) can and do allow excessive transmission of water vapor from stucco finishes into wall cavities and wood-based sheathing under certain climate conditions. This concern is addressed by an added requirement for an approved design or manufacturer's installation instructions to identify appropriate limitations on use depending on climate. Similarly, when water-resistive barrier is not vapor permeable, it may work very well in warm humid climates and in cold climates when coupled with exterior insulation, but this must be coordinated with vapor retarder requirements in Section 1405.3. This too is addressed by way of adding a requirement for an approved design or manufacturer's installation instructions which identify appropriate limitations or use requirements for a given application.

S310-12

Final Action: AS AM AMPC____ D

S311-12
2510.6

Proposed Change as Submitted

Proponent: John Woestman, Kellen Company, representing Builders Masonry Veneer Manufacturers Association (MVMA) (jwoestman@kellencompany.com)

Revise as follows:

2510.6 Water-resistive barriers. *Water-resistive barrier*s shall be installed as required in Section 1404.2 and, where applied over wood-based sheathing, shall include a ~~water-resistive vapor-permeable barrier with a performance at least equivalent to~~ water-resistive barrier with a moisture vapor permeance equal to or greater than that of two layers of Grade D paper. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing (installed in accordance with Section 1405.4) intended to drain to the water-resistive barrier is directed between the layers.

> **Exception:** Where the *water-resistive barrier* that is applied over wood-based sheathing has a water resistance and a moisture vapor permeance equal to or greater than that of 60-minute Grade D paper and is separated from the stucco by an intervening, substantially nonwater-absorbing layer or drainage space.

Reason: Existing language may be considered ambiguous as to what performance attribute is desired to be at least equivalent to two layers of Grade D paper. Water resistance? Moisture vapor permeance? This proposal clarifies moisture vapor permeability is the performance attribute desired to be at least equivalent to Grade D paper. And in the Exception, states moisture vapor permeance equal to or greater than that of 60-minute Grade D paper.

Cost Impact: The code change proposal will not increase the cost of construction.

2510.6-S-WOESTMAN.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee's action on S310-12 is preferred. The proponent is encouraged to work on a public comment to iron out differences based on changes approved in S310-12.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Jay H. Crandell, ARES Consulting, representing American Chemistry Council – Foam Sheathing Committee, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2510.6 Water-resistive barriers. A w~~W~~*ater-resistive barrier*~~s~~ complying with ~~shall be installed as required in~~ Section 1404.2 shall be provided and, where applied over wood-based sheathing, shall ~~include a water-resistive barrier with a moisture vapor permeance equal to or greater than that of~~ comply with one of the following methods or an approved design:

1. T~~t~~wo layers of Grade D paper~~. The individual layers~~ shall be installed independently such that each layer provides a separate continuous plane and any flashing (installed in accordance with Section 1405.4) intended to drain to the water-resistive barrier is directed between the layers.

2. Two layers of a vapor-permeable water-resistive barrier shall be installed as required in method #1 with each layer having a water resistance at least equivalent to that of Grade D paper.
3. ~~**Exception:**~~ A single layer ~~Where the~~ *water-resistive barrier* that is vapor permeable or not vapor permeable and that ~~applied over wood-based sheathing~~ has a water resistance ~~and a moisture vapor permeance~~ equal to or greater than that of 60 minute Grade D paper shall be ~~and is~~ separated from the stucco by an intervening, substantially nonwater-absorbing layer or drainage space.

2510.6.1 Water vapor control. Where the vapor permeability of a vapor-permeable water-resistive barrier material is greater than that of 60 minute Grade D paper, the water-resistive barrier manufacturer's installation instruction or an approved design shall identify appropriate use limitations, if any, with respect to climate conditions that cause inward vapor transmission through the vapor-permeable water-resistive barrier material. Where the water-resistive barrier material is not vapor-permeable, the water-resistive barrier manufacturer's installation instruction or an approved design shall identify appropriate use limitations, if any, with respect to climate conditions and vapor retarder applications in accordance with Section 1405.3.

Commenter's Reason: The proponent of the S311 proposal was seeking to bring clarity to the performance requirements needed for WRBs when used together with PC stucco and for the special case where it is used over wood sheathing with PC stucco. The CDC preferred S310, but S310 did not address the proponent's concern and the CDC recommended that the proponent work out differences based on changes approved in S310-12. A separate PC on S310-12 also has been provided to address the concern. But, a PC is also provided on this proposal in the event that S310-12 may be disapproved at the final action hearing.

This PC clarifies the performance requirements for and unique applications of water-resistive barriers applied behind stucco and particularly over wood-based sheathing. The requirements related to different performance attributes of vapor permeable and non-vapor permeable water-resistive barriers are clarified for three distinct methods of application, the first method retaining the traditional and familiar application of Grade D paper. Section 2510.6.1 is added to address consideration of moisture vapor control in the wall assembly when water-resistant barriers of a vapor-permeable type and non-vapor permeable type are used in accordance with the provisions of Section 2510.6.

This PC addresses the answer to the concern expressed in the reason statement for the original S311 proposal: "Existing language may be considered ambiguous as to what performance attribute is desired to be at least equivalent to two layers of Grade D paper." The answer is: IT DEPENDS. If a vapor-permeable water resistive barrier is used, it is vapor permeability and water resistance that are to be equivalent. If a non-vapor-permeable water resistive barrier is used, it is only water resistance. In both cases, there are considerations related to moisture vapor control that must be considered and each approach can have pros and cons depending on the climate conditions and the overall wall assembly design for moisture vapor control.

Public Comment 2:

Theresa Weston, PhD. DuPont Building Innovations, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

2510.6 Water-resistive barriers. *Water-resistive barrier*s shall be installed as required in Section 1404.2 and, where applied over wood-based sheathing, shall include a vapor-permeable water-resistive barrier consisting of ~~with a moisture vapor permeance equal to or greater than that~~ two layers of Grade D paper or other approved material. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing (installed in accordance with Section 1405.4) intended to drain to the water-resistive barrier is directed between the layers.

Exception: Where the *water-resistive barrier* that is applied over wood-based sheathing has a water resistance ~~and a moisture vapor permeance~~ equal to or greater than that of 60 minute Grade D paper and is separated from the stucco by an intervening, substantially nonwater-absorbing layer or drainage space.

Commenter's Reason: The modification makes changes to the original proposal without changing the intent of the original proposal to clarify the section of the code. The modification is provided in response to the committees request to coordinate the proposed changes with S310 which was approved as submitted in preference to this proposal.

S311-12

Final Action: AS AM AMPC____ D

S315-12, Part I
Appendix N (New)

Proposed Change as Submitted

Proponent: Martin Hammer, Architect, representing California Straw Building Association, Colorado Straw Bale Association, Straw Bale Construction Association – New Mexico, Ontario Bale Building Coalition, Development Center for Appropriate Technology, Environmental Building Network (mfhammer@pacbell.net)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. PART II WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES

PART I – IBC STRUCTURAL

Add new text as follows:

APPENDIX N
STRAWBALE CONSTRUCTION

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION N101
GENERAL

N101.1 Scope. This appendix shall govern the use of baled straw as a building material.

SECTION N102
DEFINITIONS

N102.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of the *International Building Code* for general definitions.

BALE. Equivalent to straw bale.

CLAY. Inorganic soil with particle sizes less than 0.00008 in. (0.002 mm) having the characteristics of high to very high dry strength and medium to high plasticity.

CLAY SLIP. A suspension of clay particles in water.

FLAKE. An intact section of compressed straw removed from an untied bale.

LAID FLAT. The orientation of a bale with its largest faces horizontal, its longest dimension parallel with the wall plane, its ties concealed in the unfinished wall and its straw lengths oriented across the thickness of the wall.

LOAD-BEARING WALL. For the purposes of this appendix, any strawbale wall that supports more than 100 lb/linear ft (1,459 N/m) of vertical load in addition to its own weight.

MESH. An openwork fabric of linked strands of metal, plastic, or natural or synthetic fiber, embedded in plaster to provide tensile reinforcement or bonding.

NONLOAD-BEARING WALL. For the purpose of this appendix, any wall that is not a load-bearing wall.

NONSTRUCTURAL WALL. All walls other than load-bearing walls or shear walls.
ON-EDGE. The orientation of a bale with its largest faces vertical, its longest dimension parallel with the wall plane, its ties on the face of the wall, and its straw lengths oriented vertically.

PIN. Metal rod, wood dowel, or bamboo, driven into, or through-tied on the surface of stacked bales for the purpose of connection or stability.

PLASTER. Gypsum, lime, cement-lime, or cement plasters, as defined in Chapter 25 and in Section N106, or clay plaster as defined in Section N106.9, or soil-cement plaster as defined in Section N106.10.

PRE-COMPRESSION. Vertical compression of stacked bales before the application of finish.

REINFORCED PLASTER. A plaster containing mesh reinforcement.

RUNNING BOND. For the purposes of this appendix, the placement of straw bales such that the head joints in successive courses are offset at least one quarter the bale length.

SHEAR WALL. A strawbale wall designed to resist lateral forces parallel to the plane of the wall in accordance with Section N105.15.

SKIN. The compilation of plaster and reinforcing, if any, applied to the surface of stacked bales.

STRUCTURAL WALL. A wall that meets the definition for a load-bearing wall or shear wall.

STACK BOND. For the purposes of this appendix, the placement of straw bales such that head joints in successive courses are vertically aligned.

STRAW. The dry stems of cereal grains after the seed heads have been removed.

STRAW BALE. A rectangular compressed block of straw, bound by ties.

STRAWBALE. The adjective form of straw bale.

STRAW-CLAY. Loose straw mixed and coated with clay slip.

TIE. A synthetic fiber, natural fiber, or metal wire used to confine a straw bale.

TRUTH WINDOW. An area of a strawbale wall left without its finish, to allow view of the straw otherwise concealed by its finish.

SECTION N103
BALES

N103.1 Types of straw. Bales shall be composed of straw from wheat, rice, rye, barley, or oat.

N103.2 Shape. Bales shall be rectangular in shape.

N103.3 Size. Bales shall have a minimum height and thickness of 12 inches (305 mm), except as otherwise permitted or required in this appendix. Bales used within a continuous wall shall be of consistent height and thickness to ensure even distribution of loads within the wall system.

N103.4 Ties. Bales shall be confined with synthetic fiber, natural fiber, or metal ties sufficient to maintain required bale density. Ties shall be at least 3 inches (76 mm) and not more than 6 inches (152 mm) from bale faces and shall be spaced not more than 12 (305 mm) inches apart. Bales with broken ties shall be retied with sufficient tension to maintain required bale density.

N103.5 Moisture content. The moisture content of bales at the time of application of the first coat of plaster or the installation of another finish shall not exceed 20 percent of the weight of the bale. The moisture content of bales shall be determined by use of a moisture meter designed for use with baled straw or hay, equipped with a probe of sufficient length to reach the center of the bale. At least 5 percent and not less than ten bales used shall be randomly selected and tested.

N103.6 Density. Bales shall have a minimum dry density of 6.5 pounds per cubic foot (92 kg/cubic meter). The dry density shall be calculated by subtracting the weight of the moisture in pounds (kg) from the actual bale weight and dividing by the volume of the bale in cubic feet (cubic meters). At least 2 percent and not less than five bales to be used shall be randomly selected and tested on site.

N103.7 Partial bales. Partial bales made after original fabrication shall be retied with ties complying with N103.4.

SECTION N104
MOISTURE CONTROL

N104.1 General. All weather-exposed bale walls and bale walls enclosing showers or steam rooms, shall be protected from water damage and moisture intrusion in accordance with this section.

N104.2 Water-resistive barriers and vapor permeance ratings. Plastered bale walls shall be constructed without any membrane barrier between straw and plaster to facilitate transpiration of moisture from the bales, and to secure a structural bond between straw and plaster, except as permitted or required elsewhere in this appendix. Where a water-resistive barrier is placed behind the exterior finish, it shall have a vapor permeance rating of at least 5 perms, except as permitted or required elsewhere in this appendix. Wall finishes shall be vapor permeable or shall have an equivalent vapor permeance rating of a Class III vapor retarder.

N104.3 Horizontal surfaces. Bale walls and other bale elements shall be provided with a moisture barrier at all weather-exposed horizontal surfaces. The moisture barrier shall be of a material and installation that will prevent water from entering the wall system. Horizontal surfaces shall include, but shall not be limited to, exterior window sills, sills at exterior niches, and buttresses. The finish material at such surfaces shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain away from all bale walls and elements. Where the moisture barrier is below the finish material, it shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain to the outside surface of the bale's vertical finish.

N104.4 Bale and concrete separation. A sheet or liquid applied Class II vapor retarder shall be installed between bales and supporting concrete or masonry. The bales shall be separated from the vapor retarder by not less than 3/4-inch (19 mm), and that space shall be filled with an insulating material such as wood or rigid insulation, or a material that allows vapor dispersion such as gravel, or other *approved* insulating or vapor dispersion material. Sill plates in structural walls shall comply with Table N105.14 and Table N105.15. Where bales abut a concrete or masonry wall that retains earth, a Class II vapor retarder shall be provided between such wall and the bales.

N104.5 Separation of bales and earth. Bales shall be separated from earth a minimum of 8" (203 mm).

N104.6 Separation of exterior plaster and earth. Exterior plaster applied to straw bales shall be located not less than 4 inches (102 mm) above the earth or 2 inches (51 mm) above paved areas.

N104.7 Showers walls and steam rooms. Bale walls enclosing showers or steam rooms shall be protected by a water-resistive barrier or by a Class I or Class II vapor retarder on the interior face between the finish and the bales.

SECTION N105
STRUCTURAL USE

N105.1 Scope. This section shall apply to structural strawbale walls. Sections N105.11, N105.12, and N105.16 shall also apply to nonstructural strawbale walls.

N105.2 General. An approved engineered design in accordance with Section N105 and the *International Building Code* shall be provided for buildings or portions thereof using structural strawbale walls.

N105.3 Foundations. Foundations for strawbale walls shall be of any type permitted by, and shall be designed in accordance with, the *International Building Code*.

N105.4 Building height and stories. Building height shall not exceed 35 feet and the limits contained in Table N105.13. Structural use of strawbale walls shall be permitted in multi-story buildings where:

1. Complete vertical and lateral load paths are demonstrated by an *approved* engineered design.
2. Strawbale walls interrupted by floor assemblies are designed and detailed by a *registered design professional*.

N105.5 Configuration of bales. Bales in structural walls shall be laid flat or on-edge and in a running bond or stack bond, except that bales in structural walls with unreinforced plasters shall be laid in a running bond only.

N105.6 Pre-compression of load-bearing strawbale walls. Prior to application of plaster, walls designed to be load-bearing shall be pre-compressed by a uniform load of not less than 100 pounds per linear foot.

N105.7 Voids and stuffing. Voids between bales in structural strawbale walls shall not exceed 4 inches (102 mm) in width, and such voids shall be stuffed with flakes of straw or straw-clay, before application of finish.

N105.8 Plaster skins. Plaster skins on structural walls shall be of any type permitted by Section N106, except gypsum plaster, and shall be in accordance with Tables N105.14 and N105.15.

N105.8.1 Straightness. Plaster skins on structural strawbale walls shall be straight, as a function of the bale wall surfaces they are applied to, as follows:

1. As measured across the face of a bale, straw bulges shall not protrude more than 3/4 inch (19 mm) across 2 feet (610 mm) of its height or length.

2. As measured across the face of a bale wall, straw bulges shall not protrude from the vertical plane of a bale wall more than 2 inches (51 mm) over 8 feet (2438 mm).

3. The vertical face of adjacent bales shall not be offset more than 1/2 inch (13 mm)

N105.8.2 Plaster and membranes. Structural strawbale walls shall not have a membrane between straw and plaster, or shall have attachment through the bale wall from one plaster skin to the other in accordance with an *approved* engineered design.

N105.9 Transfer of loads to and from plaster skins. Where plastered strawbale walls are used to support superimposed vertical loads, such loads shall be transferred to the plaster skins by continuous direct bearing or by an *approved* engineered design. Where plastered strawbale walls are used to resist in-plane lateral loads, such loads shall be transferred via the reinforcing mesh from the structural member or assembly above and to the sill plate in accordance with Table N105.15, or by an *approved* engineered design.

N105.10 Support of plaster skins. Plaster skins for structural strawbale walls shall be continuously supported along their bottom edge to facilitate the transfer of loads to the foundation system. Acceptable supports include, but are not limited to: a concrete or masonry stem wall, a concrete slab on grade, a wood-framed floor adequately blocked, with an *approved* engineered design, or a steel angle adequately anchored, with an *approved* engineered design. A conventional metal or plastic weep screed is not an acceptable support.

N105.11 Unrestrained wall height. Strawbale walls shall not exceed the ratios of stacked bale height to bale thickness between restraints, as stated in Section 2505.12, except where an *approved* engineered design demonstrates the wall will resist buckling from superimposed vertical loads and out-of-plane design loads.

N105.12 Resistance to out-of-plane lateral loads. Structural and non-structural strawbale walls shall be considered capable of resisting out-of-plane loads prescribed in the *International Building Code* with the following limitations and requirements, except where an *approved* engineered design is provided:

1. Walls with unreinforced plasters or a non-plaster finish, and without pins in accordance with N105.12.4, or other *approved* means of out-of-plane bracing, shall not exceed a 5:1 ratio of stacked bale height to bale thickness.
2. Clay plaster walls with reinforced plasters, or pins in accordance with N105.12 Item 4, or other *approved* means of out-of-plane bracing, shall not exceed the ratio indicated in Equation 24-1. Plaster reinforcement shall be any type described in Table N105.15 with staples spaced not more than 6 inches (152 mm) on center.

