FS2-06/07
701.2 (New)

Proposed Change as Submitted:

Proponent: Bill McHugh, Firestop Contractors International Association

Add new text as follows:

701.2 Modifications. No person shall remove or modify any fire-resistance-rated construction, compartmentation and structural fire resistance systems installed or maintained under the provisions of this code or the *International Fire Code* without approval by the building official

Reason: The purpose of this code change is to give the building official an additional enforcement tool for the provisions of Chapter 7, which are now very important in buildings where it is used.

Fire-resistance-rated construction, compartmentation and structural fire protection systems are critical fire and life safety items in buildings. There is no reference to the building official required involvement in removal of this critical protection in buildings.

Building alterations take place during the life cycle of the building. This brings the building official into the communications when changes are made to compartmentation and structural protection, consistent with other sections of this code.

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

Committee Action: **Disapproved**

Committee Reason: This is an operation and maintenance issue which does not belong in a code which is intended for new construction. The IFC currently contains provisions which adequately address this issue and is the primary document for maintenance. The proposal would create a conflict with Section 3401 which permits the assembly to be maintained in accordance with the code under which it was installed. The provision is therefore not clear how it would affect Chapter 34 or the IEBC provisions. The term "structural fire resistance systems" is unclear.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Bill McHugh, Firestop Contractors International Association, requests Approval as Modified by this public comment.

Modify proposal as follows:

701.2 Modifications. No person shall remove or decrease the fire resistance rating of ~~modif~~y any fire-resistance-rated construction~~, compartmentation~~ and structural fire resistance ~~systems~~ installed or maintained under the provisions of this code or the *International Fire Code* without approval by the building official.

Commenter's Reason: For consistency in the code between the sprinklers, detection and alarms, and fire and smoke resistance rated compartmentation systems, it is important to approve this public comment. Effective fire and smoke resistance rated compartmentation systems should be given the same level of attention in the code as fire sprinklers, detection and alarm systems, as already exists currently in the building code in Chapter 9, Section 901.3.

Properly designed, installed, inspected and maintained fire and smoke resistance rated compartmentation systems limits fire spread to the room of origin using compartmentation systems. Additionally, effective compartmentation, when operating in failure mode has some degree of protection for occupants in the building…albeit compromised. Nonetheless, there is some protection against fire spread restricting the speed of travel of fire, and oxygen loads needed for combustion.

Where required by code, compartmentation needs to be properly designed, installed, inspected and maintained for effectiveness when called upon to protect people in buildings.

Final Action: AS AM AMPC____ D

FS7-06/07
702.1 (IFC 902.1)

Proposed Change as Submitted:

Proponent: Greg Rogers, Kitsap Fire District 7, representing ICC Joint Fire Service Review Committee

Revise definition as follows:

FIRE AREA. The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or fire-resistance-rated horizontal assemblies of a building. Areas of the building not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor above.

Reason: Sprinkler and fire alarm requirements in Chapter 9 of the IBC and IFC are based on the square footage or occupant load of a fire area. It is not clear from the definition of a fire area that building areas without surrounding walls are included in the fire area. This concept is clear in the definition of building area found in IBC 502.1, "Areas of the building not provided with surrounding walls shall be included in the building area if such areas are included within the horizontal projection of the roof or floor above". This was confirmed by IFC Interpretation No. 25-05, dated 09-12-05.

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

Committee Action: **Disapproved**

Committee Reason: Although this issue is not clear in the existing code, placing this requirement within the definition is not the best solution and may be overlooked. The testimony discussed items such as picnic shelters, flea-markets and other items which don't have walls around them that would be affected by this requirement and now need sprinklers or alarms due to exceeding the fire area. Another example given was a canopy which was 44 feet tall and open on all sides. Items which are open and unenclosed do not create the same fire hazard and should not be regulated by the same requirements that apply to enclosed buildings.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This item is on the agenda for individual consideration because an assembly action was successful and public comments were submitted.

Public Comment 1:

Edmund Domian, West Valley City, Utah, requests Approval as Submitted.

Commenter's Reason: The real issue of this code change is not what meets the definition of "building" but what warrants a need for compartmentation. Many big box warehouse-type stores have a large attached open yard of combustible products for sale, which often meet the definition of high piled combustible storage. This "open yard" has a metal or fabric canopy overhead; the public are trapped in this area within a fenced perimeter. The fire load in these "open yards" can be substantial. Occupants must often re-enter the main building from this enclosed "open yard" to egress the building in an emergency. Such areas should be included in the calculations of any defined "FIRE AREA."

Public Comment 2:

George Mann, representing the Code Administrators Association of Kentucky, requests Disapproval.

Commenter's Reason: Code Change FS06/07 should be denied for any one of several reasons.

First and foremost, the proponent supports his position based on an interpretation issued on Sept 12, 2005; International Fire Code Interpretation #25-05 based on Section 903.2.1 of the 2003 International Fire Code. I believe this interpretation is flawed and totally inaccurate based on the printed definition of FIRE AREA.

The question asked in the interpretation was: "**Do the automatic sprinkler requirements in Section 903.2.1, based on the fire area of occupancy apply to buildings without surrounding exterior walls?"**

The answer was **"Yes. The entire area of a single floor of a building or structure must be considered when determining the automatic sprinkler requirements based on fire area… Where no surrounding exterior walls are provided along the perimeter of a building, the building area is used to identify and determine applicable fire areas. Section 502.1 f the International Building Code defines BUILDING AREA as: The area included within surrounding exterior wall (or exterior walls and fire walls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the building are if such areas are included within the horizontal projection of the roof or floor above"**

The definition of FIRE AREA in both the Fire Code and Building Code reads: "The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or fire-resistance-rated horizontal assemblies of a building."

