

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. 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. 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 meet 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 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.

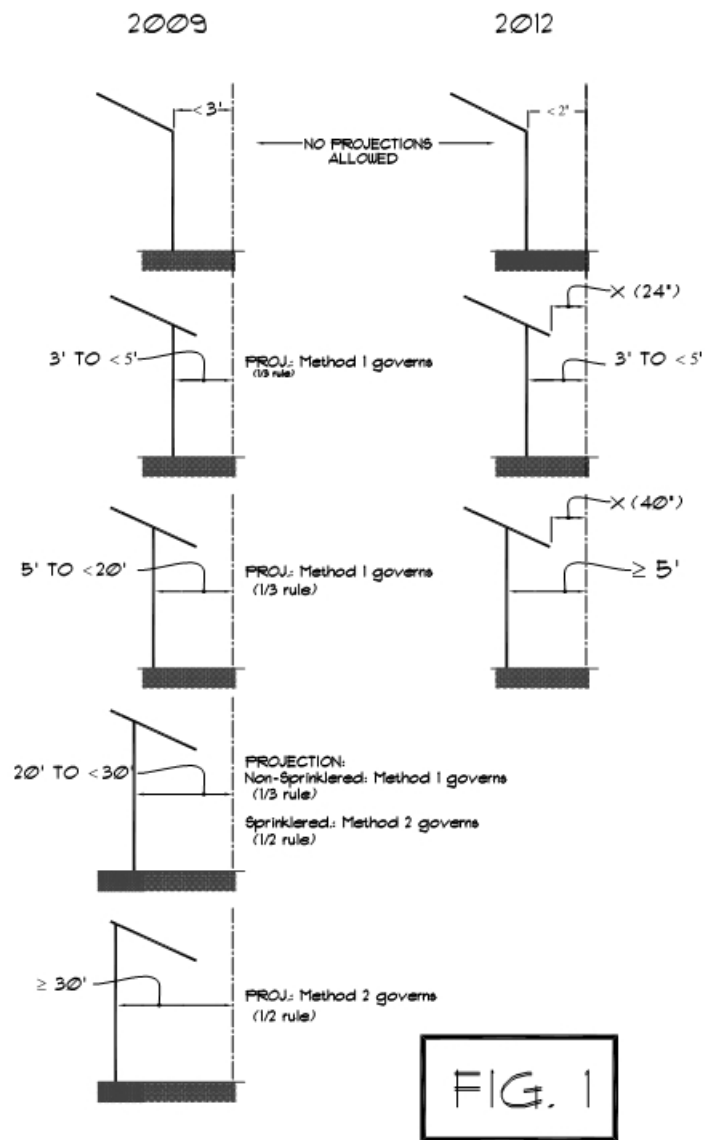
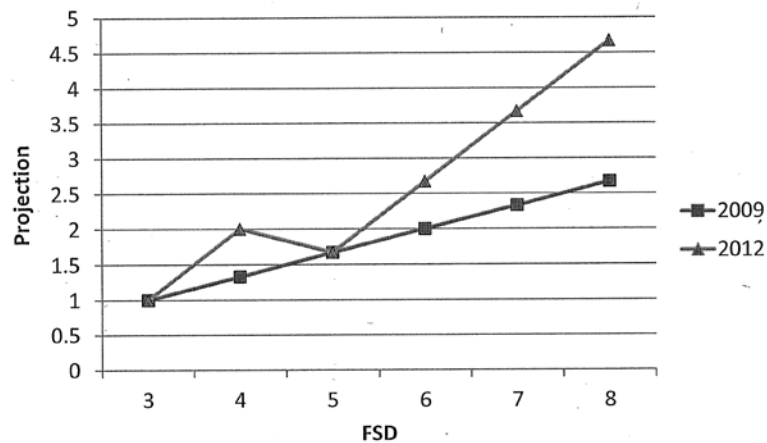


Fig. 2

FSD	2009		2012	
< 2'	NP		NP	
2' - < 3'	NP		Proj.	From Edge of Proj. to PL (x)
			0.9'	2'
3'	Proj.	X	1'	2'
	1'	2'		
4'	1.33	2.67	2'	2'
5'	1.67	3.33 (40")	1.67	3.33 (40")
6'	2	4	2.67	3.33 (40")
7'	2.33	4.67	3.67	3.33 (40")
8'	2.67	5.33	4.67	3.33 (40")
...
20'	Sprk.		16.67	3.33 (40")
	Non-Sprk.			
	Proj	X		
	10	10	6.67	13.3

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
<u>More than 2</u> feet to less than 5 3 feet	24 inches
5 feet or greater than 3 feet <u>to less than 30 feet</u>	24" plus 8" for every foot thereafter of FSD beyond 3' or fraction thereof.
<u>30 feet or greater</u>	<u>20 feet</u>

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	
<u>2 feet to less than 20</u>	<u>2/3 of the fire separation distance</u>	<u>2/3 of the fire separation distance</u>
<u>20 feet to less than 30 ft</u>	<u>1/2 of the fire separation distance</u>	<u>2/3 of the fire separation distance</u>
<u>30 feet or greater</u>	<u>10 ft</u>	<u>15 ft</u>

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
$X \leq 3$ ft	All	NP	NP	NP	NP	1 ft
$3 < X \leq 5$	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.

<u>FIRE SEPARATION DISTANCE X (feet)</u>	<u>MINIMUM DISTANCE TO PROJECTION FROM LINE USED TO DETERMINE (FSD)</u>	
	<u>Sprinkler Protected (S)</u>	<u>Non-sprinkler Protected (NS)</u>
$X \leq 2 \text{ ft}$	NP	NP
$X \leq 3 \text{ ft}$	1 ft	NP
$2 < X < 5$	1.67 ft	1.67 ft
$5 \leq X < 10$	6.67 ft	6.67 ft
$10 \leq X < 15$	10 ft	10 ft
$15 \leq X < 20$	13.3 ft	13.3 ft
$20 \leq X < 30$	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 janitor's 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
<u>10 feet or greater</u>	<u>76 inches</u>