$H^2/T = 65$ **(Equation N-1)**

Where:

H = stacked bale height
T = bale thickness
H and T are measured in feet. (H^2/T = 19,800 when H and T are measured in mm)

3. Cement, cement-lime, lime, or soil cement plaster walls with reinforced plasters, or pins in accordance with N105.12 Item 4, or other *approved* means of out-of-plane bracing, shall not exceed the ratio indicated in Equation 24-2. Plaster reinforcement shall be any type described in Table N105.15 with staples spaced not more than 6 inches (152 mm) on center.

$H^2/T = 80$ **(Equation N-2)**

Where:

H = stacked bale height
T = bale thickness
H and T are measured in feet. (H^2/T = 24,400 when H and T are measured in mm)

4. Pins shall be in accordance with an *approved* engineered design or shall comply with the following:
   - 4.1 Pins shall be 3/8 inch (10 mm) diameter steel, 3/4 inch diameter (19 mm) wood, or 1/2 inch diameter (13 mm) bamboo. Pins shall be external or internal.
   - 4.2 External pins shall be installed on both sides of the wall spaced not more than 24 inches (610 mm) on center.
   - 4.3 External pins shall have full lateral bearing on the sill plate and the roof- or floor-bearing member, and shall be tightly tied through the wall to an opposing pin with ties spaced not more than 30 inches (762 mm) apart and not more than 15 inches (381 mm) from each end.
   - 4.4 Internal pins shall be installed vertically not more than 24 inches (610 mm) on center in the center third of the bales, and shall extend from top course to bottom course.

4.5 The bottom course shall be similarly connected to its support and the top course shall be similarly connected to the roof- or floor-bearing member above with pins or other *approved* means.

4.6 Internal pins shall be continuous or shall overlap through not less than one bale course.

N105.13 Design coefficients and factors for seismic design. The values given in Table N105.13 shall apply to seismic design using strawbale shear walls detailed in accordance with Table N105.15.

N105.14 Load-bearing strawbale walls. Load-bearing strawbale walls shall be in accordance with Table N105.14 as part of an *approved* engineered design to support superimposed vertical loads.

N105.15 Strawbale shear walls. Strawbale shear walls shall be in accordance with Table N105.13 as part of an *approved* engineered design to resist in-plane lateral loads. Other *approved* in-plane lateral load resisting systems shall be permitted to be used in combination with strawbale shear walls with apportionment of design loads as prescribed in the *International Building Code*.

N105.16 Connection of light-frame walls to strawbale walls. Light-frame walls perpendicular to, or at an angle to a straw bale wall assembly, shall be fastened to the bottom and top wood members of the strawbale wall in accordance with requirements for wood or cold-formed steel light-frame walls in the *International Building Code*, or the abutting stud shall be connected to alternating straw bale courses with a 1/2 inch (13mm) diameter steel, 3/4” diameter (19 mm) wood, or 5/8” diameter (16 mm) bamboo dowel, with minimum 8 inch (203 mm) penetration.

TABLE N105.13
DESIGN COEFFICIENTS AND FACTORS FOR SEISMIC-FORCE-RESISTING SYSTEMS

Seismic-Force-Resisting System		**Response Modification Coefficient, *R*[1]**	**System Overstrength Factor, Omega[2]**	**Deflection Amplification Factor, *C***	**Structural System Limitations and Building Height (ft) Limits**				
					Seismic Design Category				
					B	C	D	E	F
A. Bearing Wall Systems									
Strawbale shear walls		3.5	3	3	25	25	15	15	15
B. Building Frame Systems									
Strawbale shear walls		4	3	3.5	35	35	25	25	25

a. R reduces forces to a strength level, not an allowable stress level

b. The tabulated value of the overstrength factor is permitted to be reduced by subtracting 0.5 for structures with flexible diaphragms, but shall not be taken as less than 2.0 for any structure.

TABLE N105.14
ALLOWABLE GRAVITY LOADS (LBS./FOOT) FOR PLASTERED STRAWBALE WALLS

WALL DESIGNATION	**PLASTER (both sides) Thickness each side**	**SILL PLATES[b,c]**	**ANCHOR[c] BOLTS (or other sill fastening)**	**MESH[d]**	**STAPLES[e,f,g]**	**ALLOWABLE BEARING CAPACITY[h] (plf)**
A	Clay[j] 1-1/2”	c	c	None required[i]	None required[i]	400
B	Soil-cement[k] 1”	c	c	d	e,f,g	800
C	Lime[l] 7/8”	c	c	d	e,f,g	500

WALL DESIGNATION	PLASTER (both sides) Thickness each side	SILL PLATES[b,c]	ANCHOR[c] BOLTS (or other sill fastening)	MESH[d]	STAPLES[e,f,g]	ALLOWABLE BEARING CAPACITY[h] (plf)
D	Cement-lime[k] 7/8"	c	c	d	e,f,g	800
E	Cement 7/8"	c	c	d	e,f,g	800

For SI: 1 inch=25.4mm, 1 pound per foot = 14.5939 N/m.

a. Plasters shall conform with Sections N106.9 through N106.12 for makeup and thickness, with Section N105.8.1 for straightness, and with Section N105.10 for support of plaster skins.

b. Sill plates shall support and be flush with each face of the bale wall and shall be preservative-treated where required by the *International Building Code*..

c. For walls supporting gravity loads only or for non-structural walls, sill plates and fastening shall be in accordance with the requirements for wood framed walls in the *International Building Code*. See Table N105.15 for requirements for shear walls.

d. Any metal mesh allowed by this section shall be installed throughout the plaster with minimum 4-inch laps and fastened in accordance with footnote e.

e. Staples shall be at maximum spacing of 2-inches on center, to roof or floor bearing assembly, or as shown in an approved design in accordance with Section N105.9, and at a maximum spacing of 4-inches on center to sill plates.

f. Staples shall be gun staples, stainless steel or electro-galvanized, 16 gauge with 1 ¼-inch legs, 7/16-inch crown; or manually driven staples, galvanized 15 gauge with 7/8-inch legs, 3/16-inch inner spread and rounded shoulder. Other staples shall be permitted to be used as designed by a *registered design professional*. Staples into preservative-treated wood shall be stainless steel.

g. Staples shall be firmly driven diagonally across mesh intersections at the spacing indicated.

h. For walls with a different plaster on each side, the lower value shall be used.

i. Except as necessary to transfer roof or floor loads to the plaster skins in accordance with Section N105.9.

j. The building official is authorized to require a cube compression test to demonstrate a minimum 100 psi compressive strength.

k. The building official is authorized to require a compression test to demonstrate a minimum 1000 psi compressive strength.

l. Lime plaster shall use hydraulic or natural hydraulic lime. The building official is authorized to require a cube compression test to demonstrate a minimum 600 psi compressive strength.

m. The building official is authorized to require a cube compression test to demonstrate a minimum 1400 psi compressive strength.

TABLE N105.15
ALLOWABLE SHEAR (POUNDS PER FOOT) FOR PLASTERED STRAWBALE WALLS[a]

DESIGNATION	PLASTER[b]		SILL PLATES[d]	ANCHOR[d] BOLTS (on center)	MESH[e]	STAPLES[f, g, h] (on center)	ALLOWABLE SHEAR[i, j, k] (plf)
	TYPE	THICK-NESS (each side)					
A1	Clay[m]	1.5-in.	2 x 4	2 ft. 8 in.	None	None	60
A2	Clay[m]	1.5-in.	2 x 4	2 ft. 8 in.	2 in. by 2 in. high-density polypropylene	2-inches	140
A3	Clay[m]	1.5-in,	2 x 4	2 ft. 8 in.	2"x2"x14ga[l]	4-inches	180
B	Soil-cement[o]	1-in.	4 x 4	2 ft. 0 in	2 in. by 2 in. by 14ga[l]	2-inches	520
C1	Lime[n]	7/8-in.	2 x 4	2 ft. 8 in.	17 ga. woven wire	3-inches	330
C2	Lime[n]	7/8-in.	4 x 4	2 ft. 0 in.	2 in. by 2 in. by 14ga[l]	2-inches	450
D1	Cement-lime[o]	7/8-in.	4 x 4	2 ft. 8 in	17 ga. woven wire	2-inches	380
D2	Cement-lime[o]	7/8-in.	4 x 4	2 ft. 0 in.	2 in. by 2 in. by 14ga[l]	2-inches	520
E1	Cement[p]	7/8-in.	4 x 4	2 ft. 8 in.	2 in. by 2 in. by 14 ga[l]	2-inches	540
E2	Cement[p]	1.5-in.	4 x 4	2 ft. 0 in.	2 in. by 2 in. by 14ga[l]	2-inches	680

SI: 1 inch=25.4 mm, 1 pound per foot = 14.5939 N/m

a. Bales shall be not less than 15 inches thick.
b. Plasters shall comply with Sections N106.7 through N106.12 for makeup and thickness, with Section N105.8.1 for straightness, and with Section N105.10 for support.
c. Sill plates shall be Douglas fir-larch or southern pine and shall be preservative-treated where required by the *International Building Code*. Multiply allowable shear value by .82 for other species with specific gravity of .42 or greater, or by .65 for all other species.
d. Anchor bolts shall be 5/8-inch diameter with 2-inch by 2-inch by 3/16-inch washers, with not less than 7-inch embedment in concrete or masonry foundation. Anchor bolts or other fasteners into framed floors shall be engineered.
e. Mesh shall run continuous vertically from sill plate to top plate, roof or floor beam, or roof or floor bearing assembly, or shall lap not less than 12-inches. Horizontal laps shall be a not less than 4-inches. Steel mesh shall be galvanized. Galvanized steel mesh shall be separated from preservative-treated wood by grade D paper, 15# roofing felt, or other *approved* barrier.
f. Staples shall be gun staples, stainless steel or electro-galvanized, 16 gauge with 1 ¼-inch legs, 7/16-inch crown; or manually driven staples, galvanized 15 gauge with 7/8-inch legs, 3/16-inch inner spread and rounded shoulder. Other staples shall be permitted to be used as designed by a registered design professional. Staples into preservative-treated wood shall be stainless steel.
g. Staples at spacing indicated are to boundary conditions, including sill plates, and top plate, roof or floor beam, or roof or floor bearing assembly,
h. Staples shall be firmly driven diagonally across mesh intersections at spacing indicated.
i. Values shown are for aspect ratios of 1:1 or less. Reduce values shown to 50 percent for the limit of a 2:1 aspect ratio. Linear interpolation shall be permitted for ratios between 1:1 and 2:1. The full value shown shall be used for aspect ratios greater than 1:1, where an additional layer of mesh is installed at the base of the wall to a height where the remainder of the wall has an aspect ratio of 1:1 or less, and the second layer of mesh is fastened to the sill plate with the required stapling, and the sill bolt spacing is decreased with linear interpolation between1:1 and 2:1.
j. For walls with a plaster Type A on one side and any other plaster type on the other side, a registered design professional shall show transfer of the design lateral load into the stiffer Type B, C, D, or E plaster only, and 50% of the allowable shear value shown for that wall type shall be used.
k. These values are permitted to be increased 40 percent for wind design.
l. 16 gauge mesh shall be permitted to be used with a reduction to 0.60 of the allowable shear values shown.
m. The building official is authorized to require a cube compression test demonstrating not less than 600 psi compressive strength.
n. Lime plaster shall use hydraulic or natural hydraulic lime. The building official is authorized to require a cube compression test demonstrating not less than 600 psi compressive strength.
o. The building official is authorized to require a cube compression test demonstrating not less than 1000 psi compressive strength.
p. The building official is authorized to require a cube compression test demonstrating not less than 1400 psi compressive strength.

SECTION N106
FINISHES

N106.1 General. Finishes applied to strawbale walls shall be any type permitted by the *International Building Code*, and shall comply with this section and with Chapters 14 and 25 unless stated otherwise in this section.

N106.2 Purpose, and where required. Strawbale walls shall be finished so as to provide mechanical protection, fire resistance, restrict the passage of air through the bales, and protect them from weather in accordance with this appendix and the *International Building Code*.

> **Exception:** Truth windows shall be permitted where a fire-resistive rating is not required. Weather-exposed truth windows shall be fitted with a weather-tight cover.

N106.3 Vapor retarders. Class I and Class II vapor retarders shall not be used on a strawbale walls, nor shall any other material be used that has a vapor permeance rating of less than 5 perms, except as permitted or required elsewhere in this appendix, or as *approved* and demonstrated to be necessary by a *registered design professional*.

N106.4 Plaster. Plaster applied to bales shall be of any type described in Section N106, and as required or limited in this appendix.

N106.5 Plaster and membranes. Plaster shall be applied directly to strawbale walls to facilitate transpiration of moisture from the bales, and to secure a mechanical bond between the skin and the bales, except where a membrane is allowed or required elsewhere in this appendix. Structural bale walls shall have no membrane between straw and plaster, or shall have attachment through the bale wall from one plaster skin to the other in accordance with an approved engineered design.

N106.6 Lath and mesh for plaster. The surface of the straw bales functions as lath, and no other lath or mesh shall be required, except as required for tensile or shear strength in structural applications as required in Table N105.14, Table N105.15, or by an *approved* engineered design.

N106.7 Plaster on non-structural walls. Plaster on non-structural walls shall be in accordance with Section N106.9, N106.10, N106.11, N106.12, N106.13 or N106.14.

N106.8 Plaster on structural walls. Plaster on structural walls shall comply with Section N106.9, N106.10, N106.11, N106.12, N106.13 or N106.14. Plaster on load-bearing walls shall also comply with Table N105.14. Plaster on shear walls shall also comply with Table N105.15.

N106.9 Clay plaster. Clay plaster shall comply with Sections N106.9.1 through N106.9.6.

N106.9.1 General. Clay plaster shall be any plaster having a clay or clay soil binder. Such plaster shall contain sufficient clay to fully bind the plaster, sand or other inert granular material, and shall be permitted to contain reinforcing fibers. Reinforcing fibers shall include, but shall not be limited to, chopped straw, sisal, and animal hair.

N106.9.2 Mesh. Clay plaster shall not be required to contain reinforcing mesh except as required in Table N105.15. Where provided, mesh shall be natural fiber, corrosion-resistant metal, nylon mesh, or high-density polypropylene.

N106.9.3 Thickness and coats. Clay plaster shall be a minimum 1 inch (25 mm) thick, unless required to be thicker for structure or fire-resistance, as described elsewhere in this appendix, and shall be applied with in not less than two coats.

N106.9.4 Rain-exposed. Clay plaster, where exposed to rain, shall be finished with lime wash, linseed oil, or other *approved* erosion resistant finish.

N106.9.5 Prohibited finish coat. Cement plaster shall not be permitted as a finish coat over clay plasters.

N106.9.6 Additives. Additives shall be permitted to increase the plaster's workability, durability, strength, or water resistance.

N106.10 Soil-cement plaster. Soil-cement plaster shall comply with Sections N106.10.1 through N106.10.3.

N106.10.1 General. Soil-cement plaster shall be comprised of soil (free of organic matter), sand, and not less than10 percent Portland cement by volume, and shall be permitted to contain reinforcing fibers.

N106.10.2 Mesh. Soil-cement plaster shall use any corrosion-resistant metal mesh permitted by the *International Building Code*, or as required in Section N105 where used on a structural wall.

N106.10.3 Thickness. Soil-cement plaster shall be not less than 1 inch (25 mm) thick.

N106.11 Gypsum plaster. Gypsum plaster shall comply with Section 2511 of the *International Building Code*. Gypsum plaster shall be limited to use on interior surfaces, and on non-structural walls, except as an interior finish coat over a structural plaster that complies with this appendix.

N106.12 Lime plaster. Lime plaster shall comply with Sections N106.12.1 and N106.12.2.

N106.12.1 General. Lime plaster is any plaster whose binder is comprised of calcium hydroxide (CaOH) including Type N or Type S hydrated lime, hydraulic lime, natural hydraulic lime, or quicklime. Hydrated lime plasters shall comply with ASTM C 206. Quicklime plasters shall comply with ASTM C 5. Lime plaster shall be permitted to be applied in 2 coats, provided that the combined thickness is at least 7/8 inch (22 mm), and each coat is not greater than 1/2 inch (13 mm) thick.

N106.12.2 On structural walls. Lime plaster on structural strawbale walls in accordance with Table N105.14 or Table N105.15 shall use hydraulic or natural hydraulic lime.

N106.13 Cement-lime plaster. Cement-lime plaster shall be plaster mixes CL or FL as described in ASTM C 926. Cement-lime plaster shall be permitted to be applied in 2 coats, provided the combined thickness is at least 7/8 inch (22 mm) thick, and each coat is not greater than 1/2 inch (13 mm) thick.

N106.14 Cement plaster. Cement plaster shall comply with Section 2512 of the *International Building Code*, except that the amount of lime in all plaster coats shall be not less than 1 part lime to 6 parts cement to allow a minimum acceptable vapor permeability. The plaster shall be permitted to be applied in 2 coats, provided the combined thickness is at least 7/8 inch (22 mm), and each coat is not greater than 1/2 inch (13 mm) thick. The combined thickness of all plaster coats shall be not more than 1 1/2 inch (38 mm) thick.

N106.15 Finishes over plaster. Other finishes, as permitted elsewhere in this section and the *International Building Code*, shall be permitted to be applied over the plaster, except as prohibited in Section N106.16.

N106.16 Prohibited plasters and finishes. Any plaster or finish with a singular or cumulative perm rating less than 5 perms shall be prohibited on straw bale walls, except where approved and demonstrated to be necessary by a *registered design professional*, or as required elsewhere in this appendix.

N106.17 Separation of wood and plaster. Where wood framing or wood sheathing occurs in strawbale walls, such wood surfaces shall be separated from exterior plaster with No. 15 asphalt felt, grade D paper, or other *approved* material in accordance with Section 1404.2 of the *International Building Code*, except where the wood is preservative-treated or naturally durable.

Exception: Exterior clay plasters shall not be required to be separated from wood.