I ask, how does the interpretations committee arrive at the conclusion that the building area is to be used to determine the fire area if the building has no exterior walls. The definition of fire area specifically states that a fire area has to be enclosed and bounded by exterior walls. This is where I believe the interpretation is flawed and in error. The interpretation makes statements of fact that do not exist. No where in the definition of fire area does it speak to using the building area or definition of building area to determine sprinkler requirements. **The definition of building area and fire area are not interchangeable.** If they were meant to be then Chapter 9 would base sprinkler systems on building area bounded by fire barriers or fire walls. No where in Section 903 does it read that a sprinkler system shall be provided when the building area exceeds a specified threshold. Again, we are supposed to determine fire area based on the area of the building enclosed and bounded by exterior walls, fire wall, fire barriers or fire-resistance-rated horizontal assemblies. Therefore, if we are looking at a building without exterior walls (column and roof only) we have no fire area and never have. This proposed change is attempting to merge 2 totally different definitions into one definition.

Second flaw with this proposed code change is in the application of the definition if approved. It reads that "areas not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor above". I read this as meaning that the area under the store front canopy, a roofed over area across the front of a retail establishment and the canopy over a loading / unloading dock would all have to be added to the area calculated within the exterior walls in order to determine sprinkler requirements. Even worse, I would include the area under the eave of the roof for it is a horizontal projection of the roof. Why would any of this be necessary?

Third flaw is implying that it is not clear from the definition of a fire area that building areas without surrounding walls are included in the fire area. The printed definition of fire area specifically reads **"enclosed and bounded by fire walls, fire barriers, exterior walls"**. I apologize but this would seem to be clear in the intent and application. What has confused the issue is the flawed interpretation that was produced last year.

Finally, the proponent proclaims that there is no increase to the cost of construction. Sprinkler system design, installation, maintenance and monitoring is not free. If this proposed change is approved, many community picnic shelters, theme park picnic shelters, open air flea markets which line every highway across the country, lumber storage shelters, open air concert venues with roofed over spectator seating (such as River Bend in Cincinnati) would be subject to sprinkler requirements that in the past would not been a consideration. Under this proposed code change, there is no threshold that would grant an exemption from sprinklers for these types of roofed over structures; such as if the roof over the spectator seating were 40 feet above the floor level or if the flea market vendors & tables were arranged such that the general public could not actually step under the roof only shelter.

There are too many reasons to deny this code change proposal and not one that I can see to approve it.

Editor's note: A copy of IFC Interpretation Number 25-05 was submitted as substantiation by Mr. Mann along with his reason statement. Copies of ICC code opinions are available on the ICC website. IFC interpretation Number 25-05 is available at http://www2.iccsafe.org/cs/interps/pdf/FI_03_25_05.pdf .

Depending upon the final action, if both FS7-06/07 and G9-06/07 are approved, the added text from FS7-06/07 will be moved to Chapter 9.

Final Action: AS AM AMPC____ D

FS9-06/07

702.3, 703.3, 720.1

Proposed Change as Submitted:

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

1. Revise as follows:

703.2 Fire-resistance ratings. The fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E 119 or in accordance with Section 703.3. Where materials, systems or devices that have not been tested as part of a fire-resistance-rated assembly are incorporated into the building element, component or assembly, sufficient data shall be made available to the building official to show that the required fire-resistance rating is not reduced. Materials and methods of construction used to protect joints and penetrations in fire-resistance-rated building elements, components or assemblies shall not reduce the required fire-resistance rating.

> **Exception:** In determining the fire-resistance rating of exterior bearing walls, compliance with the ASTM E 119 criteria for unexposed surface temperature rise and ignition of cotton waste due to passage of flame or gases is required only for a period of time corresponding to the required fire-resistance rating of an exterior nonbearing wall with the same fire separation distance, and in a building of the same group. When the fire-resistance rating determined in accordance with this exception exceeds the fire-resistance rating determined in accordance with ASTM E 119, the fire exposure time period, water pressure, and application duration criteria for the hose stream test of ASTM E 119 shall be based upon the fire-resistance rating determined in accordance with this exception.

2. 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. The required fire resistance of a building element, component or assemblies shall be permitted to be established by any of the following methods or procedures:

~~1. Fire-resistance designs documented in approved sources.~~
~~2.~~ 1. Prescriptive designs of fire-resistance-rated building elements, component or assemblies as prescribed in Section 720.
~~3.~~ 2. Calculations in accordance with Section 721.
3. Fire-resistance designs documented in approved sources.
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.
5. Alternative protection methods as allowed by Section 104.11.

3. Revise as follows:

720.1 General. The provisions of this section contain prescriptive details of fire-resistance-rated building elements, component or assemblies. The materials of construction listed in Tables 720.1(1), 720.1(2), and 720.1(3) shall be assumed to have the fire-resistance ratings prescribed therein. Where materials that change the capacity for heat dissipation are incorporated into a fire-resistance-rated assembly, fire test results or other substantiating data shall be made available to the building official to show that the required fire-resistance-rating time period is not reduced.

Reason: Section 703.2 is the genesis for the determination of fire-resistance ratings. The definition of "FIRE-RESISTANCE RATING" in Section 702 properly identifies that fire-resistance ratings apply to building elements, components and assemblies. Unfortunately, that level of detail is lost in several key charging provisions in the IBC. This proposal corrects that situation for a very important reason. For legal and technical reasons it is imperative that the construction component system be formalized so as to recognize and support the notion that there are fundamental building element fire-resistance rating requirements in Chapter 6 which are potentially modified through component and assembly provisions in Chapter 7. Additionally, this clarification will assist code users in the proper application of these fundamental provisions. Towards the goal of user friendliness, the five alternative methods for determining fire resistance in Section 703.3 have been editorially shuffled to reflect the typical order of progression used in the application of alternate methods. Those prescriptive procedures internal to the IBC are now listed first and followed by methods normally requiring external expertise.