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

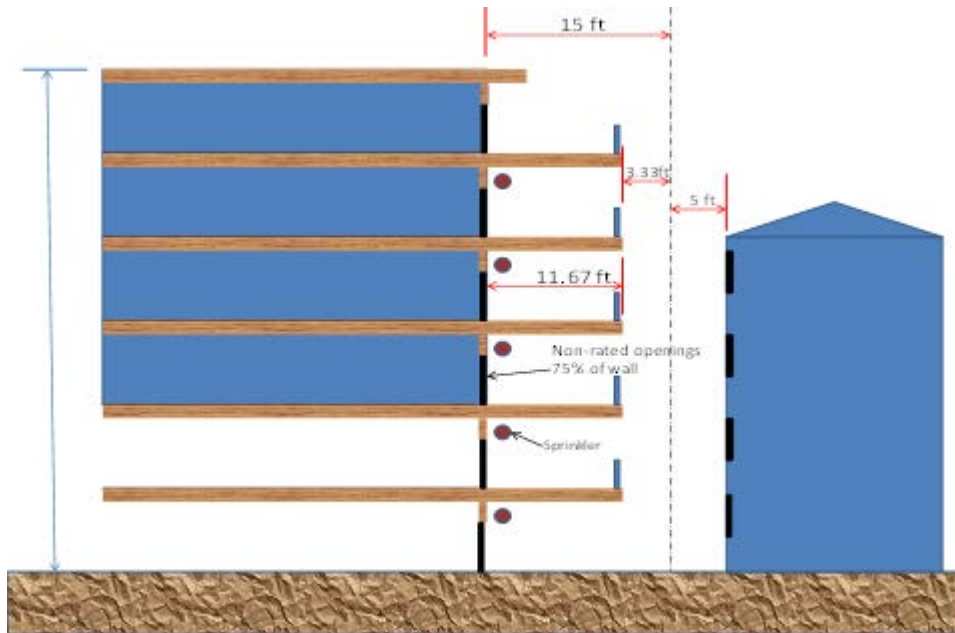


Figure A – Large cantilevered balconies permitted by

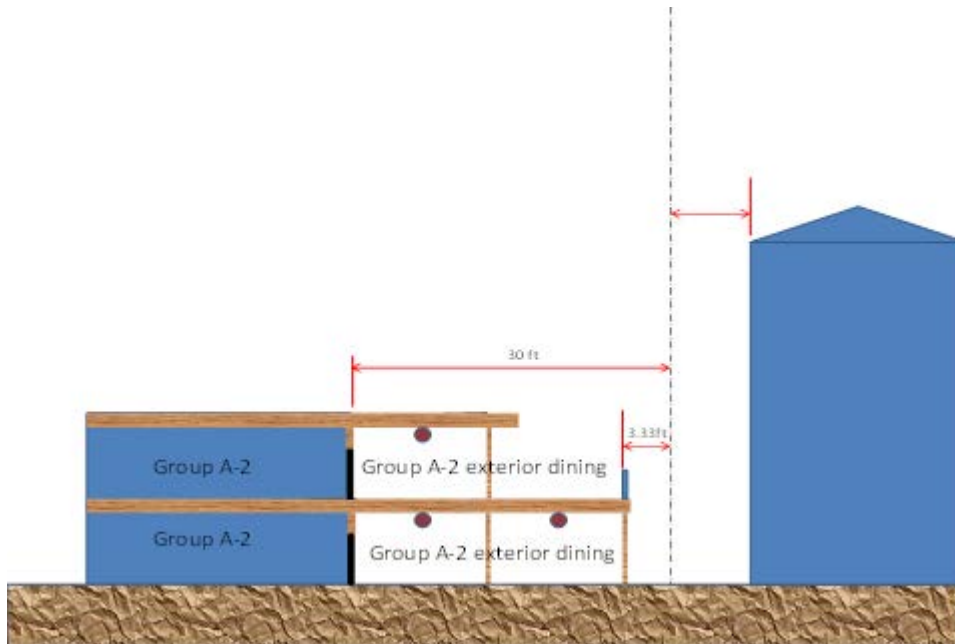


Figure B – Large deck projections permitted by 2012 IBC

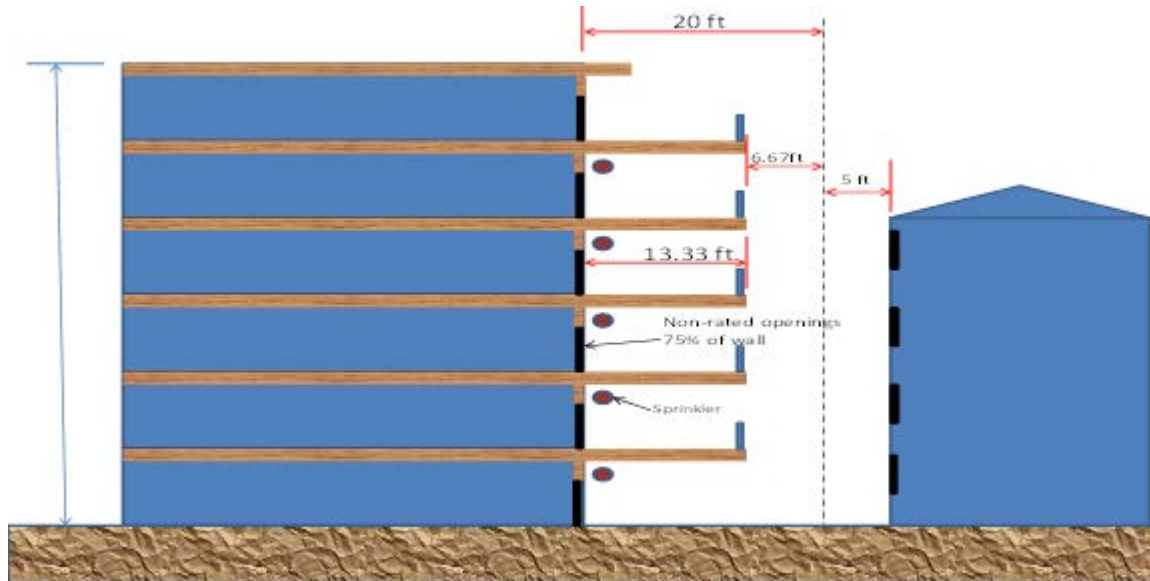


Figure C – Result of proposed public comment

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) ⁱ	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 or 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), 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 FS17 which 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 that 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

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:

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. The wall shall be rated for exposure to fire from both sides for 30 inches on each side of the opening, 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. Opening protectives of buildings shall comply with this section.

705.8.6.1 Vertical exposure for buildings on the same lot. 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 705.8.6.1.

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.

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.

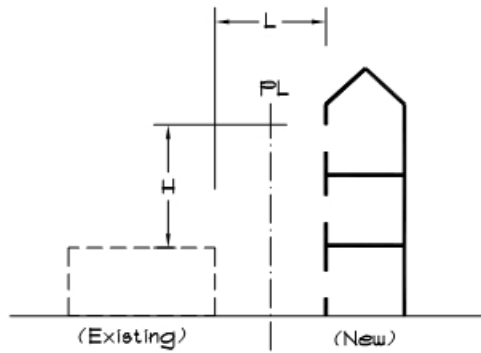


Fig. 1

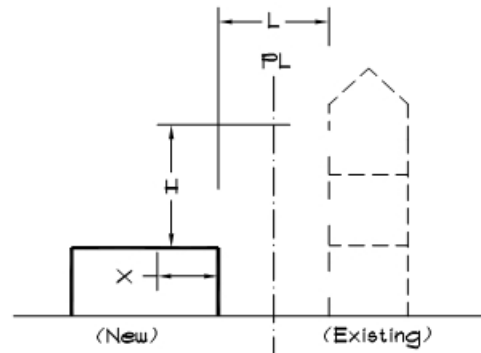


Fig. 2

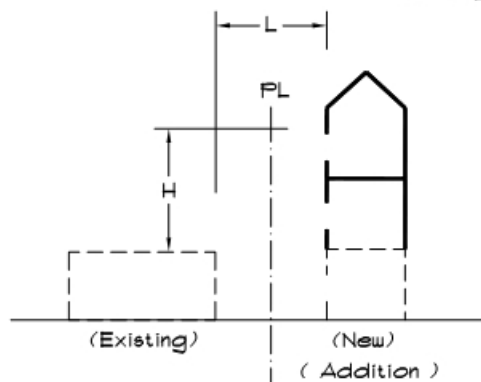


Fig. 3

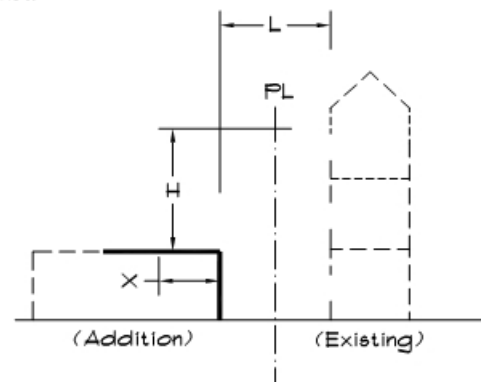


Fig. 4

— New Construction
 --- Existing Const.