SECTION N108
THERMAL INSULATION

N108.1 R-value. The unit R-value of a strawbale wall with bales laid flat is R-1.3 per inch, and with bales on-edge is R-2 per inch.

Reason: Strawbale construction has proven to be a safe, durable, resource efficient, and fully viable method of construction. However, the International Building Code does not contain a section on strawbale construction, which has been an impediment to this construction system's proper and broader use.

First practiced in Nebraska in the late 1800's, with buildings over 100 years old still in service, strawbale construction was rediscovered in the 1980's in the American southwest. Since then it has been further developed and explored, including considerable testing and research regarding structural performance (under vertical and lateral loads), moisture, fire, and its thermal and acoustic properties.

Currently only Oregon and New Mexico have adopted statewide strawbale building codes. California has legislated strawbale construction guidelines that are voluntarily adopted at the local level. In addition, nine U.S. cities or counties have adopted strawbale building codes. Three countries outside the United States – Germany, France, and Belarus - have limited strawbale building codes.

Most of the strawbale building codes that do exist are derived from the first such code, created for and adopted by Tucson / Pima County, Arizona in 1996. Much experience, testing, and research since then have proven these codes to be deficient. They are often either too restrictive, or not restrictive enough, and in some cases don't address important issues at all.

Although strawbale codes are both few and flawed, strawbale buildings are now found in 49 of the 50 United States, and strawbale construction is practiced in over 45 countries throughout the world and in every climate. There are an estimated 600-1000 strawbale buildings in California alone. The strawbale buildings in the U.S. include residences, schools, office buildings, wineries, multi-story buildings, buildings over 10,000 sq.ft in floor area, load-bearing strawbale structures, and structures in areas of high seismic risk (plastered strawbale walls are particularly resistant to earthquakes). The practice of, and the desire to utilize strawbale construction, continues to increase and promises to accelerate as we face increased pressure on our environment and natural resources.

There is great need for a comprehensive strawbale code, with full benefit of the experience and knowledge that has been gained to date about this method of construction. The following proposed Strawbale Construction appendix for the IBC was created to fulfill this need. It is based on the collective experience of the design, construction, and testing of strawbale buildings over 20 years by architects, engineers, builders, and academics throughout the U.S., Canada, and other countries throughout the world. The testing, research, and comprehensive understanding of the performance of strawbale buildings are summarized in the book *Design of Straw Bale Buildings* (B.King, et al, 2006, Green Building Press). Testing, research reports, and other supporting documentation are available for viewing and download at: http://www.ecobuildnetwork.org/strawbale-construction-code-supporting-documentation

As lead author of the proposed appendix, and as a licensed architect for 25 years, I have been involved in the design, construction, testing, and research of strawbale buildings since 1995. In 2001 I spearheaded legislation and revisions to the current California Guidelines for Straw-Bale Structures. The proposed Strawbale Construction appendix for the IBC has benefited from numerous peer reviews by experienced, licensed design and building professionals over the course of more than five years. It would serve designers, builders, owners, inhabitants, and building officials alike in the construction and utilization of strawbale buildings.

Supporting Documentation: List of selected documents available via the above link

Load-Bearing Straw Bale Construction – A summary of worldwide testing and experience, B.King, PE
Testing of Straw Bale Walls with Out-of-Plane Loads – K.Donahue, SE
In-Plane Cyclic Tests of Plastered Straw Bale Wall Assemblies – C.Ash, M.Aschheim, PE, D.Mar, SE
Structural Testing of Plastered Straw Bale Wall Assemblies – K.Lerner, Architect, K.Donahue, SE
Seismic Design Factors and Allowable Shears for Strawbale Wall Assemblies – S. Jalali, M. Aschheim, PE
Shake Table Test Video of Full Scale Straw Bale Building Specimen – D.Donovan, PE
Moisture Properties of Plaster and Stucco for Strawbale Buildings – J.Straube, PE
Monitoring of Hygrothermal Performance of Strawbale Walls – J.Sraube, PE, C.Schumacher
ASTM E119 1-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Clay Plaster
ASTM E119 2-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Cement Plaster
ASTM E119 Fire Tests - Video
Thermal Performance of Straw Bale Wall Systems (incl. Oak Ridge Lab test results) – N.Stone
Support Letters from Licensed Practitioners: Letters from 2 Structural Engineers, 4 Civil Engineers, 1 Professor of Civil Engineering, 7 Architects

Cost Impact: The code change proposal will not increase the cost of construction.

APPENDIX N (NEW)-S-HAMMER-AB2-15-12.doc

Public Hearing Results

PART I - IBC STRUCTURAL
Committee Action: Disapproved

Committee Reason: There is the same concern for this proposal as an Appendix as there is for S316-12. Even though it is optional as an appendix, when the appendix is adopted it would become mandatory.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Martin Hammer, representing California Straw Building Association, Colorado Straw Bale Association, Straw Bale Construction Association – New Mexico, Ontario Straw Bale Building Coalition, Development Center for Appropriate Technology, Ecological Building Network, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

APPENDIX N
STRAWBALE CONSTRUCTION

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION N101
GENERAL

N101.1 Scope. ~~This appendix shall govern the use of baled straw as a building material.~~ This appendix provides prescriptive and performance-based requirements for the use of baled straw as a building material. Other methods of strawbale construction shall be subject to approval in accordance with Section 104.11

SECTION N102
DEFINITIONS

N102.1 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of the *International Building Code* for general definitions.

BALE. Equivalent to straw bale.

CLAY. Inorganic soil with particle sizes less than 0.00008 in. (0.002 mm) having the characteristics of high to very high dry strength and medium to high plasticity.

CLAY SLIP. A suspension of clay particles in water.

FINISH. Completed assembly of materials on the interior or exterior faces of stacked bales.

FLAKE. An intact section of compressed straw removed from an untied bale.

LAID FLAT. The orientation of a bale with its largest faces horizontal, its longest dimension parallel with the wall plane, its ties concealed in the unfinished wall and its straw lengths oriented across the thickness of the wall.

LOAD-BEARING WALL. For the purposes of this appendix, any strawbale wall that supports more than 100 lb/linear ft (1,459 N/m) of vertical load in addition to its own weight.

MESH. An openwork fabric of linked strands of metal, plastic, or natural or synthetic fiber, embedded in plaster~~ to provide tensile reinforcement or bonding~~.

NONLOAD-BEARING WALL. For the purpose of this appendix, any wall that is not a load-bearing wall.

NONSTRUCTURAL WALL. All walls other than load-bearing walls or shear walls.

ON-EDGE. The orientation of a bale with its largest faces vertical, its longest dimension parallel with the wall plane, its ties on the face of the wall, and its straw lengths oriented vertically.

PIN. A vertical metal rod, wood dowel, or bamboo, driven into the center of stacked bales, or placed ~~through-tied~~ on ~~the~~opposite surfaces of stacked bales and through-tied~~for the purpose of connection or stability~~.

PLASTER. Gypsum, lime, cement-lime, or cement plasters, as defined in Chapter 25 and in Section N106, or clay plaster as defined in Section ~~N106.9~~ N104.7, or soil-cement plaster as defined in Section ~~N106.10~~ N104.8.

PRE-COMPRESSION. Vertical compression of stacked bales before the application of finish.

REINFORCED PLASTER. A plaster containing mesh reinforcement.

RUNNING BOND. For the purposes of this appendix, the placement of straw bales such that the head joints in successive courses are offset at least one quarter the bale length.

SHEAR WALL. A strawbale wall designed to resist lateral forces parallel to the plane of the wall in accordance with Section ~~N105.15~~ N106.15.

SKIN. The compilation of plaster and reinforcing, if any, applied to the surface of stacked bales.

STRUCTURAL WALL. A wall that meets the definition for a load-bearing wall or shear wall.

STACK BOND. For the purposes of this appendix, the placement of straw bales such that head joints in successive courses are vertically aligned.

STRAW. The dry stems of cereal grains after the seed heads have been removed.

STRAW BALE. A rectangular compressed block of straw, bound by ties.

STRAWBALE. The adjective form of straw bale.

STRAW-CLAY. Loose straw mixed and coated with clay slip.

TIE. A synthetic fiber, natural fiber, or metal wire used to confine a straw bale.

TRUTH WINDOW. An area of a strawbale wall left without its finish, to allow view of the straw otherwise concealed by its finish.

SECTION N103
BALES

~~**N103.1 Types of straw.** Bales shall be composed of straw from wheat, rice, rye, barley, or oat.~~

~~**N103.2**~~ **N103.1 Shape.** Bales shall be rectangular in shape.

~~**N103.3**~~ **N103.2 Size**. Bales shall have a minimum height and thickness of 12 inches (305 mm), except as otherwise permitted or required in this appendix. Bales used within a continuous wall shall be of consistent height and thickness to ensure even distribution of loads within the wall system.

~~**N103.4**~~ **N103.3 Ties.** Bales shall be confined ~~with~~ by synthetic fiber, natural fiber, or metal ties sufficient to maintain required bale density. Ties shall be at least 3 inches (76 mm) and not more than 6 inches (152 mm) from bale faces and shall be spaced not more than 12 (305 mm) inches apart. Bales with broken ties shall be retied with sufficient tension to maintain required bale density.

~~**N103.5**~~ **N103.4 Moisture content.** The moisture content of bales at the time of application of the first coat of plaster or the installation of another finish shall not exceed 20 percent of the weight of the bale. The moisture content of bales shall be determined by use of a moisture meter designed for use with baled straw or hay, equipped with a probe of sufficient length to reach the center of the bale. At least 5 percent and not less than ten bales used shall be randomly selected and tested.

~~**N103.6**~~ **N103.5 Density.** Bales shall have a minimum dry density of 6.5 pounds per cubic foot (92 kg/cubic meter). The dry density shall be calculated by subtracting the weight of the moisture in pounds (kg) from the actual bale weight and dividing by the volume of the bale in cubic feet (cubic meters). At least 2 percent and not less than five bales to be used shall be randomly selected and tested on site.

~~**N103.7**~~ **N103.6 Partial bales.** Partial bales made after original fabrication shall be retied with ties complying with ~~N103.4~~ N103.3.

N103.7 Types of straw. Bales shall be composed of straw from wheat, rice, rye, barley, or oat.

N103.8 Other baled material. The dry stems of other cereal grains or grasses shall be acceptable when *approved* by the *building official*.

SECTION ~~N106~~ N104
FINISHES

~~**N106.1**~~ **N104.1 General.** Finishes applied to strawbale walls shall be any type permitted by the *International Building Code*, and shall comply with this section and with Chapters 14 and 25 unless stated otherwise in this section.

~~**N106.2**~~ **N104.2 Purpose, and where required.** Strawbale walls shall be finished so as to provide mechanical protection, fire resistance, ~~restrict the passage of air through the bales, and protect them~~ protection from weather, and to restrict the passage of air through the bales, in accordance with this appendix and the *International Building Code*.

> **Exception:** Truth windows shall be permitted where a fire-resistive rating is not required. Weather-exposed truth windows shall be fitted with a weather-tight cover.

~~N106.3~~ N104.3 Vapor retarders. Class I and Class II vapor retarders shall not be used on a strawbale wall~~s~~, nor shall any other material be used that has a vapor permeance rating of less than 5 perms, except as permitted or required elsewhere in this appendix~~, or as *approved* and demonstrated to be necessary by a *registered design professional*~~.

~~N106.4~~ N104.4 Plaster. Plaster applied to bales shall be ~~of~~ any type described in this section ~~N106~~, and as required or limited in this appendix.

~~N106.5~~ N104.5 Plaster and membranes. Plaster shall be applied directly to strawbale walls to facilitate transpiration of moisture from the bales, and to secure a mechanical bond between the skin and the bales, except where a membrane is allowed or required elsewhere in this appendix. ~~Structural bale walls shall have no membrane between straw and plaster, or shall have attachment through the bale wall from one plaster skin to the other in accordance with an *approved* engineered design.~~

~~N106.6~~ N104.6 Lath and mesh for plaster. The surface of the straw bales functions as lath, and no other lath or mesh shall be required, except as required for structural walls.~~for tensile or shear strength in structural applications as required in Table N105.14, Table N105.15, or by an *approved* engineered design.~~

~~**N106.7 Plaster on non-structural walls.** Plaster on non-structural walls shall be in accordance with Section N106.9, N106.10, N106.11, N106.12, N106.13 or N106.14.~~

~~**N106.8 Plaster on structural walls.** Plaster on structural walls shall comply with Section N106.9, N106.10, N106.11, N106.12, N106.13 or N106.14. Plaster on load-bearing walls shall also comply with Table N105.14. Plaster on shear walls shall also comply with Table N105.15.~~

~~N106.9~~ N104.7 Clay plaster. Clay plaster shall comply with ~~Sections~~ N10~~6~~4.~~ 9~~7.1 through N10~~6~~4.~~ 9~~7.6.

~~N106. 9.1~~ N104.7.1 General. Clay plaster shall be any plaster having a clay or clay soil binder. Such plaster shall contain sufficient clay to fully bind the plaster, sand or other inert granular material, and shall be permitted to contain reinforcing fibers. Acceptable reinforcing fibers ~~shall~~ include, ~~but shall not be limited to,~~ chopped straw, sisal, and animal hair.

~~N106. 9.2~~ N104.7.2 Mesh. Clay plaster shall not be required to contain reinforcing mesh except as required in Table N105.15. Where provided, mesh shall be natural fiber, corrosion-resistant metal, nylon ~~mesh~~, or high-density polypropylene.

~~N106. 9.3~~ N104.7.3 Thickness and coats. Clay plaster shall be a minimum 1 inch (25 mm) thick, unless required to be thicker for structure or fire-resistance, as described elsewhere in this appendix, and shall be applied with in not less than two coats.

~~N106. 9.4~~ N104.7.4 Rain-exposed. Clay plaster, where exposed to rain, shall be finished with lime wash, linseed oil, or other *approved* erosion-resistant finish.

~~N106. 9.5~~ N104.7.5 Prohibited finish coat. Cement plaster shall not be permitted as a finish coat over clay plasters.

~~N106. 9.6~~ N104.7.6 Additives. Additives shall be permitted to increase ~~the~~ plaster~~'s~~ workability, durability, strength, or water resistance.

~~N106.10~~ N104.8 Soil-cement plaster. Soil-cement plaster shall comply with ~~Sections N106. 10.1~~ N104.8.1, N104.8.2 and ~~through N106.10.3~~ N104.8.3.

~~N106. 10.1~~ N104.8.1 General. Soil-cement plaster shall be comprised of soil (free of organic matter), sand, and not less than 10% Portland cement by volume, and shall be permitted to contain reinforcing fibers.

~~N106. 10.2~~ N104.8.2 Mesh. Soil-cement plaster shall use any corrosion-resistant metal mesh permitted by the *International Building Code*, or as required in Section N105 where used on a structural wall.

~~N106. 10.3~~ N104.8.3 Thickness. Soil-cement plaster shall be not less than 1 inch (25 mm) thick.

~~N106.11~~ N104.9 Gypsum plaster. Gypsum plaster shall comply with Section 2511 of the *International Building Code*. Gypsum plaster shall be limited to use on interior surface~~s, and on~~ of non-structural walls, ~~except~~ and as an interior finish coat over a structural plaster that complies with this appendix.

~~N106.12~~ N104.10 Lime plaster. Lime plaster shall comply with ~~Sections N106. 12.1~~ N104.10.1 and ~~N106. 12.2~~ N104.10.2.

~~N106. 12.1~~ N104.10.1 General. Lime plaster is any plaster whose binder is comprised of calcium hydroxide (CaOH) including Type N or Type S hydrated lime, hydraulic lime, natural hydraulic lime, or quicklime. Hydrated lime plasters shall comply with ASTM C 206. Quicklime plasters shall comply with ASTM C 5. Lime plaster shall be permitted to be applied in 2 coats, provided that the combined thickness is at least 7/8 inch (22 mm), and each coat is not greater than 1/2 inch (13 mm) thick.

~~N106. 12.2~~ N104.10.2 On structural walls. Lime plaster on structural strawbale walls in accordance with Table N105.14 or Table N105.15 shall use a binder comprised of hydraulic or natural hydraulic lime.

~~N106.13~~ N104.11 **Cement-lime plaster.** Cement-lime plaster shall be plaster mixes CL or FL as described in ASTM C 926. Cement-lime plaster shall be permitted to be applied in 2 coats, provided the combined thickness is at least 7/8 inch (22 mm) thick, and each coat is no~~t~~ greater than 1/2 inch (13 mm) thick.

~~N106.14~~ N104.12 **Cement plaster**. Cement plaster shall comply with Section 2512 of the *International Building Code*, except that the amount of lime in all plaster coats shall be not less than 1 part lime to 6 parts cement to allow a minimum acceptable vapor permeability. The plaster shall be permitted to be applied in 2 coats, provided the combined thickness is at least 7/8 inch (22 mm), and each coat is no~~t~~ greater than 1/2 inch (13 mm) thick. The combined thickness of all plaster coats shall be not more than 1 1/2 inch (38 mm) thick.

~~N106.15~~ N104.13 **Finishes over plaster.** Other finishes, as permitted elsewhere in this section and the *International Building Code*, shall be permitted to be applied over the plaster, except as prohibited in ~~Section N1064.16~~ N104.14.

~~N106.16~~ N104.14 **Prohibited plasters and finishes**. Any plaster or finish with a singular or cumulative perm rating less than 5 perms shall be prohibited on straw bale walls, ~~except where approved and demonstrated to be necessary by a *registered design professional*,~~ or as required elsewhere in this appendix.

~~N106.17~~ N104.15 **Separation of wood and plaster.** Where wood framing or wood sheathing occurs in strawbale walls, such wood surfaces shall be separated from exterior plaster with No. 15 asphalt felt, grade D paper, or other *approved* material in accordance with Section 1404.2 of the *International Building Code*, except where the wood is preservative-treated or naturally durable.

Exception: Exterior clay plasters shall not be required to be separated from wood.