Approval of this proposal will improve the technical accuracy of the International Building Code and in doing so will contribute to the proper interpretation and application of these key provisions.

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

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides consistency between the three terms in both the definition of fire-resistance rating and also within the various code sections. The reorganization of the items in Section 703.3 start with the prescriptive elements and then move on to the calculation and performance options which is appropriate for a prescriptive code.

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, Underwriters Laboratories, Inc., requests Approval as Modified by this public comment.

Modify 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. The required fire resistance of a building element, component or assemblies shall be permitted to be established by any of the following methods or procedures:

1. Fire-resistance designs documented in approved sources.
2. ~~1.~~ Prescriptive designs of fire-resistance-rated building elements, component or assemblies as prescribed in Section 720.
3. ~~2.~~ Calculations in accordance with Section 721.
~~3. Fire-resistance designs documented in approved sources.~~
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.
5. Alternative protection methods as allowed by Section 104.11.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification to the committee action re-establishes the original published order of the five alternative methods for determining fire resistance. This modification does not make any substantive change to the text. The original published order reflects the order of Chapter 7. The first method should be fire-resistant designs documented in approved sources. These designs are typically based on testing to the performance level of ASTM E119 (UL 263). In following the guidance established in 703.2, the fire-resistance rating shall be established by ASTM E119 (UL 263) or the alternative methods in Section 703.3. Those methods reflecting conformance to the ASTM E119 (UL 263) test should be listed first as originally published.

Final Action: AS AM AMPC____ D

FS10-06/07, Part I

410.3.5.2, 703.2, 703.2.1, 703.2.3, 703.3, 704.7, 704.9, 706.2.1, 706.7, 711.3.2, 712.3.1, 712.4.1.1, 713.1, 713.4, 714.7, 715.2, 716.5.2 (IMC 607.5.2), 716.5.3 (IMC 607.5.5), 716.6.1 (IMC 607.6.1), 716.6.2 (IMC 607.6.2.1), Table 720.1(1), 1407.10.2, 2103.2, 2603.4, 2603.5.1, Chapter 35 (IMC Chapter 15); IRC R314.1.2, Chapter 43 (New)

Proposed Change as Submitted:

PARTS II, III AND IV DID NOT RECEIVE A PUBLIC COMMENT AND ARE ON THE CONSENT AGENDA. PARTS II, III AND IV ARE REPRODUCED HERE FOR INFORMATIONAL PURPOSES ONLY.

Proponent: Bob Eugene, Underwriters Laboratories Inc.

PART I – IBC FIRE SAFETY

Revise as follows:

703.2 Fire-resistance ratings. The fire-resistance rating of building elements shall be determined in accordance with the test procedures set forth in ASTM E 119 or UL 263, or in accordance with Section 703.3. Where materials, systems or devices that have not been tested as part of a fire-resistance-rated assembly are incorporated into the assembly, sufficient data shall be made available to the building official to show that the required fire-resistance rating is not reduced. Materials and methods of construction used to protect joints and penetrations in fire-resistance-rated building elements shall not reduce the required fire-resistance rating.

> **Exception:** In determining the fire-resistance rating of exterior bearing walls, compliance with the ASTM E 119 or UL 263 criteria for unexposed surface temperature rise and ignition of cotton waste due to passage of flame or gases is required only for a period of time corresponding to the required fire-resistance rating of an exterior nonbearing wall with the same fire separation distance, and in a building of the same group. When the fire-resistance rating determined in accordance with this exception exceeds the fire-resistance rating determined in accordance with ASTM E 119 or UL 263, the fire exposure time period, water pressure, and application duration criteria for the hose stream test of ASTM E 119 or UL 263 shall be based upon the fire-resistance rating determined in accordance with this exception.

703.2.1 Nonsymmetrical wall construction. Interior walls and partitions of nonsymmetrical construction 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 conducted in compliance with ASTM E 119 or UL 263. 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 (see Section 704.5 for exterior walls).

703.2.3 Restrained classification. Fire-resistance-rated assemblies tested under ASTM E 119 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 E 119 or UL 263. Restrained construction shall be identified on the plans.

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 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 as prescribed in Section 720.
3. Calculations in accordance with Section 721.
4. Engineering analysis based on a comparison of building element 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.

704.7 Unexposed surface temperature. Where protected openings are not limited by Section 704.8, the limitation on the rise of temperature on the unexposed surface of exterior walls as required by ASTM E 119 or UL 263 shall not apply. Where protected openings are limited by Section 704.8, the limitation on the rise of

temperature on the unexposed surface of exterior walls as required by ASTM E 119 or UL 263 shall not apply provided that a correction is made for radiation from the unexposed exterior wall surface in accordance with the following formula:

$A_e = A + (A_f \times F_{eo})$ **(Equation 7-1)**

Where:

A_e = Equivalent area of protected openings.
A = Actual area of protected openings.
A_f = Area of exterior wall surface in the story under consideration exclusive of openings, on which the temperature limitations of ASTME119 or UL 263 for walls are exceeded.
F_{eo} = An "equivalent opening factor" derived from Figure 704.7 based on the average temperature of the unexposed wall surface and the fire-resistance rating of the wall.

704.9 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 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 in height.
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.