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

705.8.6-FS-MAIEL

Public Hearing Results

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.~~

705.8.6.4 Vertical exposure for adjacent buildings on the same lot. ~~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 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 buildings or structures is less than 15 feet (4572 mm).~~

Exceptions:

1. Opening protectives are not required where the roof assembly of either of the adjacent buildings or structures 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 705.8.6.4.

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 3/4-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/ft² 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/ft² 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/ft².

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 remain 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 remain 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 the 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

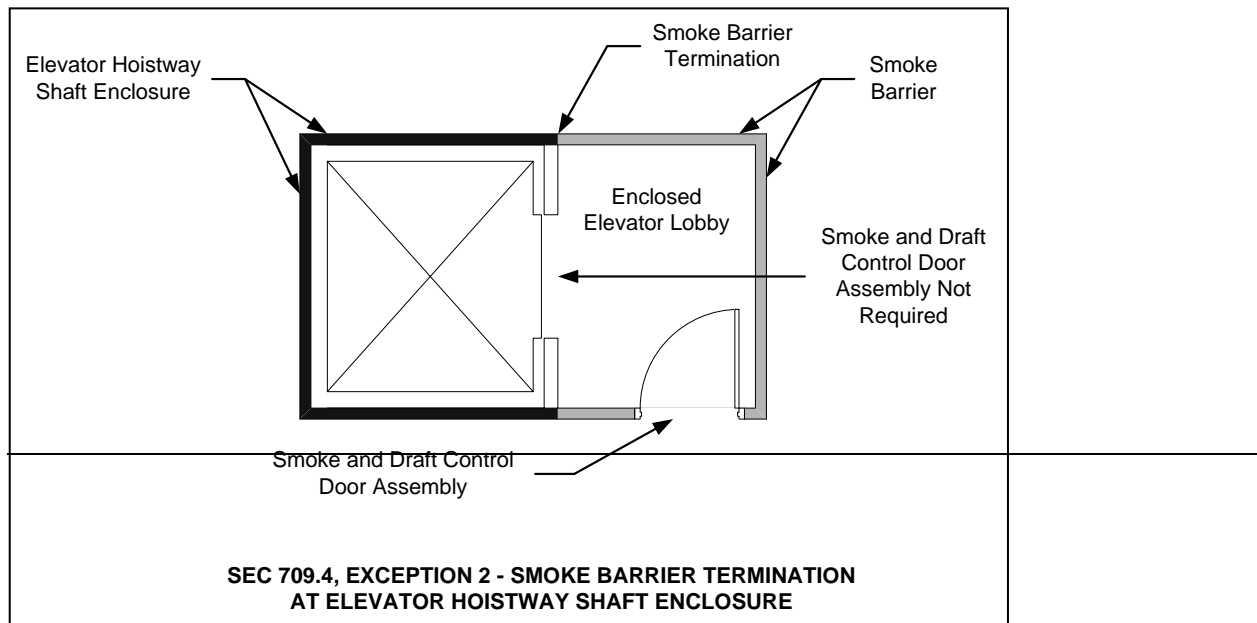
- ☐ Review the need for elevator lobbies, with emphasis on building use, building and hoistway height, active and passive fire protection features associated with the aforementioned.
- ☐ Review the differences and specific needs when dealing with elevator lobbies of traditional-use elevators, fire service 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



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 Fable, 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 upon detection of smoke in accordance with Section 716.5.9.3.
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.~~ 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.

710.5.2 Doors. ~~Doors in smoke partitions shall comply with Sections 710.5.2.1 through 710.5.2.3.~~

710.5.2.4 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 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~~ Doors protecting openings in the smoke partitions shall be self- or automatic-closing upon detection of smoke in accordance with Section 716.5.9.3 and also comply with Sections ~~710.5.2.2~~ 716.5.3.1, 710.5.2.3, and 716.5.9 and ~~duct~~ 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 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. <u>The following wall assemblies shall comply with this section:</u> 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 <i>fire-resistance rating</i> .	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.
710.5.2.4 Louvers in Doors. 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	
<p>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.</p>	Not Required	Not Required	Not Required	<p>✓ 713.14.1 Elevator lobby. Exceptions: 5. Smoke partitions shall be permitted in lieu of <i>fire partitions</i> to separate the elevator lobby at each floor where the building is equipped throughout with an <i>automatic sprinkler system</i> 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, dDoors protecting openings in these walls smoke partitions shall <u>be self- or automatic-closing upon detection of smoke in accordance with Section 716.5.9.3 and also comply with Sections 710.5.2.2, 716.5.3.1, 710.5.2.3, and 716.5.9 and</u> dDuct penetrations of the smoke partitions shall be protected as required for <i>corridors</i> in accordance with Section 717.5.4.1.</p>	<p>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.</p>

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 <i>self-closing</i> 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 <i>approved</i> material to limit the free passage of smoke.	✓	✓	✓	✓	
710.7 Joints. Joints shall be filled with an <i>approved</i> 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 <i>approved</i> material to limit the free passage of smoke. Air transfer openings in smoke partitions shall be provided with a <i>smoke damper</i> complying with Section 717.3.2.2. Exception: Where the installation of a <i>smoke damper</i> will interfere with the operation of a required smoke control system in accordance with Section 909, <i>approved</i> 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, smoke partitions are not required to have a fire-resistance 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.	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 m ³ /(s • 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.				<p>equipped throughout with an <i>automatic sprinkler system</i> 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 these walls 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 Sections 710.5.2.2, 716.5.3.1, 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> Duct penetrations of the smoke partitions shall be protected as required for corridors in accordance with Section 717.5.4.1.</p> <p>Revise IBC Section 716.5.9.3(11) as follows:</p> <p>11. Doors installed in smoke partitions in accordance with Sections 710.5.2.3, 404.6 Exception and 713.14.1 Exception #5.</p>	<p>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.</p> <p>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.</p>

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 <i>fire barrier</i> 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 <i>self-closing</i> or automatic closing upon detection of smoke in accordance with Section 716.5.9.3.	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 <i>approved</i> material to limit the free passage of smoke.	✓	✓	✓	✓	
710.7 Joints. Joints shall be filled with an <i>approved</i> 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 <i>approved</i> material to limit the free passage of smoke. Air transfer openings in smoke partitions shall be provided with a <i>smoke damper</i> complying with Section 717.3.2.2. Exception: Where the installation of a <i>smoke damper</i> will interfere with the operation of a required smoke control system in accordance with Section 909, <i>approved</i> 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. Smoke and draft control doors complying only with UL 1784 shall be permitted to show the letter "S" on the manufacturer's labeling. 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. 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.