SECTION N105
STRAWBALE WALLS – GENERAL

N105.1 General. Strawbale walls shall be designed and constructed in accordance with this section.

N105.2 Finishes. Finishes shall be in accordance with N104.

N105.3 Sill plate attachment to concrete. Sill plate attachment to concrete shall comply with Section 2308.6 except as required in N106.15.

N105.4 Out-of-plane resistance and unrestrained wall height. Strawbale walls shall not exceed the limits of stacked bale height between restraints of Table N105.4, except where an *approved* engineered design demonstrates the wall will resist buckling from superimposed vertical loads and out-of-plane design loads. Lateral resistance perpendicular to the face of the wall shall be provided according to the prescriptive requirements of Table N105.4 in accordance with *allowable stress design,* except where an *approved* engineering design is provided.

TABLE N105.4: OUT-OF-PLANE RESISTANCE AND UNRESTRAINED WALL HEIGHT

Type of Restraint[a]	Maximum allowable lateral loading (pounds per square foot)	Unrestrained Wall Height, H,		Mesh Staple Spacing at Boundary Restraints
		Absolute limit in feet	Slenderness limit[b] in feet (mm)	
Non-plaster finish or unreinforced plaster,	25	H ≤ 10	H ≤ 5T	none
Pins per N105.4.1	25	H ≤ 12	H ≤ 7T	none
Reinforced clay plaster[c]	30	H ≤ 10	$H \le 8T^{0.5}$ ($H \le 140T^{0.5}$)	≤ 6 in (152 mm)
Reinforced clay plaster[c]	30	10 < H ≤ 12	$H \le 8T^{0.5}$ ($H \le 140T^{0.5}$)	≤ 4 in (102 mm)
Reinforced cement, cement-lime, lime, or soil-cement plaster[c]	30	H ≤ 10	$H \le 9T^{0.5}$ ($H \le 157T^{0.5}$)	≤ 6 in (152 mm)
Reinforced cement, cement-lime, lime, or soil-cement plaster[c]	40	10 < H ≤ 13	$H \le 9T^{0.5}$ ($H \le 157T^{0.5}$)	≤ 4 in (102 mm)

For SI: 1 foot = 304.8 mm, 1 pound per square foot = 47.8803 N/m^2
[a] Finishes applied to both sides of stacked bales. Where different finishes are used on opposite sides of a wall, the more restrictive requirements shall apply.
[b] H = stacked bale height in feet (mm), or the horizontal distance in feet (mm) between vertical restraints. T= bale thickness in feet (mm)
[c] Plaster reinforcement must conform to Table N106.15

N105.4.1 Pins. Pins used for out-of-plane resistance shall comply with items a. and b. or items a. and c., or shall be in accordance with an *approved* engineered design:

a. External and internal pins shall be 3/8 inch (10 mm) diameter steel, 3/4 inch (19 mm) diameter wood, or 1/2 inch (13 mm) diameter bamboo.

b. External pins shall be installed vertically on both sides of the wall spaced not more than 24 inches (610 mm) on center. External pins shall have full lateral bearing on the sill plate and the roof- or floor-bearing member, and shall be tightly tied through the wall to an opposing pin with ties spaced not more than 32 inches (762 mm) apart and not more than 6 inches (381 mm) from each end of the pin.

c. Internal pins shall be installed vertically within the center third of the bales, at spacing not exceeding 24 inches (610 mm) and shall extend from top course to bottom course. The bottom course shall be similarly connected to its support and the top course shall be similarly connected to the roof- or floor-bearing member above with pins or other *approved* means. Internal pins shall be continuous or shall overlap through not less than one bale course.

~~N105.16~~ N105.5 Connection of light-frame walls to strawbale walls. Light-frame walls perpendicular to, or at an angle to a straw bale wall assembly, shall be fastened to the bottom and top wood members of the strawbale wall in accordance with requirements for wood or cold-formed steel light-frame walls in the *International Building Code*, or the abutting stud shall be connected to alternating straw bale courses with a 1/2 inch (13mm) diameter steel, 3/4" diameter (19 mm) wood, or 5/8" diameter (16 mm) bamboo dowel, with minimum 8 inch (203 mm) penetration.

~~SECTION N104~~
~~MOISTURE CONTROL~~

~~N104.1~~ N105.6 ~~General~~Moisture control. All exterior surfaces of weather-exposed bale walls and interior surfaces of bale walls enclosing showers or steam rooms, shall be protected from ~~water~~ moisture damage and ~~moisture~~ intrusion in accordance with this sub-section.

~~N104.2~~ N105.6.1 Water-resistive barriers and vapor permeance ratings. Plastered bale walls shall be constructed without any membrane barrier between straw and plaster to facilitate transpiration of moisture from the bales, and to secure a structural bond between straw and plaster, except as permitted or required elsewhere in this appendix. Where a water-resistive barrier is placed behind ~~the~~ an exterior finish, it shall have a vapor permeance rating of at least 5 perms, except as permitted or required elsewhere in this appendix. Wall finishes ~~shall be vapor permeable or~~ shall have an equivalent vapor permeance rating of a Class III vapor retarder.

N105.6.2 Vapor retarders. Wall finishes shall have an equivalent vapor permeance rating of a Class III vapor retarder, except that a Class I or Class II vapor retarder shall be provided on the interior of side of exterior strawbale walls in Climate Zones 5, 6, 7, 8 and Marine 4 as defined in Chapter 3 of the *International Energy Conservation Code*. Bales in walls enclosing showers or steam rooms shall be protected on the interior side by a Class I or Class II vapor retarder.

N105.6.3 Penetrations in exterior strawbale walls. Penetrations in exterior strawbale walls shall be sealed with an *approved* sealant or gasket on the exterior side of the wall, and on the interior sided of the wall in Climate Zones 5, 6, 7, 8 and Marine 4 as defined in Chapter 3 of the *International Energy Conservation Code*.

~~N104.3~~ N105.6.4 Horizontal surfaces. Bale walls and other bale elements shall be provided with a moisture barrier at all weather-exposed horizontal surfaces. The moisture barrier shall be of a material and installation that will prevent water from entering the wall system. Horizontal surfaces shall include, but shall not be limited to, exterior window sills, sills at exterior niches, and buttresses. The finish material at such surfaces shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain away from all bale walls and elements. Where the moisture barrier is below the finish material, it shall be sloped not less than 1 unit vertical in 12 units horizontal (8-percent slope) and shall drain to the outside surface of the bale's vertical finish.

~~N104.4~~ N105.6.5 Bale and concrete separation. A sheet or liquid applied Class II vapor retarder shall be installed between bales and supporting concrete or masonry. The bales shall be separated from the vapor retarder by not less than 3/4 inch (19 mm), and that space shall be filled with an insulating material such as wood or rigid insulation, ~~or~~ a material that allows vapor dispersion such as gravel, or other *approved* insulating or vapor dispersion material. Sill plates in structural walls shall comply with Table ~~N105.14~~N106.2 and Table ~~N105.15~~N106.3. Where bales abut a concrete or masonry wall that retains earth, a Class II vapor retarder shall be provided between such wall and the bales.

~~N104.5~~ N105.6.6 Separation of bales and earth. Bales shall be separated from earth a minimum of 8" (203 mm).

~~N104.6~~ N105.6.7 Separation of exterior plaster and earth. Exterior plaster applied to straw bales shall be located not less than 4 inches (102 mm) above the earth or 2 inches (51 mm) above paved areas.

~~**N104.7 Showers walls and steam rooms.** Bale walls enclosing showers or steam rooms shall be protected by a water-resistive barrier or by a Class I or Class II vapor retarder on the interior face between the finish and the bales.~~

SECTION ~~N105~~ N106
STRAWBALE WALLS - STRUCTURAL ~~USE~~

~~**N105.1 Scope.** This section shall apply to structural strawbale walls. Sections N105.11, N105.12, and N105.16 shall also apply to nonstructural strawbale walls.~~

~~N105.2~~ N106.1 General. An *approved* engineered design demonstrating complete vertical and lateral load paths in accordance with this section ~~N105~~ and the *International Building Code* shall be provided for buildings or portions thereof ~~using~~ that use structural strawbale walls.

~~N105.3~~ N106.2 Foundations. Foundations ~~for strawbale walls~~ shall be ~~of any type permitted by, and shall be designed~~ in accordance with Chapter 18 of the *International Building Code*.

~~N105.4~~ N106.3 Building height and stories. ~~Building height shall not exceed 35 feet and the limits contained in Table N105.13. Structural use of strawbale walls shall be permitted in multi-story buildings where:~~ Buildings or portions of buildings constructed with structural strawbale walls shall be subject to the following limitations:

1. ~~Complete vertical and lateral load paths are demonstrated by an *approved* engineered design.~~ Building height shall not exceed 35 feet and the limits contained in Table N106.14.

2. ~~Strawbale walls interrupted by floor assemblies are designed and detailed by a *registered design professional*.~~ The number of stories above grade plane shall not exceed two.

3. Structural strawbale walls interrupted by floor assemblies shall be designed and detailed by a *registered design professional*.

~~N105.5~~ N106.4 Configuration of bales. Bales in structural walls shall be laid flat or on-edge and in a running bond or stack bond, except that bales in structural walls with unreinforced plasters shall be laid in a running bond only.

~~N105.6~~ N106.5 Pre-compression of load-bearing strawbale walls. Prior to application of plaster, walls designed to be load-bearing shall be pre-compressed by a uniform load of not less than 100 pounds per linear foot.

~~N105.7~~ N106.6 Voids and stuffing. Voids between bales in structural strawbale walls shall not exceed 4 inches (102 mm) in width, and such voids shall be stuffed with flakes of straw or straw-clay, before application of finish.

~~N105.8~~ N106.7 Plaster on structural walls~~skins~~. Plaster ~~skins~~ on ~~structural~~ loadbearing walls shall be ~~of any type permitted by Section N106, except gypsum plaster, and shall be~~ in accordance with Table~~s~~ ~~N105.14~~N106.13. ~~and N105.15~~ Plaster on shear walls shall be in accordance with Table N106.15.

~~N105.8.1~~ N106.8 Straightness of plaster. Plaster ~~skins~~ on structural strawbale walls shall be straight, as a function of the bale wall surfaces they are applied to, as follows:

1. As measured across the face of a bale, straw bulges shall not protrude more than 3/4 inch (19 mm) across 2 feet (610 mm) of its height or length.

2. As measured across the face of a bale wall, straw bulges shall not protrude from the vertical plane of a bale wall more than 2 inches (51 mm) over 8 feet (2438 mm).

3. The vertical faces of adjacent bales shall not be offset more than 1/2 inch (13 mm)

~~N105.8.2~~ N106.9 Plaster and membranes. Structural strawbale walls shall not have a membrane between straw and plaster, or shall have attachment through the bale wall from one plaster skin to the other in accordance with an *approved* engineered design.

~~N105.9~~ N106.10 Transfer of loads to and from plaster skins. Where plastered strawbale walls are used to support superimposed vertical loads, such loads shall be transferred to the plaster skins by continuous direct bearing or by an *approved* engineered design. Where plastered strawbale walls are used to resist in-plane lateral loads, such loads shall be transferred ~~via~~ to the reinforcing mesh from the structural member or assembly above and to the sill plate in accordance with Table ~~N105.15~~ N106.15, or by an *approved* engineered design.

~~N105.10~~ N106.11 Support of plaster skins. Plaster skins for structural strawbale walls shall be continuously supported along their bottom edge ~~to facilitate the transfer of loads to the foundation system~~. Acceptable supports include~~, but are not limited to~~: a concrete or masonry stem wall, a concrete slab on grade, a wood-framed floor adequately blocked~~,~~ with an *approved* engineered design, or a steel angle adequately anchored~~,~~ with an *approved* engineered design. An ~~conventional metal or plastic~~ unsupported weep screed is not an acceptable support.

N106.12 Resistance to uplift loads. Where plastered strawbale walls are used to resist vertical uplift loads, such loads shall be transferred to the plaster skins by an *approved* engineered design. In lieu of an *approved* engineered design, plaster mesh in skins complying with Table N106.15, with staples at 2 inches (51 mm) on center, shall be considered capable of resisting uplift loads not associated with in-plane shear resistance, of 200 plf (2.918 kN/m) per plaster skin.

~~**N105.11 Unrestrained wall height.** Strawbale walls shall not exceed the ratios of stacked bale height to bale thickness between restraints, as stated in Section 2505.12, except where an *approved* engineered design demonstrates the wall will resist buckling from superimposed vertical loads and out-of-plane design loads.~~

~~**N105.12 Resistance to out-of-plane lateral loads.** Structural and non-structural strawbale walls shall be considered capable of resisting out-of-plane loads prescribed in the *International Building Code* with the following limitations and requirements, except where an *approved* engineered design is provided:~~

~~1. Walls with unreinforced plasters or a non-plaster finish, and without pins in accordance with N105.12.4, or other *approved* means of out-of-plane bracing, shall not exceed a 5:1 ratio of stacked bale height to bale thickness.~~

~~2. Clay plaster walls with reinforced plasters, or pins in accordance with N105.12 Item 4, or other *approved* means of out-of-plane bracing, shall not exceed the ratio indicated in Equation 24-1. Plaster reinforcement shall be any type described in Table N105.15 with staples spaced not more than 6 inches (152 mm) on center.~~

~~$H^2/T = 65$~~ ~~**(Equation N-1)**~~

~~*Where:*~~

~~H = stacked bale height~~
~~T= bale thickness~~
~~H and T are measured in feet. (H^2/T = 19,800 when H and T are measured in mm)~~

~~3. Cement, cement-lime, lime, or soil cement plaster walls with reinforced plasters, or pins in accordance with N105.12 Item 4, or other *approved* means of out-of-plane bracing, shall not exceed the ratio indicated in Equation 24-2. Plaster reinforcement shall be any type described in Table N105.15 with staples spaced not more than 6 inches (152 mm) on center.~~

~~$H^2/T = 80$~~ ~~**(Equation N-2)**~~

~~*Where:*~~

~~H = stacked bale height~~
~~T= bale thickness~~
~~H and T are measured in feet. (H^2/T = 24,400 when H and T are measured in mm)~~

~~4. Pins shall be in accordance with an *approved* engineered design or shall comply with the following:~~

- ~~4.1 Pins shall be 3/8 inch (10 mm) diameter steel, 3/4 inch diameter (19 mm) wood, or 1/2 inch diameter (13 mm) bamboo. Pins shall be external or internal.~~
- ~~4.2 External pins shall be installed on both sides of the wall spaced not more than 24 inches (610 mm) on center.~~
- ~~4.3 External pins shall have full lateral bearing on the sill plate and the roof- or floor-bearing member, and shall be tightly tied through the wall to an opposing pin with ties spaced not more than 30 inches (762 mm) apart and not more than 15 inches (381 mm) from each end.~~
- ~~4.4 Internal pins shall be installed vertically not more than 24 inches (610 mm) on center in the center third of the bales, and shall extend from top course to bottom course.~~
- ~~4.5 The bottom course shall be similarly connected to its support and the top course shall be similarly connected to the roof- or floor-bearing member above with pins or other *approved* means.~~
- ~~4.6 Internal pins shall be continuous or shall overlap through not less than one bale course.~~

~~**N105.14**~~ **<u>N106.13</u> Load-bearing strawbale walls.** Load-bearing strawbale walls shall be in accordance with Table ~~N105.14~~ <u>N106.13</u> as part of an *approved* engineered design to support superimposed vertical loads. <u>Concentrated loads shall be distributed by a structural element capable of distributing the loads to the bearing wall within the uniform load limits in N106.13. The allowable bearing capacity values in Table N106.13 are in accordance with *allowable stress design*.</u>

<u>**N106.13.1 Sill plates and sill fastening.** Sill plates shall support and be flush with each face of the straw bales above and shall be preservative-treated where required by the *International Building Code*. For walls supporting superimposed vertical loads only sill plates and fastening shall be in accordance with Section 2308.3. See Table N106.15 for sill plate requirements for shear walls.</u>

~~**N105.13**~~ **<u>N106.14</u> Design coefficients and factors for seismic design.** The values ~~given~~ in Table ~~N105.13~~ <u>N106.14</u> shall apply to seismic design using strawbale shear walls detailed in accordance with Table ~~N105.15~~ <u>N106.15</u>.

~~**N105.15**~~ **<u>N106.15</u> Strawbale shear walls.** Strawbale shear walls shall be in accordance with Table ~~N105.13~~ <u>N106.15</u> as part of an *approved* engineered design to resist in-plane lateral loads. <u>The allowable shear values in Table N106.15 are in accordance with *allowable stress design*.</u> Other *approved* in-plane lateral load resisting systems shall be permitted ~~to be used~~ <u>for use</u> in combination with strawbale shear walls with apportionment of design loads as prescribed in the *International Building Code*.