706.2.1 Fire-resistance-rated glazing. Fire-resistance-rated glazing, when tested in accordance with ASTM E 119 or UL 263 and complying with the requirements of Section 706, shall be permitted. Fire-resistance-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and the identifier "W-XXX," where the "XXX" is the fire-resistance rating in minutes. Such label or identification shall be issued by an approved agency and shall be permanently affixed to the glazing.

706.7 Openings. Openings in a fire barrier wall shall be protected in accordance with Section 715. Openings shall be limited to a maximum aggregate width of 25 percent of the length of the wall, and the maximum area of any single opening shall not exceed 156 square feet ($15m^2$). Openings in exit enclosures and exit passageways shall also comply with Sections 1020.1.1 and 1021.4, respectively.

Exceptions:

1. Openings shall not be limited to 156 square feet (15 m^2) where adjoining fire areas are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. Fire doors serving an exit enclosure.
3. Openings shall not be limited to 156 square feet (15 m^2) or an aggregate width of 25 percent of the length of the wall where the opening protective assembly has been tested in accordance with ASTME 119 or UL 263 and has a minimum fire-resistance rating not less than the fire-resistance rating of the wall.
4. Fire windows permitted in atrium separation walls shall not be limited to a maximum aggregate width of 25 percent of length of the wall.

711.3.2 Access doors. Access doors shall be permitted in ceilings of fire-resistance-rated floor/ceiling and roof/ceiling assemblies provided such doors are tested in accordance with ASTM E 119 or UL 263 as horizontal assemblies and labeled by an approved agency for such purpose.

712.3.1 Through penetrations. Through penetrations of fire-resistance-rated walls shall comply with Section 712.3.1.1 or 712.3.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space between the penetrating item and the fire-resistance-rated wall is permitted to be protected as follows:

1. In concrete or masonry walls where the penetrating item is a maximum 6-inch (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (0.0929 m^2), concrete, grout or mortar is permitted where it is installed the full thickness of the wall or the thickness required to maintain the fire-resistance rating; or
2. The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E 119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

712.4.1.1 Through penetrations. Through penetrations of fire-resistance-rated horizontal assemblies shall comply with Section 712.4.1.1.1 or 712.4.1.1.2.

Exceptions:

1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents or concrete or masonry items through a single fire-resistance- rated floor assembly where the annular space is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E 119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly, provided the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.3 m^2) of floor area.
2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter, provided the concrete, grout or mortar is installed the full thickness of the floor or the thickness required to maintain the fire-resistance rating. The penetrating items shall not be limited to the penetration of a single concrete floor, provided the area of the opening through each floor does not exceed 144 square inches (92 900 mm^2).
3. Penetrations by listed electrical boxes of any material, provided such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.

713.1 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 resist the passage of fire for a time period not less than the required fire-resistance rating of the wall, floor or roof in or between which it is installed. Fire-resistant joint systems shall be tested in accordance with Section 713.3. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be protected in accordance with Section 713.4.

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 707.
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 within open parking structures.
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 E 119 or UL 263.

713.4 Exterior curtain wall/floor intersection. 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 material or system to prevent the interior spread of fire. Such material or systems shall be securely installed and capable of preventing the passage of flame and hot gases sufficient to

ignite cotton waste where subjected either to ASTM E 119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (0.254 mm) of water column (2.5 Pa) or installed as tested in accordance with ASTM E 2307 for the 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 704.9.

714.7 Seismic isolation systems. Fire-resistance ratings for the isolation system shall meet the fire-resistance rating required for the columns, walls or other structural elements in which the isolation system is installed in accordance with Table 601. Isolation systems required to have a fire-resistance rating shall be protected with approved materials or construction assemblies designed to provide the same degree of fire resistance as the structural element in which it is installed when tested in accordance with ASTM E 119 or UL 263 (see Section 703.2).

Such isolation system protection applied to isolator units shall be capable of retarding the transfer of heat to the isolator unit in such a manner that the required gravity load-carrying capacity of the isolator unit will not be impaired after exposure to the standard time-temperature curve fire test prescribed in ASTM E 119 or UL 263 for a duration not less than that required for the fire-resistance rating of the structure element in which it is installed.

Such isolation system protection applied to isolator units shall be suitably designed and securely installed so as not to dislodge, loosen, sustain damage or otherwise impair its ability to accommodate the seismic movements for which the isolator unit is designed and to maintain its integrity for the purpose of providing the required fire-resistance protection.

715.2 Fire-resistance-rated glazing. Labeled fire-resistance- rated glazing tested as part of a fire-resistance-rated wall assembly in accordance with ASTM E 119 or UL 263 shall not be required to comply with this section.

716.5.2 (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 exit enclosures and exit passageways except as permitted by Sections 1020.1.2 and 1021.5, 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 E119 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 Hand 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 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.

716.5.3 (IMC 607.5.5) Shaft enclosures. Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with approved fire and smoke dampers installed in accordance with their listing.

Exceptions:

1. Fire dampers are not required at penetrations of shafts where:
   1.1. Steel exhaust subducts are extended at least 22 inches (559 mm) vertically in exhaust shafts, provided there is a continuous airflow upward to the outside; or
   1.2. Penetrations are tested in accordance with ASTM E 119 or UL 263 as part of the rated assembly; or
   1.3. Ducts are used as part of an approved smoke control system designed and installed in accordance with Section 909 and where the fire damper will interfere with the operation of the smoke control system; or
   1.4. The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.