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 manufacturer'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 than 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 actual 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 cornstarch 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 building.

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 to believe that the ceiling tiles will not provide adequate 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.

Monolithic ceilings are cost prohibitive to install, significantly increase risk of harm to patients, and increase maintenance costs over the life of the building as plant operations and maintenance programs are working above ceilings every day making adjustments and repairs to the mechanical ventilation, plumbing, electrical, and data systems. The disruption to patient care with monolithic ceiling is much greater than a lay in acoustical ceiling simply because areas are harder to access, take more time to complete repairs above ceiling, 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 in accordance 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 capability 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 evacuate 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 be 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 ~~744.4.2~~.

711.2 Horizontal assemblies. Horizontal assemblies shall comply with Sections 711.2.1 through 711.2.6.

711.2.1 ~~744.2~~ Materials. ~~The floor and roof~~ Assemblies shall be of materials permitted by the building type of construction.

711.2.2 ~~744.4~~ Continuity. Assemblies shall be continuous without vertical openings, ~~penetrations or joints except as permitted by this section and Sections 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 *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.

711.2.3 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 ~~744.3~~ 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 1/2 hour fire-resistance-rated construction separations in a buildings of Type IIB, IIIB and VB construction, shall have fire-resistance ratings of not less than 1/2 hour in when the buildings 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.

711.2.5 711.3.4 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 712.1.1 through 712.1.168.

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 ~~714.6~~ 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 ~~714.4.1~~ 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 ~~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 ~~712.1.10.2~~ 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 ~~712.1.10.3~~ 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 ~~712.1.11~~ Mezzanine. Vertical openings between a mezzanine complying with Section 505 and the floor below shall be permitted.

712.1.11 ~~712.1.11~~ Joints. ~~Joints shall be permitted where complying with Section 715.~~

712.1.12 ~~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 ~~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 ~~712.1.13.1~~ 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.

712.1.13.2 744.3.2 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.~~

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.

712.1.16 742.4.18 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 ~~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.
- ~~21~~ 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.
- ~~32~~ Elevators not required to be located in a shaft in accordance with Section 712.1 are not required to have enclosed elevator lobbies.
- ~~43~~ 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.
- ~~54~~ 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:
 - ~~5.14.4.~~ Group I-2 occupancies;
 - ~~5.24.2.~~ Group I-3 occupancies; and
 - ~~5.34.3.~~ Elevators serving floor levels over 75 feet (22 860 mm) above the lowest level of fire department vehicle access in high-rise buildings.
- ~~65~~ 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.

76. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21.

87. 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.

(Portions 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.

714.5 714.4.2 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 714.5.1 or 714.5.2 ~~714.4.2.1 or 714.4.2.2.~~

714.5.1 714.4.2.1 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.

714.5.2 714.4.2.2 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.

Sec. 711.1: 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.

Sec. 711.2: 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.

711.2.2 & 711.2.3: 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.

711.3.2 (2012 IBC): 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.

711.3: A new subsection is created that includes basic provisions for non-rated assemblies.

Sec. 711.4 (2012 IBC): 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.

Secs 711.5-711.8: All these sections pertain to protection of vertical openings and are relocated to Section 712.

Sec. 711.9: 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.

Sec. 712.1: 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.

Sec. 712.1.5: 2012 Section 711.4.1 is relocated to 712 because it pertains to protection of vertical openings.

Sec. 712.1.10: 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.

Sec. 712.1.11: The current section moved to Section 712.1.5.

Sec. 712.1.13: 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.

Sec. 712.1.15: 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 as 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 ~~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.~~

712.1.12 Unenclosed stairs and ramps. Vertical openings created by unenclosed stairs or ramps in accordance with Sections 4009.2 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~~
 - 4.12 Group I-3 occupancies; and
 - 4.23 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 be 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 hospitals the fire suppression systems are extremely 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 hospitals due to weather and fire events that dispel 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 capability 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 evacuate 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 be 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 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 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.~~

54. 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.
65. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 909.21.
76. 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.**

- *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**

- *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**

- *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.**

- *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**

- *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.**

- *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.**

- *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**

- *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.

- *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, 30078.7.2 or 30089.7.2 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 ($0.01524 \text{ m}^3/\text{s} \cdot \text{m}^2$) 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.

1007.6.23 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.

1007.6.35 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, 30078 or 30089.

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 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 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 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 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) 3007~~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 3007~~8~~.7.1 through 3007~~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) 3007~~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) 3007~~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 m²) in an area with a minimum dimension of 8 feet (2440 mm).

(E110-12) 3008~~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) 3008~~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 be 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 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. 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 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 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.

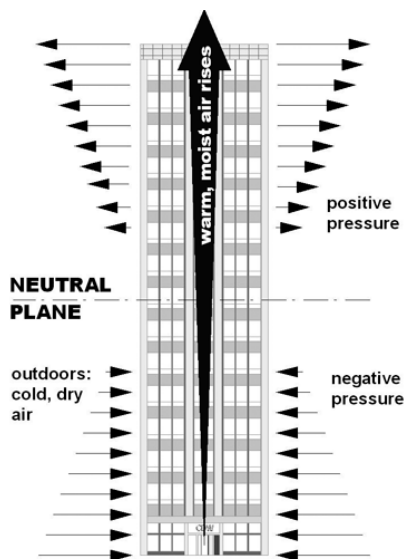
One of the early lessons learned from fire disasters is the need to protect shafts that can act as “chimneys,” carrying heat, smoke, and gasses to remote areas of a building. Smoke and fire spread up hoistways and stairways accessed through non-rated doors had been implicated as early as in 1911 in the 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.

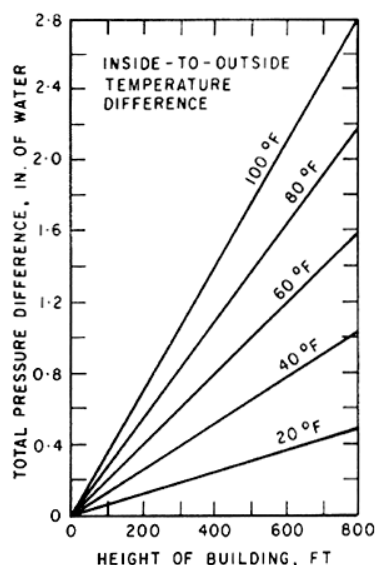


Figure 2 – Pressures Produced by Stack Effect Across Landing Doors

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 Klotz 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. [Klotz 2004; Klotz 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 [Klotz and Tamura 1986, Klotz 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."