~~**N105.16 Connection of light-frame walls to strawbale walls.** Light-frame walls perpendicular to, or at an angle to a straw bale wall assembly, shall be fastened to the bottom and top wood members of the strawbale wall in accordance with requirements for wood or cold-formed steel light-frame walls in the *International Building Code*, or the abutting stud shall be connected to alternating straw bale courses with a 1/2 inch (13mm) diameter steel, 3/4" diameter (19 mm) wood, or 5/8" diameter (16 mm) bamboo dowel, with minimum 8 inch (203 mm) penetration.~~

TABLE ~~N105.14~~ N106.13
ALLOWABLE ~~GRAVITY~~ SUPERIMPOSED VERTICAL LOADS (LBS./FOOT) FOR PLASTERED STRAWBALE WALLS

WALL DESIGNATION	PLASTER[a] (both sides) ~~Thickness each side~~		~~SILL PLATES~~[~~b,c~~]	~~ANCHOR~~[~~c~~] ~~BOLTS (or other sill fastening)~~	MESH[~~d~~ b]	STAPLES [~~e,f,g~~ c,d,e]	ALLOWABLE BEARING CAPACITY[~~h~~f] (plf)
	TYPE	THICKNESS (each side)					
A	Clay[~~i~~ g] ~~1-1/2"~~	1-1/2 in.	~~c~~	~~c~~	None required[~~i~~ g]	None required[~~i~~ g]	400
B	Soil-cement[~~k~~i] ~~1"~~	1 in.	~~c~~	~~c~~	~~d~~ b	~~e,f,g~~ c,d,e	800
C	~~Lime~~[~~l~~j] ~~7/8"~~	7/8 in.	~~c~~	~~c~~	~~d~~ b	~~e,f,g~~ c,d,e	500
D	Cement-lime[~~k~~ l] ~~7/8"~~	7/8 in.	~~c~~	~~c~~	~~d~~ b	~~e,f,g~~ c,d,e	800
E	Cement ~~7/8"~~	7/8 in.	~~c~~	~~c~~	~~d~~ b	~~e,f,g~~ c,d,e	800

For SI: 1 inch=25.4mm, 1 pound per foot = 14.5939 N/m.

a. Plasters shall conform with ~~Sections N106.9~~ N104.7 through ~~N106.12~~ N104.12 for makeup and thickness, with ~~Section N105.8.1~~N106.8 for straightness, and with ~~Section N105.10~~ N106.11 for support of plaster skins.

~~b. Sill plates shall support and be flush with each face of the bale wall and shall be preservative-treated where required by the *International Building Code*..~~

~~c. For walls supporting gravity loads only or for non-structural walls, sill plates and fastening shall be in accordance with the requirements for wood framed walls in the *International Building Code*. See Table N105.15 for requirements for shear walls.~~

b. Any metal mesh allowed by this section shall be installed throughout the plaster with minimum 4-inch laps and fastened in accordance with footnote e.

c. Staples shall be at maximum spacing of 2-inches on center, to roof or floor bearing assembly, or as shown in an *approved* design in accordance with Section ~~N105.9~~ N106.10, and at a maximum spacing of 4-inches on center to sill plates.

d. Staples shall be ~~gun~~ pneumatically driven staples, stainless steel or electro-galvanized, 16 gauge with 1 ¼-inch legs, 7/16-inch crown; or manually driven staples, galvanized 15 gauge with 7/8-inch legs, 3/16-inch inner spread and rounded shoulder. Other staples shall be permitted to be used as designed by a *registered design professional*. Staples into preservative-treated wood shall be stainless steel.

e. Staples shall be firmly driven diagonally across mesh intersections at the spacing indicated.

f. For walls with a different plaster on each side, the lower value shall be used.

g. Except as necessary to transfer roof or floor loads to the plaster skins in accordance with Section ~~N105.9~~ N106.10.

h. The building official is authorized to require a cube compression test to demonstrate a minimum 100 psi compressive strength.

i. The building official is authorized to require a cube compression test to demonstrate a minimum 1000 psi compressive strength.

j. Lime plaster shall use hydraulic or natural hydraulic lime. The building official is authorized to require a cube compression test to demonstrate a minimum 600 psi compressive strength.

k. The building official is authorized to require a cube compression test to demonstrate a minimum 1400 psi compressive strength.

TABLE ~~N105.13~~ N106.14
DESIGN COEFFICIENTS AND FACTORS FOR SEISMIC-FORCE-RESISTING SYSTEMS

Seismic-Force-Resisting System		Response Modification Coefficient, *R*[a]	System Overstrength Factor, Omega[b]	Deflection Amplification Factor, *C*	Structural System Limitations and Building Height (ft) Limits				
					Seismic Design Category				
					B	C	D	E	F
A. Bearing Wall Systems									
Strawbale shear walls		3.5	3	3	25	25	15	15	~~15~~NP
B. Building Frame Systems									
Strawbale shear walls		4	3	3.5	35	35	25	~~25~~ 15	~~25~~NP

a. R reduces forces to a strength level, not an allowable stress level

b. The tabulated value of the overstrength factor is permitted to be reduced by subtracting 0.5 for structures with flexible diaphragms, but shall not be taken as less than 2.0 for any structure.

TABLE ~~N105.15~~ N106.15
ALLOWABLE SHEAR (POUNDS PER FOOT) FOR PLASTERED STRAWBALE WALLS[a]

WALL DESIGNATION	PLASTER[b]		SILL PLATES[d]	ANCHOR[d] BOLTS (on center)	MESH[e]	STAPLE SPACING[f, g, h] (on center)	ALLOWABLE SHEAR[i, j, k] (plf)
	TYPE	THICK-NESS (each side)					
A1	Clay[m]	1.5-in.	2 x 4	~~2 ft. 8~~ 32 in.	None	None	60
A2	Clay[m]	1.5-in.	2 x 4	~~2 ft. 8~~ 32 in.	2 in. by 2 in. high-density polypropylene	2-inches	140
A3	Clay[m]	1.5-in,	2 x 4	~~2 ft. 8~~ 32 in.	2"x2"x14ga[l]	4-inches	180
B	Soil-cement[o]	1-in.	4 x 4	~~2 ft. 0~~ 24 in.	2 in. by 2 in. by 14ga[l]	2-inches	520
C1	Lime[n]	7/8-in.	2 x 4	~~2 ft. 8~~ 32 in.	17 ga. woven wire	3-inches	330
C2	Lime[n]	7/8-in.	4 x 4	~~2 ft. 0~~ 24 in.	2 in. by 2 in. by 14ga[l]	2-inches	450
D1	Cement-lime[o]	7/8-in.	4 x 4	~~2 ft. 8~~ 32 in.	17 ga. woven wire	2-inches	380
D2	Cement-lime[o]	7/8-in.	4 x 4	~~2 ft. 0~~ 24 in.	2 in. by 2 in. by 14ga[l]	2-inches	520
E1	Cement[p]	7/8-in.	4 x 4	~~2 ft. 8~~ 32 in.	2 in. by 2 in. by 14 ga[l]	2-inches	540
E2	Cement[p]	1.5-in.	4 x 4	~~2 ft. 0~~ 24 in.	2 in. by 2 in. by 14ga[l]	2-inches	680

SI: 1 inch=25.4 mm, 1 pound per foot = 14.5939 N/m

a. Bales shall be not less than 15 inches thick.

b. Plasters shall conform with ~~Sections N106.9~~ N104.7 through ~~N106.12~~ N104.12 for makeup and thickness, with ~~Section N105.8.1~~N106.8 for straightness, and with ~~Section N105.10~~ N106.11 for support of plaster skins.

c. Sill plates shall be Douglas fir-larch or southern pine and shall be preservative-treated where required by the *International Building Code*. Multiply allowable shear value by .82 for other species with specific gravity of .42 or greater, or by .65 for all other species.

d. Anchor bolts shall be 5/8-inch diameter with 2-inch by 2-inch by 3/16-inch washers, with not less than 7-inch embedment in concrete or masonry foundation. Anchor bolts or other fasteners into framed floors shall be engineered.

e. Mesh shall run continuous vertically from sill plate to top plate, roof or floor beam, or roof or floor bearing assembly, or shall lap not less than ~~12-inches~~ 8 inches. ~~Horizontal laps shall be a not less than 4-inches.~~ Steel mesh shall be galvanized. Galvanized steel mesh shall be separated from preservative-treated wood by grade D paper, 15# roofing felt, or other *approved* barrier.

f. Staples shall be ~~gun~~ pneumatically driven staples, stainless steel or electro-galvanized, 16 gauge with ~~1 ¼-inch legs,~~ 7/16-inch crown~~,~~. Staple legs shall be 1 ¾ inch long except that 1-1/4 inch legs shall be permitted to be used to fasten mesh in clay plaster walls. ~~or~~ manually driven staples, galvanized 15 gauge with 7/8-inch legs, 3/16-inch inner spread and rounded shoulder shall be permitted to be used in clay plaster walls. Other staples shall be permitted to be used as designed by a *registered design professional*. Staples into preservative-treated wood shall be stainless steel.

g. Staples at spacing indicated are to boundary ~~conditions~~members, including sill plates, and top plate, roof or floor beam, or roof or floor bearing assembly,

h. Staples shall be firmly driven diagonally across mesh intersections at spacing indicated.

i. Values shown are for aspect ratios of 1:1 or less. Reduce values shown to 50% for the limit of a 2:1 aspect ratio. Linear interpolation shall be permitted for aspect ratios between 1:1 and 2:1. The full value shown shall be used for aspect ratios greater than 1:1, where an additional layer of mesh is installed at the base of the wall to a height where the remainder of the wall has an aspect ratio of 1:1 or less, and the second layer of mesh is fastened to the sill plate with the required stapling, and the sill bolt spacing is decreased with linear interpolation between1:1 and 2:1.

j. For walls with a plaster Type A on one side and any other plaster type on the other side, a registered design professional shall show transfer of the design lateral load into the stiffer Type B, C, D, or E plaster only, and 50% of the allowable shear value shown for that wall ~~type~~ designation shall be used.

k. These values are permitted to be increased 40 percent for wind design.

l. 16 gauge mesh shall be permitted to be used with a reduction to 0.60 of the allowable shear values shown.

m. The building official is authorized to require a cube compression test demonstrating not less than ~~600~~100 psi compressive strength.

n. Lime plaster shall use a binder consisting of hydraulic or natural hydraulic lime. The building official is authorized to require a cube compression test demonstrating not less than 600 psi compressive strength.

o. The building official is authorized to require a cube compression test demonstrating not less than 1000 psi compressive strength.

p. The building official is authorized to require a cube compression test demonstrating not less than 1400 psi compressive strength.

SECTION N108
THERMAL INSULATION

N108.1 R-value. The unit R-value of a strawbale wall with bales laid flat is R-1.3 per inch of bale thickness.~~, and~~ The unit R- value of a straw bale wall with bales on-edge is R-2 per inch of bale thickness.

Commenter's Reason: Proposal S315-12 to create an Appendix on Strawbale Construction has been modified to respond to concerns raised at the ICC Code Development hearing in Dallas, and raised in review by members of the National Council of Structural Engineers Associations (NCSEA) Code Committee and members of the Structural Engineers Association of California (SEAOC) Code Committee, as well as review by the primary authors of the original proposal.

Substantial changes include:

- Restricting buildings that utilize strawbale walls as load-bearing or lateral-force-resisting systems to 35 ft and two-stories in height above grade.
- Excluding strawbale walls from use as lateral load-resisting systems in Seismic Design Category F and restricting the height of buildings utilizing strawbale walls as lateral load resisting systems to 15 ft. in Seismic Design Category E.
- Introducing prescriptive criteria for resistance to out-of-plane loads.
- Adding a Table regarding out-of-plane resistance and unrestrained wall height.
- Introducing requirements for concentrated superimposed vertical loads.
- Introducing requirements for the use of strawbale walls to resist uplift loads.

In addition, the organization of the proposed Appendix has changed for clarity. A new section entitled "Strawbale Walls - General" has been formed, largely from language in the original proposal, including the original "Moisture Control" section. The section entitled "Finishes" has been relocated and the section entitled "Structural Use" is now entitled "Strawbale Walls – Structural", with non-structural content moved to the "Strawbale Walls - General" section.

Vague or unenforceable language has been modified, and redundant language has been removed.

Also, the Reason Statement from the original proposal stands, including its link to supporting documentation, as follows:

Strawbale construction has proven to be a safe, durable, resource efficient, and fully viable method of construction. However, the International Building Code does not contain a section on strawbale construction, which has been an impediment to this construction system's proper and broader use.

First practiced in Nebraska in the late 1800's, with buildings over 100 years old still in service, strawbale construction was rediscovered in the 1980's in the American southwest. Since then it has been further developed and explored, including considerable testing and research regarding structural performance (under vertical and lateral loads), moisture, fire, and its thermal and acoustic properties.

Currently only Oregon and New Mexico have adopted statewide strawbale building codes. California has legislated strawbale construction guidelines for voluntary adoption by local jurisdictions. In addition, nine U.S. cities or counties have adopted strawbale building codes. Three countries outside the United States – Germany, France, and Belarus - have limited strawbale building codes.

Most of the strawbale building codes that do exist are derived from the first such code, created for and adopted by Tucson / Pima County, Arizona in 1996. Much experience, testing, and research since then have proven these codes to be deficient. They are often either too restrictive, or not restrictive enough, and in some cases don't address important issues at all.

Although strawbale codes are both few and flawed, strawbale buildings are now found in 49 of the 50 United States, and strawbale construction is practiced in over 45 countries throughout the world and in every climate. There are an estimated 600-1000 strawbale buildings in California alone. The strawbale buildings in the U.S. include residences, schools, office buildings, wineries, multi-story buildings, buildings over 10,000 sq.ft in floor area, load-bearing strawbale structures, and structures in areas of high seismic risk (plastered strawbale walls are particularly resistant to earthquakes). The practice of, and the desire to utilize strawbale construction, continues to increase and promises to accelerate as we face increased pressure on our environment and natural resources.

There is great need for a comprehensive strawbale code, with full benefit of the experience and knowledge that has been gained to date about this method of construction. The proposed Strawbale Construction appendix for the IBC was created to fulfill this need. It is based on the collective experience of the design, construction, and testing of strawbale buildings over 20 years by architects, engineers, builders, and academics throughout the U.S., Canada, and other countries throughout the world. The testing, research, and comprehensive understanding of the performance of strawbale buildings are summarized in the book *Design of Straw Bale Buildings* (B.King, et al, 2006, Green Building Press). Testing, research reports, and other supporting documentation are available for viewing and download at: http://www.ecobuildnetwork.org/strawbale-construction-code-supporting-documentation

As lead author of the proposed appendix, and as a licensed architect for 25 years, I have been involved in the design, construction, testing, and research of strawbale buildings since 1995. In 2001 I spearheaded legislation and revisions to the current California Guidelines for Straw-Bale Structures. The proposed Strawbale Construction appendix for the IBC has benefited from numerous peer reviews by experienced, licensed design and building professionals over the course of more than five years. It would serve designers, builders, owners, inhabitants, and building officials alike in the construction and utilization of strawbale buildings.

Supporting Documentation: Selected documents that are available via the above link

Load-Bearing Straw Bale Construction – A summary of worldwide testing and experience, B.King, PE
Testing of Straw Bale Walls with Out-of-Plane Loads – K.Donahue, SE
In-Plane Cyclic Tests of Plastered Straw Bale Wall Assemblies – C.Ash, M.Aschheim, PE, D.Mar, SE
Structural Testing of Plastered Straw Bale Wall Assemblies – K.Lerner, Architect, K.Donahue, SE
Basis for Allowable Shears for Strawbale Walls – M.Aschheim, PE, M.Hammer, Architect
Proposed Shear Values and Seismic Design Factors for Strawbale Walls – M.Aschheim, PE

Shake Table Test Video of Full Scale Straw Bale Building Specimen – D.Donovan, PE
Moisture Properties of Plaster and Stucco for Strawbale Buildings – J.Straube, PE
Monitoring of Hygrothermal Performance of Strawbale Walls – J.Sraube, PE, C.Schumacher
ASTM E119 1-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Clay Plaster
ASTM E119 2-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Cement Plaster
ASTM E119 Fire Tests - Video
Thermal Performance of Straw Bale Wall Systems (incl. Oak Ridge Lab test results) – N.Stone
Support Letters from Licensed Practitioners: Letters from 2 Structural Engineers, 4 Civil Engineers, 1 Professor of Civil Engineering, 7 Architects

Public Comment 2:

Hope Medina, Town of Castle Rock, CO, representing self and Kirk Nagle City of Arvada, CO, representing self, requests Approval as Submitted.

Commenter's Reason: The committee's concern regarding adoption into the appendix is not relevant because all jurisdictions can exclude any or all portions of the appendix as necessary. Code adaption by local jurisdictions or by states could exclude straw bale construction if they felt that it was unacceptable. There are existing structures built from 1896 through 1907 in Nebraska, with nine structures still in use. There are more than 1,000 straw bales homes in California which have withstood earthquakes, demonstrating their structural strength to withstand lateral and longitudinal forces. These buildings are highly energy efficient, sustainable, and use local materials for construction. These structures are homes, churches, schools, commercial buildings, gyms, stores, and many other viable sustainable structures used by occupants for their safety and energy efficiency. Overturning the committee is the right thing to do.

Wood buildings if purposed as a new material for construction, based on current engineering standards would not be allowed into the body of the code. Wood buildings have been around for hundreds of years and so has straw bale construction. Straw bale is a viable building material that has proved itself for hundreds of years.

S315, Part I-12
Final Action: AS AM AMPC____ D

S315-12, Part II
Appendix N (New)

Proposed Change as Submitted

Proponent: Martin Hammer, Architect, representing California Straw Building Association, Colorado Straw Bale Association, Straw Bale Construction Association – New Mexico, Ontario Bale Building Coalition, Development Center for Appropriate Technology, Environmental Building Network (mfhammer@pacbell.net)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. PART II WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES

PART II – IBC FIRE SAFETY

SECTION N107
FIRE RESISTANCE

N107.1 Fire-resistance rating. Fire-resistance ratings for strawbale walls shall be established in accordance with Section N107.1.1 or N107.1.2, or shall be determined in accordance with Section 703.2 or 703.3 of the *International Building Code*.

N107.1.1 1-hour rated clay plastered wall. 1-hour fire-resistance-rated nonload-bearing clay plastered strawbale walls shall comply with all of the following:

1. Bales shall be laid flat or on-edge in a running bond. Gaps shall be fire-stopped with straw-clay,
2. Bales shall maintain thickness of not less than 18 inches (457 mm),
3. Clay plaster on each side of the wall shall be not less than 1 inch (25 mm) thick and shall be comprised of a mixture of 3 parts clay, 2 parts chopped straw, and 6 parts sand, or an alternative *approved* clay plaster.
4. Plaster application shall be in accordance with Section N106.9 for the number and thickness of coats.