2. In Group B and R occupancies, equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, smoke dampers are not required at penetrations of shafts where:
   2.1. Kitchen, clothes dryer, bathroom and toilet room exhaust openings are installed with steel exhaust subducts, having a wall thickness of at least 0.019 inch (0.48 mm); and
   2.2. That extend at least 22 inches (559 mm) vertically; and
   2.3. An exhaust fan is installed at the upper terminus of the shaft that is, powered continuously in accordance with the provisions of Section 909.11, so as to maintain a continuous upward airflow to the outside.
3. Smoke dampers are not required at penetration of exhaust or supply shafts in parking garages that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.
4. Smoke dampers are not required at penetrations of shafts where ducts are used as part of an approved mechanical smoke control system designed in accordance with Section 909 and where the smoke damper will interfere with the operation of the smoke control system.

716.6.1 (IMC 607.6.1) Through penetrations. In occupancies other than Groups I-2 and I-3, a duct constructed of approved materials in accordance with the *International Mechanical Code* that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection, provided a listed fire damper is installed at the floor line or the duct is protected in accordance with Section 712.4. For air transfer openings, see Exception 7 to Section 707.2.

Exception: A duct is permitted to penetrate three floors or less without a fire damper at each floor, provided it meets all of the following requirements:

1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel not less than 0.019 inch (0.48 mm) (26 gage) in thickness.
2. The duct shall open into only one dwelling or sleeping unit and the duct system shall be continuous from the unit to the exterior of the building.
3. The duct shall not exceed 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches (0.065 m^2) in any 100 square feet (9.3 m^2) of floor area.
4. The annular space around the duct is protected with materials 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 the time period equivalent to the fire-resistance rating of the construction penetrated.
5. Grille openings located in a ceiling of a fire-resistance- rated floor/ceiling or roof/ceiling assembly shall be protected with a listed ceiling radiation damper installed in accordance with Section 716.6.2.1.

716.6.2.1 (IMC 607.6.2.1)Ceiling radiation dampers. Ceiling radiation dampers shall be tested in accordance with UL 555C and installed in accordance with the manufacturer's installation instructions and listing. Ceiling radiation dampers are not required where either of the following applies:

1. Tests in accordance with ASTM E 119 or UL 263 have shown that ceiling radiation dampers are not necessary in order to maintain the fire-resistance rating of the assembly.
2. Where exhaust duct penetrations are protected in accordance with Section 712.4.1.2, are located within the cavity of a wall and do not pass through another dwelling unit or tenant space.

TABLE 720.1(1)
MINIMUM PROTECTION OF STRUCTURAL PARTS BASED ON TIME PERIODS FOR VARIOUS NONCOMBUSTIBLE INSULATING MATERIALS[m]

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 square inch = 645.2 mm^2, 1 cubic foot = 0.0283 m^3.
a. Reentrant parts of protected members to be filled solidly.
b. Two layers of equal thickness with a 3/4-inch airspace between.
c. For all of the construction with gypsum wallboard described in Table 720.1(1), gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for gypsum wallboard, provided attachment is identical to that specified for the wallboard and the joints on the face layer are reinforced, and the entire surface is covered with a minimum of 1/16-inch gypsum veneer plaster.
d. An approved adhesive qualified under ASTM E 119 or UL 263.
e. Where lightweight or sand-lightweight concrete having an oven-dry weight of 110 pounds per cubic foot or less is used, the tabulated minimum cover shall be permitted to be reduced 25 percent, except that in no case shall the cover be less than 3/4 inch in slabs or 11/2 inches in beams or girders.
f. For solid slabs of siliceous aggregate concrete, increase tendon cover 20 percent.
g. Adequate provisions against spalling shall be provided by U-shaped or hooped stirrups spaced not to exceed the depth of the member with a clear cover of 1 inch.

h. Prestressed slabs shall have a thickness not less than that required in Table 720.1(3) for the respective fire resistance time period.
i. Fire coverage and end anchorages shall be as follows: Cover to the prestressing steel at the anchor shall be 1/2 inch greater than that required away from the anchor. Minimum cover to steel-bearing plate shall be 1 inch in beams and 3/4 inch in slabs.
j. For beam widths between 8 inches and 12 inches, cover thickness shall be permitted to be determined by interpolation.
k. Interior spans of continuous slabs, beams and girders shall be permitted to be considered restrained.
l. For use with concrete slabs having a comparable fire endurance where members are framed into the structure in such a manner as to provide equivalent performance to that of monolithic concrete construction.
m. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in GA 600 shall be accepted as if herein listed.
n. No additional insulating material is required on the exposed outside face of the column flange to achieve a 1-hour fire-resistance rating.

1407.10.2 Thermal barriers. MCM shall be separated from the interior of a building by an approved thermal barrier consisting of 0.5-inch (12.7 mm) gypsum wallboard or equivalent thermal barrier material that will limit the average temperature rise of the unexposed surface to not more than 250°F (121°C) after 15 minutes of fire exposure in accordance with the standard time-temperature curve of ASTM E 119 or UL 263 The thermal barrier shall be installed in such a manner that it will remain in place for not less than 15 minutes based on a test conducted in accordance with UL 1715.

2603.4 Thermal barrier. Except as provided for in Sections 2603.4.1 and 2603.9, foam plastic shall be separated from the interior of a building by an approved thermal barrier of 0.5-inch (12.7 mm) gypsum wallboard or equivalent thermal barrier material that will limit the average temperature rise of the unexposed surface to not more than 250°F (120°C) after 15 minutes of fire exposure, complying with the standard time-temperature curve of ASTM E 119 or UL 263 . The thermal barrier shall be installed in such a manner that it will remain in place for 15 minutes based on FM 4880, UL 1040, NFPA 286 or UL 1715. Combustible concealed spaces shall comply with Section 717.

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.