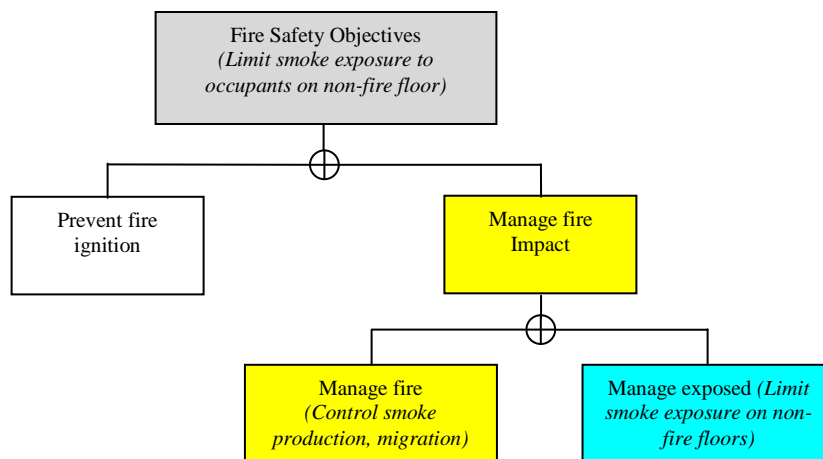


Figure 3: Top-gates of the Tree annotated with the intent of IBC §713.14.1

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.

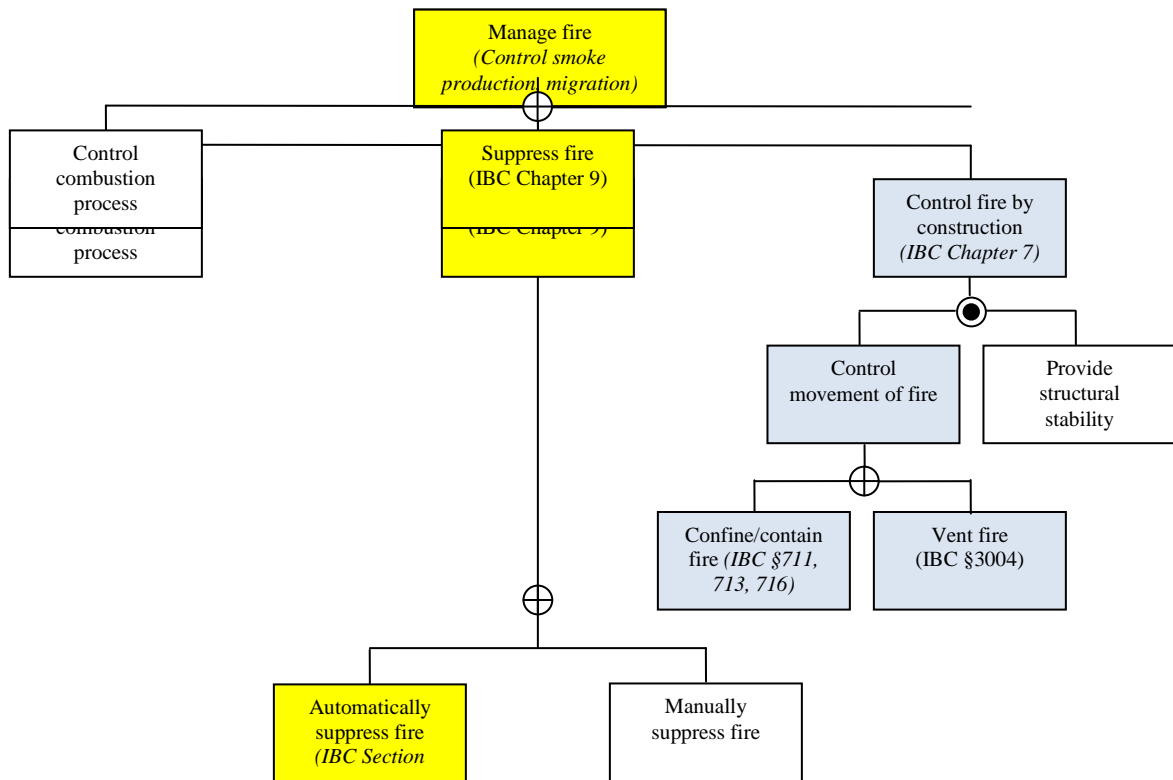


Figure 4: IBC 2012 required features and systems that contribute to limiting smoke production and migration to non-fire floors.

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.

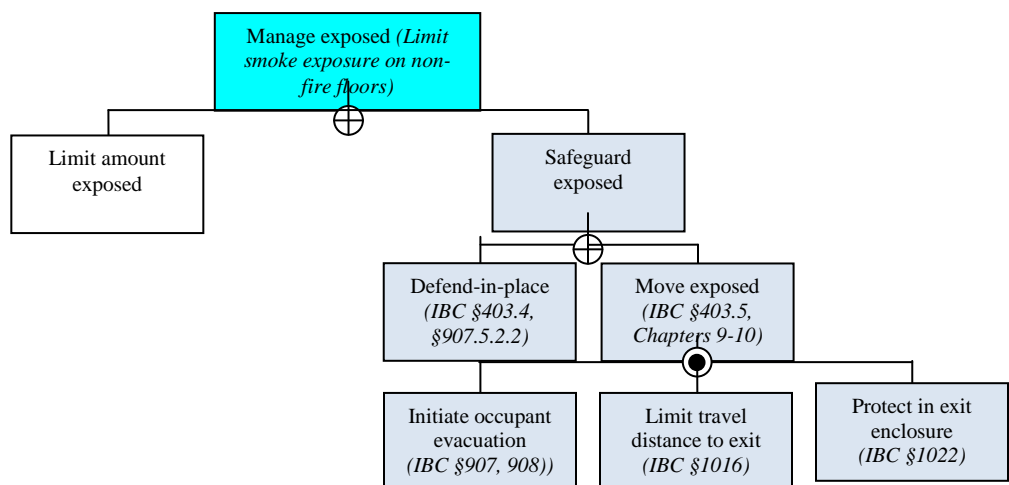


Figure 5: IBC 2012 required features and systems that limit smoke exposure to occupants on non-fire floors.

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.**

- *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**

- *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**

- *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.**

- *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**

- *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.**

- *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.

- *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**

- *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.

○ *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 in a high-rise building. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire smoke partitions. In addition to the requirements in Section 708 ~~for fire partitions~~ 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. ~~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. 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.

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 are 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 Group I-3 occupancies; and
 - 4.4 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

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:

(No changes to Exceptions 1 through 7)

- 8. Enclosed elevator lobbies and protection of elevator hoistway door openings are not required where the elevator hoistway opens to the exterior.**

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, 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 on the level 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 door opens directly to the exterior or to areas within 5 ft from the exterior of the building.

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 fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0103 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. Membrane penetrations of maximum 2-hour fire resistance-rated walls and partitions by steel Electrical boxes that exceed 16 square inches (0.0103 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:

- 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 (0.0103 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 that exceed 16 square inches (0.0103 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 (0.0103 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 that is sheathed with Type X gypsum wallboard, 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 and the ceiling membrane is tight to the top plates. ~~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 ~~715.6.4.4~~ 715.4.4.

SECTION 715 ~~FIRE-RESISTANT 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.

~~715.4~~ **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 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 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.

~~715.4.4~~ **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 "flames, excessive heat, and hot gases" 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

Public Hearing Results

Committee Action:

Disapproved

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 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

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:

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 ~~745.6~~ 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.