N107.1.2 2-hour rated cement plastered wall. 2-hour fire-resistance-rated nonload-bearing cement plastered strawbale walls shall comply with all of the following:

1. Bales shall be laid flat or on-edge in a running bond. Gaps shall be fire-stopped with straw-clay.
2. Bales shall maintain a thickness of not less than 14 inches (356 mm).
3. 1 1/2 inch (38 mm) by 17 gauge galvanized woven wire mesh shall be attached to wood members with 1 1/2 inch (38 mm) staples at 6 inches (406 mm) on center. 9 gauge U-pins with minimum 8 inch (203 mm) legs shall be installed in the field at 18 inches (457 mm) on center.
4. Cement plaster on each side of the wall shall be not less than 1 inch (25 mm) thick.
5. Plaster application shall be in accordance with Section N106.14 for the number and thickness of coats.

N107.2 Openings in rated walls. Openings and penetrations in bale walls required to have a fire-resistance rating shall satisfy the same requirements for openings and penetrations as prescribed in the *International Building Code*.

N107.3 Clearance to fireplaces and chimneys. Strawbale surfaces adjacent to fireplaces or chimneys shall have a minimum 3/8 inch (10 mm) thick plaster coat of any type permitted by this section, and shall maintain the specified clearances to the plaster finish as required to combustibles in *International Building*

Code Chapter 21, Sections 2111, 2112, and 2113, or as required by manufacturer's installation instructions, whichever is more restrictive.

N107.4 Type of construction. Buildings or portions thereof utilizing strawbale walls in accordance with this appendix shall be classified as Type V-B construction. Strawbale walls constructed in compliance with Section N107.1.1 or N107.1.2 shall be permitted wherever combustible walls of the same fire-resistance are allowed by Chapter 6 of the *International Buildlng Code*. Strawbale walls with any finish allowed by this appendix shall be permitted wherever non-rated combustible walls are allowed by the *International Building Code*.

Reason: Strawbale construction has proven to be a safe, durable, resource efficient, and fully viable method of construction. However, the International Building Code does not contain a section on strawbale construction, which has been an impediment to this construction system's proper and broader use.

First practiced in Nebraska in the late 1800's, with buildings over 100 years old still in service, strawbale construction was rediscovered in the 1980's in the American southwest. Since then it has been further developed and explored, including considerable testing and research regarding structural performance (under vertical and lateral loads), moisture, fire, and its thermal and acoustic properties.

Currently only Oregon and New Mexico have adopted statewide strawbale building codes. California has legislated strawbale construction guidelines that are voluntarily adopted at the local level. In addition, nine U.S. cities or counties have adopted strawbale building codes. Three countries outside the United States – Germany, France, and Belarus - have limited strawbale building codes.

Most of the strawbale building codes that do exist are derived from the first such code, created for and adopted by Tucson / Pima County, Arizona in 1996. Much experience, testing, and research since then have proven these codes to be deficient. They are often either too restrictive, or not restrictive enough, and in some cases don't address important issues at all.

Although strawbale codes are both few and flawed, strawbale buildings are now found in 49 of the 50 United States, and strawbale construction is practiced in over 45 countries throughout the world and in every climate. There are an estimated 600-1000 strawbale buildings in California alone. The strawbale buildings in the U.S. include residences, schools, office buildings, wineries, multi-story buildings, buildings over 10,000 sq.ft in floor area, load-bearing strawbale structures, and structures in areas of high seismic risk (plastered strawbale walls are particularly resistant to earthquakes). The practice of, and the desire to utilize strawbale construction, continues to increase and promises to accelerate as we face increased pressure on our environment and natural resources.

There is great need for a comprehensive strawbale code, with full benefit of the experience and knowledge that has been gained to date about this method of construction. The following proposed Strawbale Construction appendix for the IBC was created to fulfill this need. It is based on the collective experience of the design, construction, and testing of strawbale buildings over 20 years by architects, engineers, builders, and academics throughout the U.S., Canada, and other countries throughout the world. The testing, research, and comprehensive understanding of the performance of strawbale buildings are summarized in the book *Design of Straw Bale Buildings* (B.King, et al, 2006, Green Building Press). Testing, research reports, and other supporting documentation are available for viewing and download at: http://www.ecobuildnetwork.org/strawbale-construction-code-supporting-documentation

As lead author of the proposed appendix, and as a licensed architect for 25 years, I have been involved in the design, construction, testing, and research of strawbale buildings since 1995. In 2001 I spearheaded legislation and revisions to the current California Guidelines for Straw-Bale Structures. The proposed Strawbale Construction appendix for the IBC has benefited from numerous peer reviews by experienced, licensed design and building professionals over the course of more than five years. It would serve designers, builders, owners, inhabitants, and building officials alike in the construction and utilization of strawbale buildings.

Supporting Documentation: List of selected documents available via the above link

Load-Bearing Straw Bale Construction – A summary of worldwide testing and experience, B.King, PE
Testing of Straw Bale Walls with Out-of-Plane Loads – K.Donahue, SE
In-Plane Cyclic Tests of Plastered Straw Bale Wall Assemblies – C.Ash, M.Aschheim, PE, D.Mar, SE
Structural Testing of Plastered Straw Bale Wall Assemblies – K.Lerner, Architect, K.Donahue, SE
Seismic Design Factors and Allowable Shears for Strawbale Wall Assemblies – S. Jalali, M. Aschheim, PE
Shake Table Test Video of Full Scale Straw Bale Building Specimen – D.Donovan, PE
Moisture Properties of Plaster and Stucco for Strawbale Buildings – J.Straube, PE
Monitoring of Hygrothermal Performance of Strawbale Walls – J.Sraube, PE, C.Schumacher
ASTM E119 1-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Clay Plaster
ASTM E119 2-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Cement Plaster
ASTM E119 Fire Tests - Video
Thermal Performance of Straw Bale Wall Systems (incl. Oak Ridge Lab test results) – N.Stone
Support Letters from Licensed Practitioners: Letters from 2 Structural Engineers, 4 Civil Engineers, 1 Professor of Civil Engineering, 7 Architects

Cost Impact: The code change proposal will not increase the cost of construction.

APPENDIX N (NEW)-S-HAMMER-AB2-15-12.doc

Public Hearing Results

PART II – IBC FIRE SAFETY
Committee Action: **Disapproved**

Committee Reason: The committee felt that the proposal was insufficient for the following reasons: The fire resistance rated assemblies are not complete and do not specify the installation of materials; load-bearing assemblies should be included; evidence of tested opening protective assemblies should be provided; and the mixture ratio of clay plaster as it relates to Section 2407.1.1 should be provided.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Martin Hammer, representing California Straw Building Association, Colorado Straw Bale Association, Straw Bale Construction Association – New Mexico, Ontario Straw Bale Building Coalition, Development Center for Appropriate Technology, Ecological Building Network, requests Approval as Submitted.

Commenter's Reason: Proposal S315-12 to create an Appendix on Strawbale Construction has been modified to respond to concerns raised at the ICC Code Development hearing in Dallas, and raised in review by members of the National Council of Structural Engineers Associations (NCSEA) Code Committee and members of the Structural Engineers Association of California (SEAOC) Code Committee, as well as review by the primary authors of the original proposal.

Substantial changes include:

- Restricting buildings that utilize strawbale walls as load-bearing or lateral-force-resisting systems to 35 ft and two-stories in height above grade.
- Excluding strawbale walls from use as lateral load-resisting systems in Seismic Design Category F and restricting the height of buildings utilizing strawbale walls as lateral load resisting systems to 15 ft. in Seismic Design Category E.
- Introducing prescriptive criteria for resistance to out-of-plane loads.
- Adding a Table regarding out-of-plane resistance and unrestrained wall height.
- Introducing requirements for concentrated superimposed vertical loads.
- Introducing requirements for the use of strawbale walls to resist uplift loads.

In addition, the organization of the proposed Appendix has changed for clarity. A new section entitled "Strawbale Walls - General" has been formed, largely from language in the original proposal, including the original "Moisture Control" section. The section entitled "Finishes" has been relocated and the section entitled "Structural Use" is now entitled "Strawbale Walls – Structural", with non-structural content moved to the "Strawbale Walls - General" section.

Vague or unenforceable language has been modified, and redundant language has been removed.

Also, the Reason Statement from the original proposal stands, including its link to supporting documentation, as follows:

Strawbale construction has proven to be a safe, durable, resource efficient, and fully viable method of construction. However, the International Building Code does not contain a section on strawbale construction, which has been an impediment to this construction system's proper and broader use.

First practiced in Nebraska in the late 1800's, with buildings over 100 years old still in service, strawbale construction was rediscovered in the 1980's in the American southwest. Since then it has been further developed and explored, including considerable testing and research regarding structural performance (under vertical and lateral loads), moisture, fire, and its thermal and acoustic properties.

Currently only Oregon and New Mexico have adopted statewide strawbale building codes. California has legislated strawbale construction guidelines for voluntary adoption by local jurisdictions. In addition, nine U.S. cities or counties have adopted strawbale building codes. Three countries outside the United States – Germany, France, and Belarus - have limited strawbale building codes.

Most of the strawbale building codes that do exist are derived from the first such code, created for and adopted by Tucson / Pima County, Arizona in 1996. Much experience, testing, and research since then have proven these codes to be deficient. They are often either too restrictive, or not restrictive enough, and in some cases don't address important issues at all.

Although strawbale codes are both few and flawed, strawbale buildings are now found in 49 of the 50 United States, and strawbale construction is practiced in over 45 countries throughout the world and in every climate. There are an estimated 600-1000 strawbale buildings in California alone. The strawbale buildings in the U.S. include residences, schools, office buildings, wineries, multi-story buildings, buildings over 10,000 sq.ft in floor area, load-bearing strawbale structures, and structures in areas of high seismic risk (plastered strawbale walls are particularly resistant to earthquakes). The practice of, and the desire to utilize strawbale construction, continues to increase and promises to accelerate as we face increased pressure on our environment and natural resources.

There is great need for a comprehensive strawbale code, with full benefit of the experience and knowledge that has been gained to date about this method of construction. The proposed Strawbale Construction appendix for the IBC was created to fulfill this need. It is based on the collective experience of the design, construction, and testing of strawbale buildings over 20 years by architects, engineers, builders, and academics throughout the U.S., Canada, and other countries throughout the world. The testing, research, and comprehensive understanding of the performance of strawbale buildings are summarized in the book *Design of Straw Bale Buildings* (B.King, et al, 2006, Green Building Press). Testing, research reports, and other supporting documentation are available for viewing and download at: http://www.ecobuildnetwork.org/strawbale-construction-code-supporting-documentation

As lead author of the proposed appendix, and as a licensed architect for 25 years, I have been involved in the design, construction, testing, and research of strawbale buildings since 1995. In 2001 I spearheaded legislation and revisions to the current California Guidelines for Straw-Bale Structures. The proposed Strawbale Construction appendix for the IBC has benefited from numerous peer reviews by experienced, licensed design and building professionals over the course of more than five years. It would serve designers, builders, owners, inhabitants, and building officials alike in the construction and utilization of strawbale buildings.

Supporting Documentation: Selected documents that are available via the above link

Load-Bearing Straw Bale Construction – A summary of worldwide testing and experience, B.King, PE
Testing of Straw Bale Walls with Out-of-Plane Loads – K.Donahue, SE
In-Plane Cyclic Tests of Plastered Straw Bale Wall Assemblies – C.Ash, M.Aschheim, PE, D.Mar, SE
Structural Testing of Plastered Straw Bale Wall Assemblies – K.Lerner, Architect, K.Donahue, SE
Basis for Allowable Shears for Strawbale Walls – M.Aschheim, PE, M.Hammer, Architect
Proposed Shear Values and Seismic Design Factors for Strawbale Walls – M.Aschheim, PE
Shake Table Test Video of Full Scale Straw Bale Building Specimen – D.Donovan, PE
Moisture Properties of Plaster and Stucco for Strawbale Buildings – J.Straube, PE
Monitoring of Hygrothermal Performance of Strawbale Walls – J.Sraube, PE, C.Schumacher
ASTM E119 1-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Clay Plaster
ASTM E119 2-Hour Fire Resistance Test of a Non-Loadbearing Straw Bale Wall with Cement Plaster
ASTM E119 Fire Tests - Video
Thermal Performance of Straw Bale Wall Systems (incl. Oak Ridge Lab test results) – N.Stone
Support Letters from Licensed Practitioners: Letters from 2 Structural Engineers, 4 Civil Engineers, 1 Professor of Civil Engineering, 7 Architects

Public Comment 2:

Hope Medina, Town of Castle Rock, CO, representing self and Kirk Nagle City of Arvada, CO, representing self, requests Approval as Submitted.

Commenter's Reason: The committee's concern regarding adoption into the appendix is not relevant because all jurisdictions can exclude any or all portions of the appendix as necessary. Code adaption by local jurisdictions or by states could exclude straw bale construction if they felt that it was unacceptable. There are existing structures built from 1896 through 1907 in Nebraska, with nine structures still in use. There are more than 1,000 straw bales homes in California which have withstood earthquakes, demonstrating their structural strength to withstand lateral and longitudinal forces. These buildings are highly energy efficient, sustainable, and use local materials for construction. These structures are homes, churches, schools, commercial buildings, gyms, stores, and many other viable sustainable structures used by occupants for their safety and energy efficiency. Overturning the committee is the right thing to do.

Wood buildings if purposed as a new material for construction, based on current engineering standards would not be allowed into the body of the code. Wood buildings have been around for hundreds of years and so has straw bale construction. Straw bale is a viable building material that has proved itself for hundreds of years.

S315, Part II-12
Final Action: AS AM AMPC____ D

S319-12
G102.1

Proposed Change as Submitted

Proponent: John Ingargiola and Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (john.ingargiola@dhs.gov, gregory.p.wilson@dhs.gov) and Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net)

Revise as follows:

G102.1 General. This appendix, in conjunction with the *International Building Code*, provides minimum requirements for development located in flood hazard areas, including the subdivision of land; <u>site improvements and</u> installation of utilities; placement and replacement of manufactured homes; <u>placement of recreational vehicles;</u> new construction and repair, reconstruction, rehabilitation or additions to new construction; substantial improvement of existing buildings and structures, including restoration after damage, <u>installation of tanks;</u> temporary structures, and temporary or permanent storage, utility and miscellaneous Group U buildings and structures, and certain building work exempt from permit under Section 105.2 <u>and other buildings and development activities</u>.

Reason: The purpose of this section is to identify the development activities for which minimum requirements are listed in Appendix G. The proposed changes are consistent with the subsections in Appendix G (including some proposed new subsections).

Cost Impact: The code change proposal will not increase the cost of construction.

G102.1-S-INGARGIOLA-WILSON-QUINN.doc

Public Hearing Results

Committee Action: **Approved as Submitted**

Committee Reason: This code change aligns the IBC appendix with FEMA requirements and ASE 24. It also clarifies the appendix by coordinating the wording of Section G102.1 with the remainder of the appendix.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Jonathan Siu, City of Seattle Department of Planning & Development requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

~~**G102.1 General.** This appendix, in conjunction with the *International Building Code*, provides minimum requirements for development located in flood hazard areas, including the subdivision of land; site improvements and installation of utilities; placement and replacement of manufactured homes; placement of recreational vehicles; new construction and repair, reconstruction, rehabilitation or additions to new construction; substantial improvement of existing buildings and structures, including restoration after damage, installation of tanks; temporary structures, and temporary or permanent storage, utility and miscellaneous Group U buildings and structures, and certain building work exempt from permit under Section 105.2 and other buildings and development activities.~~

G102.1 General. This appendix, in conjunction with the *International Building Code*, provides minimum requirements for development located in flood hazard areas, including:

1. The subdivision of land;
2. Site improvements and installation of utilities;
3. Placement and replacement of manufactured homes;
4. Placement of recreational vehicles;
5. New construction and repair, reconstruction, rehabilitation or additions to new construction;
6. Substantial improvement of existing buildings and structures, including restoration after damage;
7. Installation of tanks;
8. Temporary structures;
9. Temporary or permanent storage, utility and miscellaneous Group U buildings and structures; and
10. Certain building work exempt from permit under Section 105.2 and other buildings and development activities.

Commenter's Reason: The purpose of this public comment is to reformat the list of activities within the scope of this appendix in to a bullet list. This makes the section more readable and easier to understand. No technical changes are made—the text in the bullet list is taken verbatim from the existing text in the code, and includes the additional items approved by the Structural Committee in Dallas.

S319-12

Final Action: AS AM AMPC____ D

S323-12

G103.8 (New), G104.2

Proposed Change as Submitted

Proponent: John Ingargiola and Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency (john.ingargiola@dhs.gov, gregory.p.wilson@dhs.gov) and Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency (rcquinn@earthlink.net)

Revise as follows:

G103.8 Substantial improvement and substantial damage determinations. For permit applications to improve or repair buildings and structures, including additions, repairs, rehabilitations, renovations, alterations, relocations, reconstructions, or other work, the building official, shall:

1. Estimate the market value, or require the applicant to obtain a professional appraisal of the market value, of the building or structure before the proposed work is performed; the market value of the building or structure shall be the market value before the damage occurred or before any improvement is made;
2. Compare the cost to perform the improvement, the cost to repair the damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure;
3. Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; and
4. If the determination finds that the proposed work constitutes substantial improvement or repair of substantial damage, notify the applicant of the results of the determination and whether compliance with the requirements of the building code is required.

~~G103.8~~ G103.9 Records. The *building official* shall maintain a permanent record of all *permits* issued in *flood hazard areas*, including copies of inspection reports and certifications required in Section 1612.