PART II – IBC GENERAL

Revise as follows:

410.3.5.2 Fire test. A sample curtain with a minimum of two vertical seams shall be subjected to the standard fire test specified in ASTM E 119 or UL 263 for a period of 30 minutes. The curtain shall overlap the furnace edges by an amount that is appropriate to seal the top and sides. The curtain shall have a bottom pocket containing a minimum of 4 pounds per linear foot (5.9 kg/m) of batten. The exposed surface of the curtain shall not glow, and flame or smoke shall not penetrate the curtain during the test period. Unexposed surface temperature and hose stream test requirements are not applicable to the proscenium fire safety curtain test.

PART III – IBC STRUCTURAL

1. Revise as follows:

2103.2 Clay or shale masonry units. Clay or shale masonry units shall conform to the following standards: ASTM C 34 for structural clay load-bearing wall tile; ASTM C56 for structural clay nonload-bearing wall tile; ASTM C 62 for building brick (solid masonry units made from clay or shale); ASTM C 1088 for solid units of thin veneer brick; ASTM C 126 for ceramic-glazed structural clay facing tile, facing brick and solid masonry units; ASTM C 212 for structural clay facing tile; ASTM C 216 for facing brick (solid masonry units made from clay or shale); ASTM C 652 for hollow brick (hollow masonry units made from clay or shale); and ASTM C 1405 for glazed brick (single-fired solid brick units).

Exception: Structural clay tile for nonstructural use in fireproofing of structural members and in wall furring shall not be required to meet the compressive strength specifications. The fire-resistance rating shall be determined in accordance with ASTM E 119 or UL 263 and shall comply with the requirements of Table 602.

2. Add standard to Chapter 35 as follows:

UL

UL 263-03	Standard for Fire Test of Building Construction and Materials

PART IV – IRC BUILDING/ENERGY

Revise as follows:

R314.4 Thermal barrier. Unless otherwise allowed in Section R314.5 or Section R314.6, foam plastic shall be separated from the interior of a building by an approved thermal barrier of minimum 0.5 inch (12.7 mm) gypsum wallboard or an approved finish material equivalent to a thermal barrier material that will limit the average temperature rise of the unexposed surface to no more than 250°F (139°C) after 15 minutes of fire exposure complying with the ASTM E 119 or UL 263 standard time temperature curve. The thermal barrier shall be installed in such a manner that it will remain in place for 15 minutes based on NFPA 286 with the acceptance criteria of Section R315.4, FM 4880, UL 1040 or UL 1715.

R317.1 Two-family dwellings. Dwelling units in two-family dwellings shall be separated from each other by wall and/or floor assemblies having not less than a 1-hour fire-resistance rating when tested in accordance with ASTM E 119 or UL 263. Fire-resistance-rated floor-ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of ½ hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13.
2. Wall assemblies need not extend through attic spaces when the ceiling is protected by not less than 5/8-inch (15.9 mm) Type X gypsum board and an attic draft stop constructed as specified in Section R502.12.1 is provided above and along the wall assembly separating the dwellings. The structural framing supporting the ceiling shall also be protected by not less than ½-inch (12.7 mm) gypsum board or equivalent.

R317.3.1 Through penetrations. Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section R317.3.1.1 or R317.3.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be protected as follows:

1. In concrete or masonry wall or floor assemblies where the penetrating item is a maximum 6 inches (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (92 900 mm^2), concrete, grout or mortar is permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating.
2. The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 or UL 263 time temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire resistance rating of the construction penetrated.

Reason: Add a direct reference to UL 263 where ASTM E119 is currently referenced.

The purpose of this code change is to include reference to UL 263 as an alternate to ASTM E 119, which is currently referenced in these code sections. These two Standards describe the same test method. The specifications for the test apparatus and test procedure are identical between the two standards. As such, identical test results would be obtained from tests conducted using each of these methods. UL 263 is an ANSI approved standard.

The inclusion of this alternate test method would provide the authority having jurisdiction with the flexibility to accept listed and labeled products evaluated in accordance with ASTM E 119 or UL 263.

These fire tests are applicable to assemblies of masonry units and to composite assemblies of structural materials for buildings, including bearing and other walls and partitions, columns, girders, beams, slabs, and composite slab and beam assemblies for floors and roofs. They are also applicable to other assemblies and structural units that constitute permanent integral parts of a finished building.

Bibliography: UL 263

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

Analysis: Results of the review of the proposed standard(s) will be posted on the ICC website by August 20, 2006.

Note: The following analysis was not in the Code Change Proposal book but was published in the "Errata to the 2006/2007 Proposed Changes to the International Codes and Analysis of Proposed Referenced Standards" provided at the code development hearings:

Analysis: Review of proposed new standard indicated that, in the opinion of staff, the standard did comply with ICC standards criteria

PART I — IBC FIRE SAFETY
Committee Action: **Approved as Submitted**

Committee Reason: Similar to the action taken on FS8-06/07 the addition of the new standard does provide additional flexibility for the designer and building official. While there was some uncertainty regarding whether the UL standard has incorporated some of the recent changes that have been made to the ASTM E 119 standard, the proposed UL standard does match up with the currently referenced E 119 standard.

Assembly Action: **None**

PART II — IBC GENERAL
Committee Action: **Approved as Submitted**

Committee Reason: The inclusion of UL 263 as an alternate and equivalent standard to ASTM E 119 was felt to be an appropriate addition to the code. This is also consistent with the actions taken on the other portions of this code change.

Assembly Action: **None**

PART III — IBC STRUCTURAL
Committee Action: **Approved as Submitted**

Committee Reason: The change adds a needed reference to a fire test standard.