711.6 715.5 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) Systems1903.3
~~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 Assemblies715.3~~
 F 547—06 Terminology of Nails for Use with Wood and Wood-based MaterialsTable 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 or floor/ceiling 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 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.

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.

716.3.4 716.3.3 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 716.3.1 716.5.8.3.4 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" markings on a fire rated glazing assembly label means that the glazing assembly meets 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 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	400 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	400 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. ^{cd}	≤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	13 ^b 13 ^b	Maximum size tested Maximum size tested	D-20 D-20	3/4 ^b 13	D-H-OH-45 D-H-OH-20		
Other fire partitions	1 0.5	3/4 13	Maximum size tested Maximum size tested	D-H-45 D-H-20	3/4 13	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	1½	400 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	1½	400 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	¾	Maximum Size tested	D-H-45	¾		D-H-45	
Smoke barriers					Fire protection			
	1½	1½ ^b	Maximum Size tested Size Tested size tt	D-20	¾		D-H-OH-45	

For SI: 1 square inch = 645.2 mm

- Two doors, each with a fire protection rating of 1½ 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.
- For testing requirements, see Section 716.6.3.
- Fire-resistance-rated glazing tested to ASTM E 119 in accordance with Section 716.2 shall be permitted, in the maximum size tested.
- 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.
- 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 m²) with no dimension exceeding 10 inches (0.3 m²).~~

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 m²).~~

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 its 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 ($0.01524 \text{ m}^3/\text{s} \cdot \text{m}^2$) 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

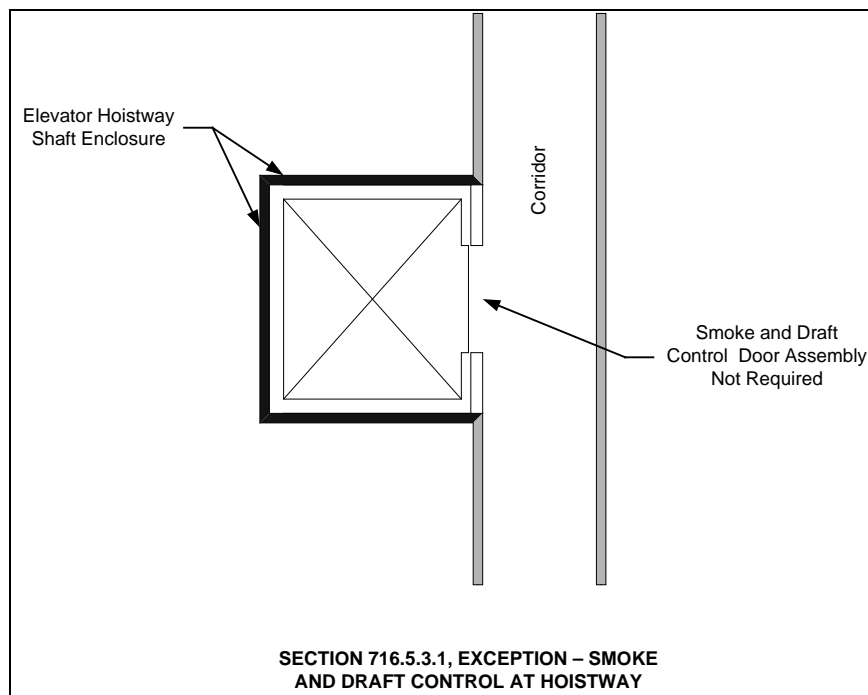
- Review the need for elevator lobbies, with emphasis on building use, building and hoistway height, active and passive fire protection features associated with the aforementioned.
- Review the differences and specific needs when dealing with elevator lobbies of traditional-use elevators, fire service 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



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 $\frac{1}{2}$ 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 $\frac{1}{2}$ 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 ($0.015424 \text{ m}^3/(\text{s} \cdot \text{m}^2)$) 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)

Proposed Change as Submitted

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, subject to the limitations in Section 716.5.3.2.1.

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.

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.

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.

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.

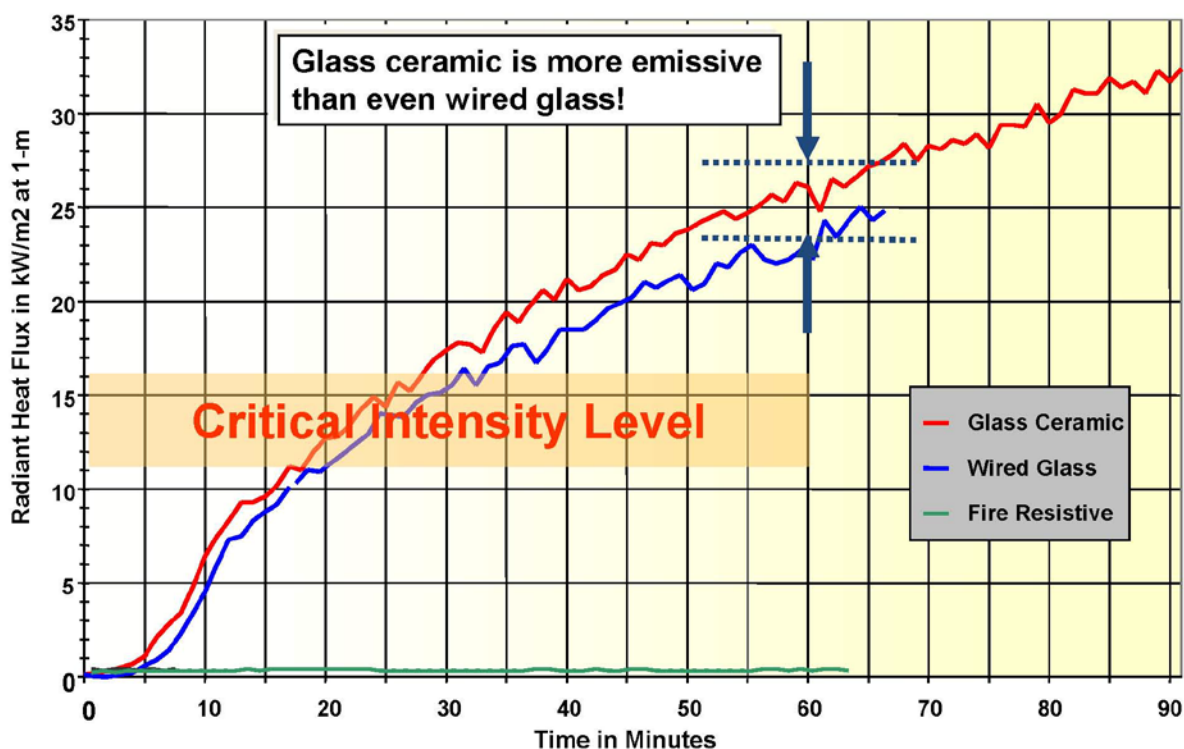
The third paragraph of NFPA 80 Appendix I states:

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/m², at 20 minutes of fire exposure, these materials transmit in excess of 10 kW/m², and at 10 minutes of fire exposure, transmit 5 kW/m². <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/m² due to unbearable pain. (See SFPE Handbook of Fire Protection Engineering, 2nd edition, page 2-114).

Radiant Heat Flux: Comparison



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.

Bibliography

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. 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.~~

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 doors*. ~~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.~~ 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.