G104.2 Application for permit. The applicant shall file an application in writing on a form furnished by the *building official*. Such application shall:

1. Identify and describe the development to be covered by the permit.
2. Describe the land on which the proposed development is to be conducted by legal description, street address or similar description that will readily identify and definitely locate the site.
3. Include a site plan showing the delineation of flood hazard areas, floodway boundaries, flood zones, design flood elevations, ground elevations, proposed fill and excavation and drainage patterns and facilities.
4. Indicate the use and occupancy for which the proposed development is intended.
5. Be accompanied by construction documents, grading and filling plans and other information deemed appropriate by the building official.
6. State the valuation of the proposed work.
7. Include a market value appraisal of the building (excluding land), for applications for work on existing buildings, unless otherwise advised by the building official.

~~7~~8. Be signed by the applicant or the applicant's authorized agent.

Reason: Communities that participate in the NFIP agree to regulate all development in flood hazard areas. FEMA states that the flood provisions in the I-Codes are consistent with the NFIP requirements for the design and construction of buildings. To fully meet the requirements of the NFIP local jurisdictions must adopt a local ordinance or Appendix G in order to have the necessary administrative provisions and requirements for development other than buildings.

Section 105.3 of the code requires the applicant to describe the work to be covered by the permit and to state the valuation of the proposed work. The building code defines and uses the terms “substantial improvement” and “substantial damage.” This proposal clarifies how the building official is to use the information to determine whether proposed work meets the definitions.

FEMA recently published FEMA P-758, *Substantial Improvement/Substantial Damage Desk Reference*, that includes guidance for local officials on estimating market value as well as estimating costs. This proposal states that the applicant shall submit a market value appraisal unless otherwise advised; FEMA guidance now states that local officials may use “adjusted assessed value” or “actual cash value” (replacement minus depreciation).

Cost Impact: The code change proposal will not increase the cost of construction. Determining whether work proposed on an existing building is substantial improvement or repair of substantial damage is implicit in the definitions of those terms. This proposal does not change the fact that determining whether proposed work meets those definitions has to be done. It simply clarifies how it is to be done.

G103.8 #2-S-INGARGIOLA-WILSON-QUINN.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Substantial improvement determinations are already required, but the provision proposed for Appendix G is a very prescriptive requirement that seems to place more of a burden on the building official. It is possible that the requirement does not belong in the building code and may be more appropriate for zoning regulation.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

John Ingargiola and Gregory Wilson, representing Department of Homeland Security, Federal Emergency Management Agency and Rebecca Quinn, RCQuinn Consulting, Inc., representing Federal Emergency Management Agency, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

<u>**ADJUSTED ASSESSED VALUE.** The value of a building determined for property tax or assessment purposes, adjusted by a factor to reasonably reflect current market value by accounting for appraisal cycle, land value and assessment level.</u>

<u>**ACTUAL CASH VALUE.** The cost to replace a building on the same parcel with a new building of like-kind and quality, minimum depreciation due to age, use, and neglect.</u>

G103.8 Substantial improvement and substantial damage determinations. For permit applications to improve or repair buildings and structures, including additions, repairs, rehabilitations, renovations, alterations, relocations, reconstructions, or other work, the building official, shall:

1. Estimate the market value <u>using adjusted assessed value or actual cash value</u>, or require the applicant to obtain a professional appraisal of the market value, of the building or structure before the proposed work is performed; the market value of the building or structure shall be the market value before the damage occurred or before any improvement is made;
2. Compare the cost to perform the improvement, the cost to repair the damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure;
3. Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; and
4. If the determination finds that the proposed work constitutes substantial improvement or repair of substantial damage, notify the applicant of the results of the determination and whether compliance with the requirements of the building code is required.

G103.9 Records. The *building official* shall maintain a permanent record of all *permits* issued in *flood hazard areas*, including copies of inspection reports and certifications required in Section 1612.

G104.2 Application for permit. The applicant shall file an application in writing on a form furnished by the *building official*. Such application shall:

1. Identify and describe the development to be covered by the permit.

2. Describe the land on which the proposed development is to be conducted by legal description, street address or similar description that will readily identify and definitely locate the site.
3. Include a site plan showing the delineation of flood hazard areas, floodway boundaries, flood zones, design flood elevations, ground elevations, proposed fill and excavation and drainage patterns and facilities.
4. Indicate the use and occupancy for which the proposed development is intended.
5. Be accompanied by construction documents, grading and filling plans and other information deemed appropriate by the building official.
6. State the valuation of the proposed work.
7. Include a market value appraisal of the building (excluding land), for applications for work on existing buildings, unless ~~otherwise advised by~~ the building official has estimated market value pursuant to G103.8, :item 1.
8. Be signed by the applicant or the applicant's authorized agent.

Commenter's Reason: The IBC and IEBC define "substantial improvement" and "substantial damage" without indicating the source of the market value. Both definitions require the cost of proposed work to be compared to the market value of the building. Section 105.3 requires the applicant to describe the work to be covered by the permit and to state the valuation of the proposed work. This proposal, modified to reflect committee discussion and comments made during the hearing, clarifies how the building official is to get the market value in order to be able to determine whether proposed work meets the definitions. As modified, this proposal permits use of adjusted assessed value or actual cash value as estimates of market value, while reserving the option to require the applicant to obtain a professional appraisal. Most communities accept professional appraisals if the applicant elects to provide one.

The committee commented on the prescriptive nature of the proposal and expressed concern about placing burden on the building official. This proposal adds no additional responsibility or burden. It is already the building official's responsibility to determine if work on existing buildings in flood hazard areas meets the definition of substantial improvement or substantial damage. This proposal is consistent with FEMA guidance FEMA P-758, *Substantial Improvement/Substantial Damage Desk Reference*, regarding estimating market value.

S323-12

Final Action: AS AM AMPC____ D

S335-12
L101.1

Proposed Change as Submitted

Proponent: James Bela, Oregon Earthquake Awareness, representing self

Revise as follows:

L101.1 General. Every ~~structure~~ building located ~~where the 1-second spectral response acceleration, S1, in accordance with Section 1613.3 is greater than 0.40~~ within 15 miles distance of an active fault with a maximum potential earthquake M 6 or above, or lies within 25 miles distance of an active fault wit a maximum potential earthquake M 7 or avove; that either 1) exceeds six stories in height with an aggregate floor area of 60,000 square feet (5574 m2) or more, or 2) exceeds ten stories in height regardless of floor area, shall be equipped with not less than three approved recording accelerographs. The accelerographs shall be interconnected for common start and common timing.

Reason: The 1-second spectral response acceleration contours are interesting, but their locations are yo-yoing around with each new addition of the maps; such that they are not reliable over time. See discussion per Code Change: **IBC-12.13 FIGURE 1613.3.3.1 (1)(2)(3)(4)(5)(6)_.**

An earthquake will occur on a fault, and it is the proximity of a building to an earthquake source that determines its actual experience to ground shaking in a real earthquake. This additional charging language fills this hole in locations, particularly in the western U.S. where there are active faults; but the sum total (of probabilities of exceedence) of all contributing faults is not enough to give 1-second contours of 0.40g.

The term building is as used in the city of Los Angeles strong motion accelerograph language. We have building officials, building codes, building permits, building maintenance, Building Owners and Managers Associations . . . so everyone is pretty clear what a "building" actually is. Maybe, for example, an airplane hangar is more of a structure, than it is a building?

Cost Impact: The code change proposal will not increase the cost of construction.

L101.1-S-BELA.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee prefers the current trigger in Appendix L which is simple and based on the maps that are in the code.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

James Bela, Oregon Earthquake Awareness, representing self, requests Approval as Submitted.

Commenter's Reason: The Committee Action for Disapproval: (a) incorrectly substitutes the committee's so-called "preference" for retaining "the current trigger in Appendix L" without stating specific and defensible objections against the Proposed Change S335-12; and (b) misunderstands that the current trigger in Appendix L (based on the USGS seismic hazard maps) is, in reality, not simple – because it is non-stable over repeating cycles of USGS generated seismic hazard mapping assessments.

Tying the suggested requirements to installing strong motion instrumentation to a non-stable platform, such as the ground motion parameters depicted in the USGS seismic hazard maps; is neither wise nor practical. Will these installed strong ground motion instruments continue to be maintained throughout the future -- should the "current triggers" dip below the stated thresholds for the requirement for instrumentation?

Furthermore, the current triggers mischaracterize the earthquake risk, because they do not focus on any one particular earthquake source (with its potential maximum magnitude). Focusing on real earthquakes (i.e., Deterministic earthquakes) makes much more sense, since the recording of actual buildings' performances (and deformations) during earthquakes is being sought (and required) fundamentally so as to be able to improve building code requirements -- from lessons learned from actual earthquakes.

Therefore, changing the current triggers from fictitious mathematical models of earthquake hazard [fatally flawed as described in additional Public Comments S107-12 ASCE-7 and S110-12 Figs. 1613.1(1-6) (NEW) Deleting MCE_R] to a robust and stable platform anchored on earthquake source "fault length" and potential maximum "magnitude" -- provides a much simpler and much needed improvement that will not only assuredly improve building code design requirements; but also will prevent the irretrievable loss of valuable earthquake records from affected buildings that were, unfortunately, not instrumented because earthquake shaking was determined (unwisely) by PSHA methodology to be "very unlikely."

So, to protect public safety . . . let's get to the heart of the matter!

"PAY NO ATTENTION TO THAT MAN BEHIND THE CURTAIN!"

http://www.youtube.com/watch?v=XMsO4Mmtp5E&feature=related

S335-12

Final Action: AS AM AMPC____ D

S336-12
M101

Proposed Change as Submitted

Proponent: Michael Mahoney, Federal Emergency Management Agency, representing National Tsunami Hazard Mitigation Program

Revise as follows:

APPENDIX M
TSUNAMI-GENERATED FLOOD HAZARD
The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance

~~**SECTION M101**~~
~~**TSUNAMI-GENERATED FLOOD HAZARD**~~

SECTION M101
GENERAL

M101.1 ~~General~~ Scope. The purpose of this appendix is to provide tsunami regulatory criteria for those communities that have a tsunami hazard and have elected to develop and adopt a map of their tsunami hazard ~~inundation~~ zone. This appendix applies to structures located within an identified Tsunami Hazard Zone, as defined by the Authority Having Jurisdiction.

M101.2 Performance objectives. All structures that are considered either essential to the community and its disaster response or structures that represent a substantial hazard to human life in the event of failure, as defined by Risk Category III and IV as specified under Section 1604.5 of the *International Building Code*, must be protected from tsunamis by either being located outside of the Tsunami Hazard Zone or be designed and constructed to withstand without collapse the specified loads and effects associated with the Maximum Considered Tsunami. For structures in other Risk Categories, life safety protection is to be provided by a community Tsunami Warning and Evacuation Procedure.

M101.3 Tsunami Design Hazard Level. The regulatory criteria contained in this appendix is based on the Maximum Considered Tsunami and its associated flow elevation and velocity, which shall be determined by the Authority Having Jurisdiction. The Maximum Considered Tsunami shall be permitted to be derived either deterministically or probabilistically by the Authority Having Jurisdiction. The Maximum Considered Tsunami shall be represented using a Tsunami Hazard Zone Map adopted by the Authority Having Jurisdiction.

~~M101.2~~ M101.4 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein.

MAXIMUM CONSIDERED TSUNAMI. A tsunami that is determined and adopted by the Authority Having Jurisdiction for design purposes and represented using a Tsunami Hazard Zone Map. The Maximum Considered Tsunami shall be taken as having a collapse prevention design equivalent of a 2% probability of being exceeded in a 50-year period or a 2500 year average return period.

TSUNAMI HAZARD ZONE MAP. A map adopted by the ~~community~~ authority having jurisdiction that designates the extent of inundation ~~by a design event~~ the maximum considered tsunami. This map shall ~~be based on the~~ take into consideration any available tsunami inundation map which is developed and provided to a community by either the applicable State agency or the National Oceanic and Atmospheric

~~and Oceanic~~ Administration (NOAA) under the National Tsunami Hazard Mitigation program, but shall be permitted to utilize a different probability or hazard level.

TSUNAMI HAZARD ZONE. The area vulnerable to being flooded or inundated ~~by a design event~~ the maximum considered tsunami as identified on a community's Tsunami Hazard Zone Map.

TSUNAMI VERTICAL EVACUATION REFUGE. A Tsunami Vertical Evacuation Refuge is a structure designated to serve as a point of refuge to which a community's population can evacuate above a tsunami when high ground is not available. It is designed and constructed so as to comply with the applicable provisions of the latest edition of *Guidelines for Design of Structures for Vertical Evacuation from Tsunamis*, published by the Federal Emergency Management Agency (FEMA P-646).

TSUNAMI WARNING AND EVACUATION PROCEDURE. A Tsunami Warning and Evacuation Procedure is a plan and procedure developed and adopted by a community that would receive a tsunami warning from the National Oceanic and Atmospheric Administration (NOAA) at all hours and transmit that warning to its citizens and establishes and designates evacuation routes for its citizens to either high ground or to a designated Tsunami Vertical Evacuation Refuge. Tsunami evacuation procedures may use evacuation maps that are significantly greater in extent than the tsunami hazard zone and are not developed for design purposes. Tsunami evacuation maps are based on the tsunami inundation map which is developed and provided to a community by either the applicable State agency or NOAA under the National Tsunami Hazard Mitigation Program.

SECTION M102
TSUNAMI REGULATORY CRITERIA

~~M101.3~~ M102.1 Establishment of Tsunami Hazard Zone. Where applicable, if a community has adopted a Tsunami Hazard Zone Map, that map shall be used to establish a community's Tsunami Hazard Zone.

~~M101.4~~ M102.2 Construction within the Tsunami Hazard Zone. Construction of structures designated Risk Category III and IV as specified under Section 1604.5 shall be prohibited within a Tsunami Hazard Zone.

Exception~~s~~:

~~1. A vertical evacuation tsunami refuge shall be permitted to be located in a Tsunami Hazard Zone provided it is constructed in accordance with FEMA P646.~~

~~2.~~ Community Risk Category III and IV structures and other critical facilities shall be permitted to be located within the Tsunami Hazard Zone when such a location is necessary to fulfill their function, providing ~~suitable structural and emergency evacuation~~ the following measures have been incorporated.

1. The structure and its foundation shall be designed to resist without collapse all tsunami loads associated with the Maximum Considered Tsunami, including hydrostatic, hydrodynamic, waterborne debris accumulation and impact loads, and scour.
2. A Tsunami Warning and Evacuation Procedure has been incorporated for the facilities.

M102.3 Tsunami Vertical Evacuation Refuge. A structure designated as a Tsunami Vertical Evacuation Refuge shall be permitted to be located in a Tsunami Hazard Zone provided it meets the following criteria:

1. The structure shall be designated as a Tsunami Vertical Evacuation Refuge Structure and shall be capable of being operational within the community's tsunami warning time.
2. The structure shall be designed and constructed so as to comply with the applicable provisions of the latest edition of *Guidelines for Design of Structures for Vertical Evacuation from Tsunamis*, published by the Federal Emergency Management Agency (FEMA P-646).
3. All operational components of the refuge structure necessary for life safety shall be located above the elevation of the Maximum Considered Tsunami. .

The structure and its foundation shall be designed and constructed to resist seismic loads as defined in Chapter 16 of the *International Building Code* for Risk Category IV structures.

M102.4 Tsunami Warning and Evacuation Procedure. The jurisdiction shall have a Tsunami Warning and Evacuation Procedure adopted and enforced by a community that shall be capable of receiving a tsunami warning from the National Oceanic and Atmospheric Administration (NOAA) at all hours and transmit that warning to its citizens and shall establish and designate evacuation routes for its citizens to either high ground or to a designated Tsunami Vertical Evacuation Refuge.

SECTION ~~M102~~ M103
REFERENCED STANDARDS

FEMA P646—08 Guidelines for Design of Structures for Vertical Evacuation from Tsunamis

Reason: On March 11, 2011, a magnitude 9.0 earthquake struck off the coast of Japan. Although Japan is the most advanced country in the world when it comes to tsunami protection measures, 20,000 people perished from the resulting tsunami. While the damage was utterly devastating with over 250,000 structures collapsed, there were many examples of engineered buildings of multi-story construction that survived the earthquake and subsequent tsunami as well as many partially inundated vertical evacuation refuge buildings that successfully saved many lives.

This same type of subduction fault lies off the coastline of Washington, Oregon and northern California, and Alaska and is capable of unleashing a similar magnitude earthquake and resulting tsunami. Furthermore, tsunamis can and have struck the entire Pacific coast, Hawaii, the Caribbean, portions of the Atlantic coast and even within the Gulf of Mexico. While the probability of a damaging tsunami may be low, the consequences would be enormous.

Prior to the 2011 Japan tsunami, the American Society of Civil Engineers/Structural Engineering Institute Standard ASCE/SEI 7 *Minimum Design Loads for Buildings and Other Structures* had formed a new committee to develop a new chapter on tsunami design. While the committee's work is ongoing, we should update Appendix M with some of their work to date relating to the tsunami load criteria and associated design provisions for essential facilities, such as defining a Maximum Considered Tsunami.

The first Appendix M, adopted and published in the 2012 IBC, focused on keeping critical and high risk structures out of the tsunami inundation zone. This revision keeps that same philosophy but expands the description of what is a properly constructed Tsunami Vertical Evacuation Refuge that can withstand without collapse the hydrostatic, hydrodynamic, debris accumulation and impact loads, and scour associated with the Maximum Considered Tsunami.

The National Tsunami Hazard Mitigation Program is proposing this change to keep Appendix M as current as possible with the latest appropriate information to come out of the ongoing ASCE/SEI 7 Tsunami Loads and Effects Committee's development work. This change proposal has been reviewed by the committee.

Cost Impact: Since the primary difference between this proposed change and the current Appendix M is that it would allow for construction within the Tsunami Inundation Zone providing it meets certain criteria, cost impact is not applicable.