Assembly Action: **None**

PART IV — IRC
Committee Action: **Approved as Submitted**

Committee Reason: The new reference to the Standard UL 263 adds depth to the code and provides an alternative to ASTM E119. These two standards describe the same test method. The addition of this alternate test method provides the authority having jurisdiction with the flexibility to accept listed and labeled products evaluated under UL 263.

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, Underwriters Laboratories, Inc., requests Approval as Modified by this public comment for Part I.

Modify 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 E 119 or UL 263. Restrained construction shall be identified on the plans.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Editorial. The term “or UL 263” was added throughout the I-codes wherever ASTM E 119 was referenced, but in this one section, the revision was missed in the first sentence.

Final Action: AS AM AMPC____ D

FS12-06/07
703.3

Proposed Change as Submitted:

Proponent: Susan Lamont, PhD, Arup Fire

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 a credible worst case design based fire exposure and acceptance criteria as agreed with the building official. The required fire resistance of a building element 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 as prescribed in Section 720.
3. Calculations in accordance with Section 721.
4. Engineering analysis based on a comparison of building element designs having fire-resistance ratings as determined by the test procedures set forth in ASTM E 119.
5. Alternative protection methods as allowed by Section 104.11.
6. Global structural analysis of a whole frame or assembly including: exposure to a series of credible worst case design fires, the relevant heat transfer calculations to the structural members, the relevant loads, the relevant failure modes during fire exposure, the temperature-dependent material properties and member stiffness as well as the effects of thermal expansion. The impact of deformations on compartmentation shall also be taken into account.

Reason: The purpose of the code change is to include new text such that performance based design of structural steel frames can be proposed on projects. This means that the IBC would allow performance based design for fire resistance similarly to other international codes for example in the UK, Europe and Australia. Also, to recognize that the performance of structural members in a real fire can be very different to the fire resistance of single members i.e. a beam, column or slab acting in isolation of the rest of the frame in a standard furnace.

This is important because savings in structural fire protection can be made when structures are robustly designed but also weaknesses in the structural frame which can exist when thermal expansion forces act on a structure during a fire can be identified and designed against. This is particularly important in innovative structural design and iconic buildings which are generally much taller or have longer spans and cannot be adequately tested in standard furnace tests. The methodology however is applicable to any structure.

The recommendations in the IBC for fire resistance are based on single element tests in a standard furnace. Although this approach is an essential requirement of the regulatory system and enables engineers, manufacturers and building officials to compare the relative performance of different structural components and materials for a range of fire resistance periods it does not represent the real response of structures in real fires. The fire is not necessarily representative of many credible worst case fires and the forces induced in single elements in a furnace can be very different to those induced as a result of restrained thermal expansion and alternative load paths in a highly redundant frame.

As the understanding of the science of fire develops, and its resulting effect on materials and structure, more advanced validated tools are becoming available for engineers for use in the design process.

It is becoming increasingly clear through research and performance based design projects that designing structures with the single aim of protecting structural materials to meet the code requirements for hourly fire resistance, may result in intrinsic weaknesses within the structural stability system. Alternatively it can mean ignoring intrinsic strengths. Passive fire protection simply delays the heating of steel members it does not eliminate it thus protected steel members still get hot and expand. This expansion allows floors to reach high deflections which can be beneficial because alternative load paths exist such as catenary action in beams or tensile membrane action in slabs. However expansion also generates forces and moments which the primary structure, particularly the columns have to resist and were never designed or tested to resist.

The sole aim of structural fire engineering proposed in the code change is to quantify the response of the proposed “cold temperature” structural design, in realistic fire scenarios, in order to determine if this response is acceptable. Strengths and weaknesses can then be clearly identified and addressed within the design, as appropriate.

In the investigation of the WTC collapse NIST set out a series of recommendations to be considered in code development. One of these (recommendation 9) specifically addresses the need to calculate structural fire response in design of tall or innovative buildings.

Research into the fire response of structures has been developing for many years ever since the first standard furnace test over 100 years ago. The understanding of the whole frame response to fire has however increased rapidly in the last 15 years with the Broadgate Fire (a multi- storey composite steel frame caught fire at night during construction when most of the steel frame was unprotected and remained standing after a severe post-flashover fire) in the UK, the detailed analysis of the Cardington 8-storey composite steel frame fire tests in the UK and Europe, similar tests and research in New Zealand and Australia, and onwards to the analysis of the WTC collapse on 9-11 by NIST and others, and currently the recent Torre Windsor fire in Madrid, Spain.

The Cardington Frame tests enabled engineers to measure temperatures and deflections in a whole series of compartment fire tests where the steel beams were left unprotected on a real composite steel frame and temperatures in the compartment exceeded 1000C for up to an hour. The tests and subsequent modeling of the tests showed that alternative load carrying mechanisms develop in fire when the composite slab and beams deflect as a result of thermal expansion and thermal bowing. These mechanisms allow the gravity and live loads to be supported in catenary action in the beams and tensile membrane action in the slab. For the 9m span beams which formed the Cardington Frame failure of the structure was not observed even in the largest post-flashover compartment fires.

Recent research is now considering longer spans (up to 21m) and different steel members such as trusses or deep beams with many penetrations in the web which typically heat more quickly than hot-rolled beam sections. As at Cardington there are alternative load paths but the much larger deflections as a consequence of the longer spans, need to be addressed and sometimes simply protecting the member in accordance with prescriptive rules is not necessarily the best solution.

Arup Fire already use finite element analysis techniques validated for fire by the Cardington Large Building Test Frame program, and more recently used to quantify the WTC collapse sequence, in design.

The references and standards listed in the Bibliography below outlines the background and the basis of the performance based design methodology proposed, the reasons why it is important for design and appropriate validation for software.