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*. Listed fire-resistance rated glazing in a fire door using listed fire-resistance-rated glazing shall have a maximum transmitted temperature rise in accordance with Section 716.5.5 when the fire door is tested in accordance with 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 doors 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. Fire-resistance-rated glazing shall comply with the size limitations in Section 716.5.8.1.1. Fire-protection-rated glazing shall comply with the size limitations of NFPA 80, except as provided in Sections ~~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 m²) with no dimension exceeding 10 inches (0.3 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 m²).

716.5.8.2 Elevator, stairway and ramp protectives. Approved fire-protection-rated glazing used in *fire door* assemblies in elevator, stairways and ramps 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 ~~716.5.8.3.4~~ Table 716.3 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 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

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 (stthomas@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:

Fire Curtain. A flexible membrane assembly constructed of materials designed to restrict the spread of fire when tested in accordance with UL 10D.

Add new text as follows:

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.

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**

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 40D 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)

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 (stthomas@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. 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.

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 detector 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. HVAC ducts 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.

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* evaluated 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 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* evaluated 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 cites 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 may 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 than 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 ducts systems having a fire resistance rating of not less than 2 hours in accordance with the requirements of ASTM E2816.-41, 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 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 than 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 system 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. Klotz 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/ft³ in the compartment of origin for the unsprinklered fire scenario and a concentration of 1.89×10^{-6} lb/ft³ for the sprinklered fire scenario which is reportedly based on the fire test data contained in the Klotz study.

The Klotz 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 Klotz 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)	$3 \text{ m}^{-1} @ 4 \text{ mins}^1$	$0.1 \text{ m}^{-1} @ 3 \text{ mins}$
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 (obscurant 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, 4th 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 smoke barriers required by Section 407.5 ambulatory care facilities and for Group I-2 hospitals ~~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 suppression system is not valid. In our health care facilities the fire suppression systems are extremely 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 substantial amount of good data was provided with this proposal 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 identified 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:

FIBER-CEMENT SIDING

TABLE 722.6.2(3)
MEMBRANE^a ON EXTERIOR FACE OF WOOD STUD WALLS

SHEATHING	PAPER	EXTERIOR FINISH
$\frac{5}{8}$ – inch T & G lumber $\frac{5}{16}$ – inch exterior glue wood structural panel $\frac{1}{2}$ – inch gypsum wallboard $\frac{5}{8}$ – inch gypsum wallboard $\frac{1}{2}$ – inch fiberboard	Sheathing paper	Lumber siding Wood shingles and shakes <u>$\frac{1}{4}$-inch fiber-cement lap, panel or shingle siding</u> $\frac{1}{4}$ -inch wood structural panels- exterior type $\frac{1}{4}$ -inch hardboard Metal siding Stucco on metal lath Masonry veneer Vinyl siding
None		$\frac{3}{8}$ – 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 $\frac{3}{8}$ 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 $\frac{7}{8}$ inch (22.2 mm) thickness of stucco complying with Section 2510.
6. A minimum $\frac{1}{4}$ -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.

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-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.
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 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.

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 (which 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 comply with either 803.2.1 or 803.2.2 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.

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.

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.

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 what is being provided in this public comment. The comment directs that the fire performance required when the background surface is combustible be the same as 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 be 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 Index and Smoke-developed Index. 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* evaluated 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 a circuit integrity cable having a *fire-resistance rating* of not less than 2 hours-, or shall be protected by a listed electrical circuit protective system 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 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, or shall be protected by a listed electrical circuit protective system 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 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

Public Hearing Results

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

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:

Electrical circuit protective system - 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. 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* 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 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: Exhaust 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. 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.
(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.

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.

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/m² 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/m², a Total Heat Release of less than 20 MJ/m² 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/m².
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/m² 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.

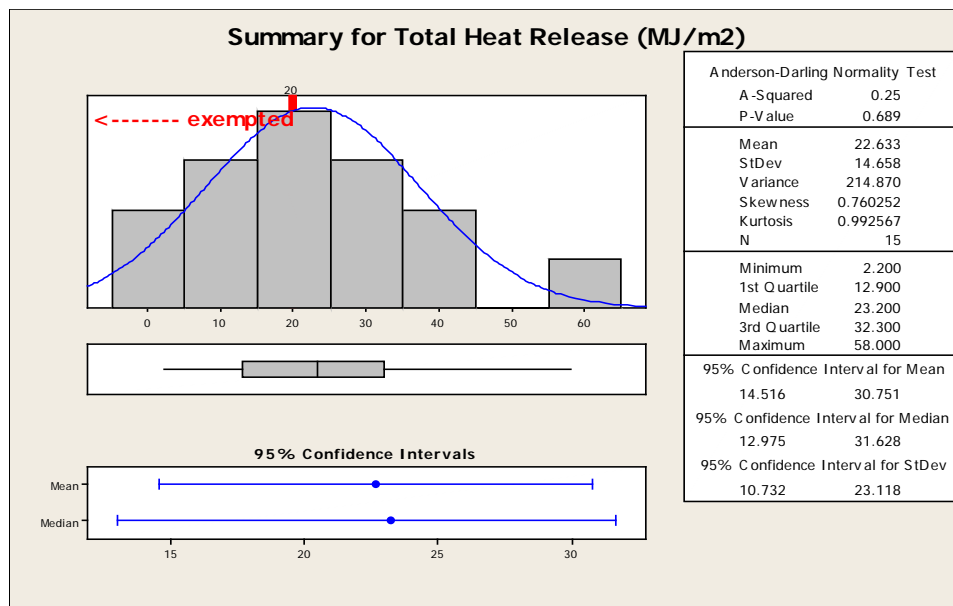
Exception 3 - Clarifies that Section 1403.5 does not apply to windows, and the flashing of windows. The intent of Section 1405.3 is to apply to the installation of water resistive barriers over the opaque section of exterior walls. When water resistive barriers in installed in such a large quantity they 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 AWP~~
~~U1 for the species, product and end use using a preservative listed in Section 4 of AWP~~
~~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-308) 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*.

(Portions 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 2005). 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°F (49 °C) to -22°F (-30 °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 or Section R402.4.1.1 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.~~

(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

Proposed Change as Submitted

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*. 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 Voluntary Specification for Liquid Applied Flashing Used to Create a Water-Resistive Seal around Exterior Wall Openings in Buildings

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

Public Hearing Results

For staff analysis of the content of AAMA 711-07 and AAMA 714-11 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 was concerned that not all parties 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 compliant 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 12 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 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, 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 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. 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. 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, 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.

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 unless the exceptions to Section 1405.14.2 apply. 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 exceed 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 where the basic wind speed does not exceed 90 miles per hour (40 m/s) (V_{asd}) or the Exposure Category is C or D, or all any conditions 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}). 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 were 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 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 3 1/2 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 1/2" 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 1/2" 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 3 1/2 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. Penetrations of the thermal barrier shall be protected to maintain the integrity of the thermal barrier. 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 Multi-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 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 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 2603.5.78.

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 2603.5.78.

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 Sections 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.

~~**2603.5.63.3**~~ **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.

~~**2603.5.63.5**~~ **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.