M101 (NEW)-S-MAHONEY.doc

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal to update the tsunami-generated flood hazard appendix is not quite ready as written. Requirements in definitions repeat what is in the code text. Risk Category III structures may pose a problem.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Michael Mahoney, Federal Emergency Management Agency, representing National Tsunami Hazard Mitigation Program, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

APPENDIX M: TSUNAMI GENERATED FLOOD HAZARD

SECTION M101
GENERAL

M101.1 Scope. The purpose of this appendix is to provide tsunami regulatory criteria for those communities that have a recognized tsunami hazard and have developed and adopted a map of their Tsunami Hazard Zone. This appendix applies to structures located within an identified Tsunami Hazard Zone, as defined by the Authority Having Jurisdiction.

M101.2 Performance Objectives. All structures that are considered either essential to the community and its disaster response or structures that represent a substantial hazard to human life in the event of failure, as defined by Risk Category III and IV as specified under Section 1604.5 of the *International Building Code*, must be protected from tsunamis by either being located outside of the Tsunami Hazard Zone or be designed and constructed to withstand without collapse the specified loads and effects associated with the Maximum Considered Tsunami. For structures in other Risk Categories, life safety protection is to be provided by a community Tsunami Warning and Evacuation Procedure.

M101.3 Tsunami Design Hazard Level. The regulatory criteria contained in this appendix is based on the Maximum Considered Tsunami and its associated flow elevation and velocity~~, which shall be determined by the Authority Having Jurisdiction. The Maximum Considered Tsunami shall be permitted to be derived either deterministically or probabilistically by the Authority Having Jurisdiction. The Maximum Considered Tsunami shall be represented using a Tsunami Hazard Zone Map adopted by the Authority Having Jurisdiction~~.

M101.4 Definitions. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of the *International Building Code* for general definitions.

MAXIMUM CONSIDERED TSUNAMI. A tsunami that is determined and adopted by the Authority Having Jurisdiction for design purposes and represented using a Tsunami Hazard Zone Map. The Maximum Considered Tsunami ~~shall be developed~~ is defined as a collapse prevention design equivalent of a 2500 year probability of recurrence.

TSUNAMI HAZARD ZONE MAP. A map adopted by the Authority Having Jurisdiction that designates the extent and depth of inundation by the Maximum Considered Tsunami. ~~This map should be based on shall take into consideration any available tsunami inundation map that is developed and provided to a community by either the applicable State agency or the National Oceanic and Atmospheric and Oceanic Administration (NOAA) under the National Tsunami Hazard Mitigation Program.~~

TSUNAMI HAZARD ZONE. The area vulnerable to being flooded or inundated by the Maximum Considered Tsunami as identified on a community's Tsunami Hazard Zone Map.

TSUNAMI VERTICAL EVACUATION REFUGE. A ~~Tsunami Vertical Evacuation Refuge is a~~ structure designated to serve as a point of refuge to which a community's population can evacuate above a tsunami ~~if high ground is not available. It is designed and constructed so as to comply with the applicable provisions of the latest edition of *Guidelines for Design of Structures for Vertical Evacuation from Tsunamis*, published by the Federal Emergency Management Agency (FEMA P-646).~~

TSUNAMI WARNING AND EVACUATION PROCEDURE. A ~~Tsunami Warning and Evacuation Procedure is a plan and~~ procedure developed and adopted by a community that would receive ~~a tsunami warning from the National Oceanic and Atmospheric Administration (NOAA) at all hours~~ and transmit ~~that~~ a tsunami warning to its citizens and establishes and designates evacuation routes for its citizens to either high ground or to a designated Tsunami Vertical Evacuation Refuge(s) or both. ~~Tsunami evacuation procedures typically utilize evacuation maps that are significantly greater in extent than the tsunami hazard zone and are not developed for design purposes. Tsunami evacuation maps are based on the tsunami inundation map which is developed and provided to a community by either the applicable State agency or NOAA under the National Tsunami Hazard Mitigation Program.~~

SECTION M102
TSUNAMI REGULATORY CRITERIA

M102.1 Adoption of Tsunami Hazard Zone Map. Where applicable, a community shall adopt a Tsunami Hazard Zone Map. The Tsunami Hazard Zone Map shall be based on the Maximum Considered Tsunami. The Maximum Considered Tsunami shall provide the collapse prevention design equivalent of a 2500 year probability of recurrence. The Tsunami Hazard Zone Map shall be permitted to take into consideration available tsunami inundation mapping developed by either the applicable State agency or the National Oceanic and Atmospheric Administration (NOAA) under the National Tsunami Hazard Mitigation Program.

M102.~~1~~2 Establishment of Tsunami Hazard Zone. Where ~~applicable, if~~ a community has adopted a Tsunami Hazard Zone Map, that map shall be used to establish a community's Tsunami Hazard Zone(s).

M102.~~2~~3 Construction within the Tsunami Hazard Zone. Construction of structures designated Risk Category III and IV as specified under Section 1604.5 shall be prohibited within a Tsunami Hazard Zone.

Exception: ~~Community~~ Risk Category III and IV structures ~~and other critical facilities~~ shall be permitted to be located within the Tsunami Hazard Zone ~~when such a location is necessary to fulfill their function~~, providing the following measures have been incorporated:

1. The structure and its foundation shall be designed to resist without collapse all tsunami loads associated with the Maximum Considered Tsunami, including hydrostatic, hydrodynamic, waterborne debris accumulation and impact loads, and scour, and,
2. A Tsunami Warning and Evacuation Procedure has been incorporated for the facilities such that the building occupants shall be able to reach high ground or a Tsunami Vertical Evacuation Refuge within the allowable warning time.

M102.~~3~~4 Tsunami Vertical Evacuation Refuge. A structure designated as a Tsunami Vertical Evacuation Refuge shall be permitted to be located in a Tsunami Hazard Zone provided it meets the following criteria:

1. The structure shall be designated as a Tsunami Vertical Evacuation Refuge Structure and shall be capable of being operational within the community's tsunami warning time.
2. The structure shall be designed and constructed so as to comply with the applicable provisions of ~~the latest edition of~~ *Guidelines for Design of Structures for Vertical Evacuation from Tsunamis*, published by the Federal Emergency Management Agency (FEMA P-646).
3. All ~~operational~~ components of the refuge structure necessary for ~~life safety~~ its operation shall be either be located above the elevation of the Maximum Considered Tsunami or shall be designed so as to remain functional after tsunami inundation.
4. The structure and its foundation shall be designed and constructed to resist seismic loads as defined in Chapter 16 of the *International Building Code* for Risk Category IV structures.

M102.~~4~~5 Tsunami Warning and Evacuation Procedure. The jurisdiction shall have a Tsunami Warning and Evacuation Procedure adopted and enforced ~~by a community~~ that shall be capable of receiving a tsunami warning from the National Oceanic and Atmospheric Administration (NOAA) at all hours and transmit that warning to its citizens. The Procedure ~~and~~ shall establish and designate evacuation routes for its citizens to either high ground or to ~~a~~ designated Tsunami Vertical Evacuation Refuge(s) utilizing tsunami inundation maps developed and provided to a community by either the applicable State agency or NOAA under the National Tsunami Hazard Mitigation Program.

SECTION 103
REFERENCED STANDARDS

FEMA

P646-~~08~~12 Guidelines for Design of Vertical Evacuation Structures For Vertical Evacuation from Tsunamis

Commenter's Reason: The Appendix M text submitted under S336 has been revised as shown to address comments raised by the Structural Code Change committee, including duplicate requirements in the definitions and how Risk Category III buildings are addressed

On March 11, 2011, a magnitude 9.0 earthquake struck off the coast of Japan. Although Japan is the most advanced country in the world when it comes to tsunami protection measures, 20,000 people perished from the resulting tsunami. While the damage was utterly devastating with over 250,000 structures collapsed, there were many examples of engineered buildings of multi-story construction that survived the earthquake and subsequent tsunami as well as many partially inundated vertical evacuation refuge buildings that successfully saved many lives.

This same type of subduction fault lies off the coastline of Washington, Oregon and northern California, and Alaska and is capable of unleashing a similar magnitude earthquake and resulting tsunami. Furthermore, tsunamis can and have struck the entire Pacific coast, Hawaii, the Caribbean, portions of the Atlantic coast and even within the Gulf of Mexico. While the probability of a damaging tsunami may be low, the consequences would be enormous.

Prior to the 2011 Japan tsunami, the American Society of Civil Engineers/Structural Engineering Institute Standard ASCE/SEI 7 *Minimum Design Loads for Buildings and Other Structures* had formed a new committee to develop a new chapter on tsunami design. While the committee's work is ongoing, we should update Appendix M with some of their work to date relating to the tsunami load criteria and associated design provisions for essential facilities, such as defining a Maximum Considered Tsunami.

The first Appendix M, adopted and published in the 2012 IBC, focused on keeping critical and high risk structures out of the tsunami inundation zone. This revision keeps that same philosophy but expands the description of what is a properly constructed

Tsunami Vertical Evacuation Refuge that can withstand without collapse the hydrostatic, hydrodynamic, debris accumulation and impact loads, and scour associated with the Maximum Considered Tsunami.

The National Tsunami Hazard Mitigation Program is proposing this change to keep Appendix M as current as possible with the latest appropriate information to come out of the ongoing ASCE/SEI 7 Tsunami Loads and Effects Committee's development work. This change proposal has been reviewed by the committee.

S336-12

Final Action: AS AM AMPC____ D

S337-12
M101

<u>Proposed Change as Submitted</u>

Proponent: James Bela, Oregon Earthquake Awareness, representing self

Delete without substitution:

~~**SECTION M101 TSUNAMI-GENERATED FLOOD HAZARD**~~

~~**M101.1 General.** The purpose of this appendix is to provide tsunami regulatory criteria for those communities that have a tsunami hazard and have elected to develop and adopt a map of their tsunami hazard inundation zone.~~

~~**M101.2 Definitions.** The following words and terms shall, for the purposes of this appendix, have the meanings shown herein.~~

~~**TSUNAMI HAZARD ZONE MAP.** A map adopted by the community that designates the extent of inundation by a design event tsunami. This map shall be based on the tsunami inundation map which is developed and provided to a community by either the applicable State agency or the National Atmospheric and Oceanic Administration (NOAA) under the National Tsunami Hazard Mitigation program, but shall be permitted to utilize a different probability or hazard level.~~

~~**TSUNAMI HAZARD ZONE.** The area vulnerable to being flooded or inundated by a design event tsunami as identified on a community's Tsunami Hazard Zone Map.~~

~~**M101.3 Establishment of Tsunami Hazard Zone.** Where applicable, if a community has adopted a Tsunami Hazard Zone Map, that map shall be used to establish a community's Tsunami Hazard Zone.~~

~~**M101.4 Construction within the Tsunami Hazard Zone.** Construction of structures designated Risk Category III and IV as specified under Section 1604.5 shall be prohibited within a Tsunami Hazard Zone.~~

~~**Exceptions:**~~

1. ~~A vertical evacuation tsunami refuge shall be permitted to be located in a Tsunami Hazard Zone provided it is constructed in accordance with FEMA P646.~~
2. ~~Community critical facilities shall be permitted to be located within the Tsunami Hazard Zone when such a location is necessary to fulfill their function, providing suitable structural and emergency evacuation measures have been incorporated.~~

~~**SECTION M102 REFERENCED STANDARDS**~~

~~FEMA P646—08 Guidelines for Design of M101.4 Structures for Vertical Evacuation from Tsunamis~~

Reason: Given the recent M 9.1 Great 11 March 2011 Tohoku Earthquake and Tsunami disaster in Japan, I would view this code section to be extremely dangerous to public safety; and I believe that it should be removed. Vertical evacuation structures were overtopped in the Tohoku earthquake, and people were killed as a result. Even concrete structures (previously assumed to be "invincible" were overturned and destroyed.

This "weak" and very problematical FEMA effort has copied the same "failed approach" for U.S. Building design practice – it presupposes a "design tsunami event" – and somehow probabilistically determined. No one is accountable for its failures and tragic loss-of-life that could result if such a standard were "followed." They are too uncertain for "local tsunami" generated waves and coastal innundation.

There needs to be a more "stringent" for accepting something into the building code as a "standard". The fact that it is located in the appendix speaks for itself.

For further background information:

Union Frontiers of Geophysics Lecture: Tohoku to Tsunami: Personal Account From Science to Experience by Hiroo Kanamori
http://sites.agu.org/fallmeeting/scientific-program/lectures/

Insights from the great 2011 Japan earthquake:
The diverse set of waves generated in Earth's interior, oceans, and atmosphere during the devastating Tohoku-oki earthquake reveal some extraordinary geophysics -- Thorne Lay and Hiroo Kanamori
http://www.physicstoday.org/resource/1/phtoad/v64/i12/p33_s1?bypassSSO=1

S23C Gutenberg Lecture*
Great Earthquake Ruptures in the Age of Seismo-Geodesy
Presented by Thorne Lay, University of California, Santa Cruz, USA
http://sites.agu.org/fallmeeting/scientific-program/lectures/bowie-and-named-lectures/6dec/

U33C The Great 11 March 2011 Tohoku Earthquake I
Moscone South, Room 104, 1340h
http://sites.agu.org/fallmeeting/scientific-program/sessions-on-demand-7-december/

U34A The Great 11 March 2011 Tohoku Earthquake II
Moscone South, Room 104, 1600h
http://sites.agu.org/fallmeeting/scientific-program/sessions-on-demand-7-december/

U41D The Great 11 March 2011 Tohoku Earthquake III
Moscone South, Room 104, 0800h
http://sites.agu.org/fallmeeting/scientific-program/sessions-on-demand-8-december/

U42A The Great 11 March 2011 Tohoku Earthquake IV
Moscone South, Room 104, 1020h
http://sites.agu.org/fallmeeting/scientific-program/sessions-on-demand-8-december/

U23C Predicting Extreme Events in Natural and Socioeconomic Systems:
State-of-the-Art and Emerging Possibilities II
Moscone South, Room 103, 1340h
http://sites.agu.org/fallmeeting/scientific-program/sessions-on-demand-6-december/

Cost Impact: The code change proposal will not increase the cost of construction.

M101-S-BELA.doc

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee prefers to retain the appendix chapter on tsunami-generated flood hazard rather than delete it. The appendix may need improvement, but it also needs to stay in the code.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

James Bela, Oregon Earthquake Awareness, representing self, requests Approval as Submitted.

Commenter's Reason: The Committee Action for Disapproval: (a) incorrectly substitutes the committee's so-called "preference" for retaining Appendix M101 in the code for any actual, specific and defensible "reasons in support of that action; and (b) also ignores the very specific dangers to public safety embodied in this very deficient and impractical FEMA product. One of the saddest commentaries on FEMA funded projects is that, the more "public money" that is expended, the less knowledge is produced by FEMA, and the more unsafe the general public becomes.

The public does not and should not support the adoption into the IBC Structural Building Code of so-called "standards" that so prominently eschew responsibility and liability for the use of those very same products. "FEMA P646—08 Guidelines for Design of M101.4 Structures for Vertical Evacuation from Tsunamis," which was developed before the 2011 M 9 northern Japan giant megathrust earthquake and tsunami, and which further invalidated many (if not all) of its assumptions; is not truly a standard – it certainly is not maintained in any formal, qualified and practical way.

When you adopt a code, you are setting the level of risk to which the public is exposed. Furthermore, no one member of the Structural Code Committee is anywhere near to being qualified as an expert in tsunamis; as witnessed by the lack of any clear or reasonable objections to this Code Change Proposal, As Submitted. This was the same situation as in Japan (lack of tsunami expertise), which emboldened the committee evaluating the earthquake safety of the Tohoku nuclear power plants to "dismiss" the very real and documented threat from tsunamis along the entire Japan trench, and along the Sendai plane where the nuclear plants were located, in particular.

A few important points are:

1. The definition of the so-called Tsunami Hazard Zone is too ambiguous, or "free floating," if you will. It permits pretty much any criterion for its definition, including probabilistically defined tsunami hazard zones, which are not only unsafe, but a clear threat to public safety and survivability. Probabilistic hazard estimates, which are permitted, are not only mathematically flawed, as previously described in Public Comments S107-12 ASCE 7 and S110-12 Figs. 1613.3.1 MCEsubR Maps; but recent deadly tsunamis from the M 9 2004 Indonesian and M 9 2011 Japan subduction zone megathrust earthquakes have, unfortunately, provided clear examples of the "danger to public safety" where the hazard is defined by what seems "probable," as compared to what is "possible."
2. "TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES," although the only thing available; does not really work for tsunami inundation hazards – where debris generation, fire potential and high occupancy loads are all prime concerns. Risk Category II structures are not necessarily de-facto either wise or safe choices for designated Tsunami Hazard Zones.
3. Vertical evacuation structures are always dangerously subject to "overtopping," as, in fact, did occur in the March 11, 2011 M 9.0 Tohoku megathrust earthquake and tsunami. It is always best and safest to evacuate." There may be higher than planned for coastal inundation due to: (a) coastal configuration and offshore bathymetry; (b) tsunami wave resonance within a bay; (c) submarine landslides and their accompanying slide-generated waves; (d) multiple tsunami generating sources; (e) reflection and refraction of tsunami waves, along with "edge wave" effects; and (f) compounding effects of coastal subsidence combined with estuarine flooding.

In summary, since you cannot come close to assuring safety for any occupants seeking refuge in any such vertical evacuation structures; I believe it is unwise to codify their acceptance in this Appendix. In the final analysis, when you adopt a code you are really saying: "This is OK." Addressing the tsunami hazard requires much more thought . . . than that embodied in this abbreviated and cryptic Appendix M

And this is not OK! See the two attached photos.

So, to protect public safety against the threat of a tsunami . . . it takes a heart, it takes a brain, and it takes courage!

"PAY NO ATTENTION TO THAT MAN BEHIND THE CURTAIN!"

http://www.youtube.com/watch?v=XMsO4Mmtp5E&feature=related

S337-12

Final Action: AS AM AMPC____ D