~~**2603.5.73.6**~~ **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 1/4 -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 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 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 $1,000 \text{ m}^2$;

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 $1,000 \text{ m}^2$, 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 $1,000 \text{ m}^2$, 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 m² 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

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 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.

Add new standard to Chapter 35 as follows:

Structural Building Components Association (SBCA)

6300 Enterprise Lane
Madison, Wisconsin 53719

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 WEIGHT¹**

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 WEIGHT¹

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			24"oc FURRING ⁵		
					Cladding Weight:			Cladding Weight:		
					3 psf	11 psf	25 psf	3 psf	11 psf	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](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 NYSEDA 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 NYSEDA 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.steel framing.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 WEIGHT¹**

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
		1/4" 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 3/4 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](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.foamshathing.org) to address attachments to wood framing and the resulting data is included in the data set

analyzed and presented in the NYSEDA 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 as Wiss, Janney, & Elstner (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 of 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 WEIGHT¹**

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
		6	4	4	1.5	4	3	1
	0.131" diameter nail	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 ⁶	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
		1/4" lag screw ⁶	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 blankets 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 803.4.2.1 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.

2614.4 Fire Testing. Radiant barrier with plastic core shall comply with either of the following fire testing methods:

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.

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.

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

RADIANT BARRIER. A material having a low emittance surface of 0.1 or less installed in building assemblies.

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).

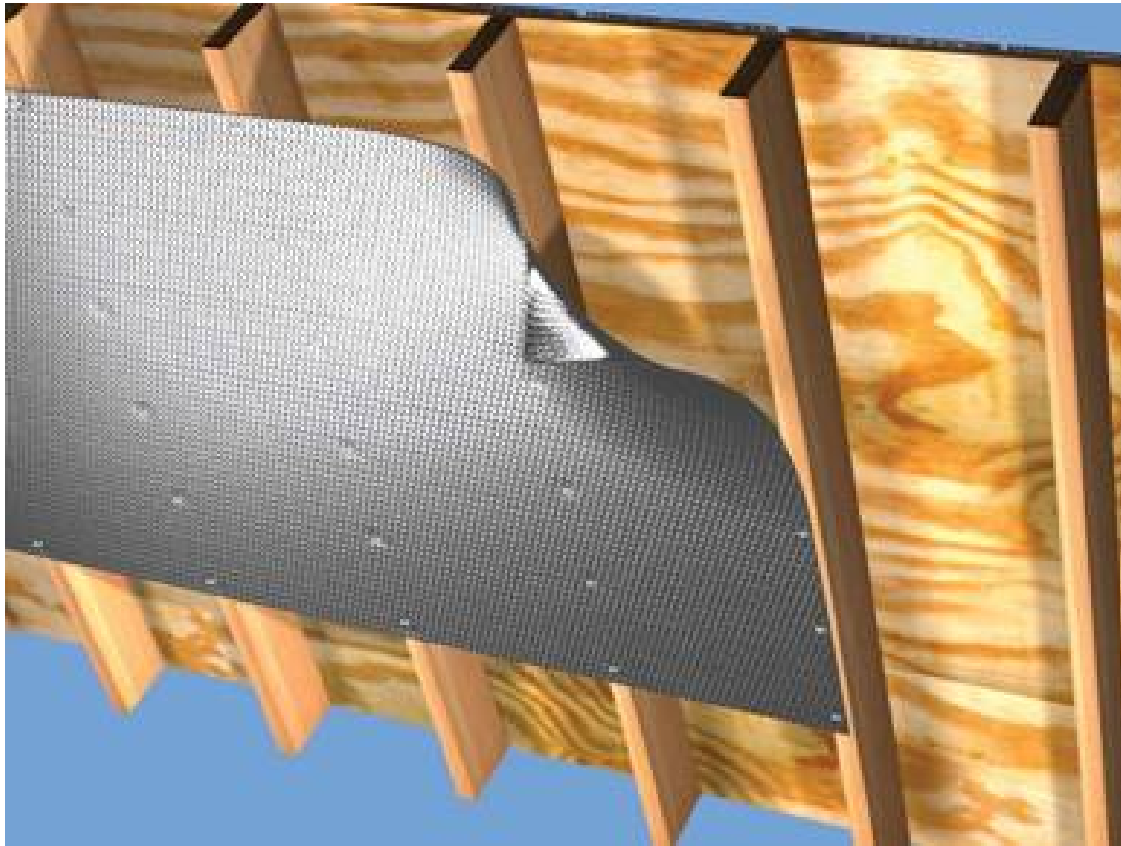
Another key issue is that radiant barriers can be laminated to a substrate. With regard to fire testing it is important to ensure that radiant barriers that are laminated to a substrate must be fire tested as a system, including the substrate. If a system consisting of a radiant barrier and a substrate 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."

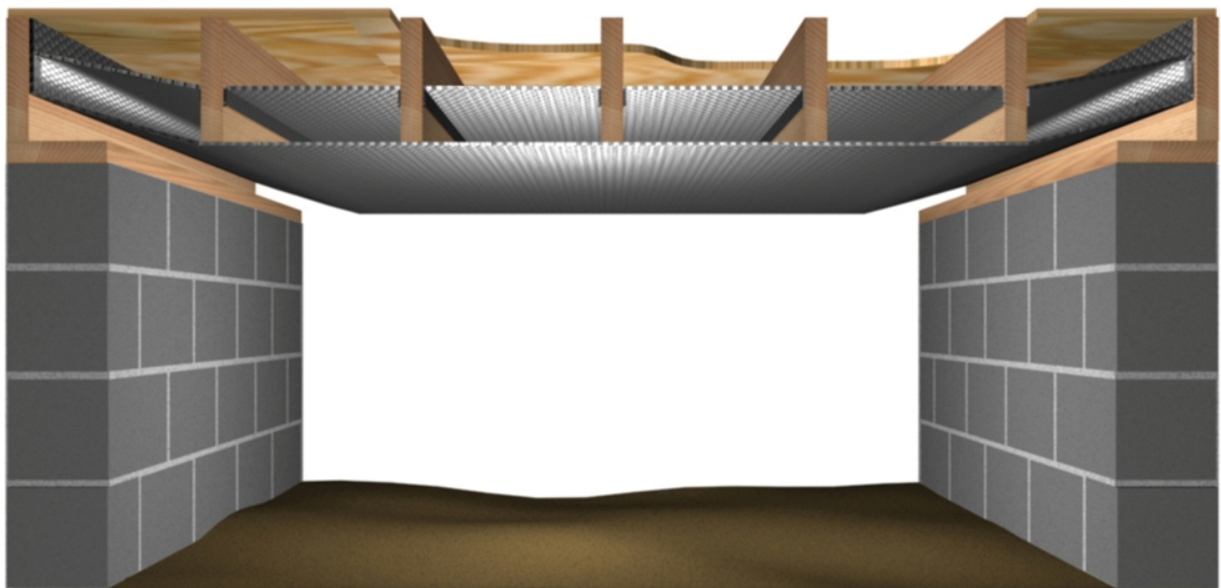
On the other hand, reflective insulation is covered by ASTM C1224 (Standard Specification for Reflective Insulation for Building Applications). The abstract of ASTM C1224 reads as follows: "This specification covers the general requirements and physical properties of reflective insulations for use in 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