The contents of the references can be summarized as follows;

A four step approach is required for a global structural fire analysis as follows:

a. determine reasonable design basis fire scenarios

b. quantify the heat transfer from these fires to representative structural elements

c. quantify the mechanical response of the elements for the entire duration of the fire

d. determine appropriate passive fire protection and/or structural detailing based on this response

The fire size is the main input to a structural fire analysis. The Design Fires proposed should address (a) the quantity of fuel available (b) the quantity of ventilation through the glazed façade, c) compartment dimensions and d) properties of the wall linings.

Heat transfer analyses provide the temperature variation with time along the length and through each section of all structural materials during the fire exposure. It is from this data using a fully validated non-linear finite element analysis package that the mechanical response of the structure to the fire can be quantified.

The software used for heat transfer and structural analysis needs to be validated against full scale test data for example the Cardington frame fire tests.

The design approach is important to calculate the structural response of buildings to fire because current prescriptive rules ignore the forces generated in building elements by thermal expansion therefore design teams can either over design members or ignore inherent weaknesses. Many of the innovative structures developed by design teams with long spans for example cannot be adequately tested in a standard furnace.

This approach is described in British Standards, Eurocodes and design guides in Australia, New Zealand and around the world. It is most widely used in the UK and Europe because the fundamental research was conducted there but the methodology can be applied to performance based design in any country.

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Bailey C.G. and Moore D.B. “The behaviour of full-scale steel framed buildings subject to compartment fires”. The Structural Engineer. 77(8), pp. 15-21, 1999.

BS EN 1991-1-2:2002 Eurocode 1: Actions on structures — Part 1-2: General actions — Actions on structures exposed to fire, British Standards Institution.

BS EN 1993-1-2:2005 Eurocode 3: Design of steel structures — Part 1-2: General rules — Structural fire design, British Standards Institution.

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Buchanan, A.H, Structural Design for Fire Safety,Wiley, 2001:

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Gillie M., Usmani A.S. , Rotter J.M. . Modelling heated composite floor slabs with reference to the Cardington experiments Fire Safety Journal 36 (8) 745-767, 2001

Huang Z., Burgess I.W. and Plank R.J. (1999), “Three dimensional modelling of two full scale fire tests on a composite building”, Proceedings of the Institute of Civil Engineers Structures and Buildings 134, pp. 243-255.

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The University of Edinburgh, Final report of the DETR-PIT project: Behaviour of steel framed structures under fire conditions. Technical report, 2000. www.civ.ed.ac.uk/research/fire/project/main.html.

Usmani A.S. Chung Y.C. and Torero J.L., How Did the WTC Collapse: A New Theory Fire Safety Journal, 38, 6, 501-591, 2003.

Usmani A.S., Rotter J.M. , Lamont S., A.M.Sanad, Gillie M.. Fundamental principles of structural behaviour under thermal effects Fire Safety Journal, 36, 721-744, 2001.

Cost Impact: The code change proposal will not increase the cost of construction unless the structural design is such that it is particularly susceptible to fire in which case changes to the design may be necessary. In most cases these changes can be offset by savings in passive fire protection to secondary members which have been shown by the performance based analysis to be redundant.

Committee Action: Disapproved

Committee Reason: While the proposal is intended to apply to structural systems, it is written where it could be applied to any “assembly” and not just to structural elements. The committee felt that this was more of a performance code issue which should be located there versus an item which belongs within the IBC. In addition, the committee felt that the provisions of the current item 5 which references Section 104.11 would already permit this option if approved by the building official. Some additional concerns where what types of loads are considered, what is “credible worst case”, who could be capable of doing a peer review, and the fact that the fire code

official would not be included within the planning and evaluation. Given the NIST presentations regarding the World Trade Center and the limitations which were found with the existing software, the committee did not feel that there had been adequate evaluation yet to move this into the IBC.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Susan Lamont, ARUP Fire, requests Approval as Submitted.

Commenter's Reason: The following text aims to address the reasons given by the committee for disapproving the code change at the public hearing and therefore provides further justification to support the code change as submitted:

The approach proposed by the code change is based on performance objectives but we believe it should be highlighted in the IBC separately from Section 104.11 to raise awareness of alternative solutions and to permit the building official to more easily approve this type of solution for fire resistance design of elements of structure.

There are academics and professional in the US and abroad capable of doing a peer review of this type of work and they could assess the acceptability of the live, dead and wind loads also credible worst case fires. These experts are preparing guidance documents for performance based design of structures in fire with many of the professional bodies in the US. Many were also involved in the official investigations of the World Trade Center collapses.

Significant evaluation of the analysis techniques and modeling tools has been carried out globally, against full scale fire tests and is accepted by building officials worldwide.

The software used by NIST for the World Trade Center investigation does have limitations but is not the preferred software of engineers working in this field.

It is Arup's view that this design approach is required on high rise buildings to check safety levels that cannot be checked by standard furnace testing. This is because the forces generated by thermal expansion, which can be detrimental to primary members such as columns, are not addressed by testing.

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BS EN 1991-1-2:2002 Eurocode 1: Actions on structures — Part 1-2: General actions — Actions on structures exposed to fire, British Standards Institution.
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Final Action: AS AM AMPC____ D

FS14-06/07, Part I

703.5 (New), IFC 703.5 (New)

Proposed Change as Submitted:

Proponent: Sean DeCrane, Cleveland Fire Fighters Association, IAFF Local #93

PART I – IBC FIRE SAFETY

Add new text as follows:

703.5 Marking and identification. Firewalls, fire barriers and fire partitions required to have a fire-resistance rating shall be identified with signs or stenciling in a manner acceptable to the building official, Such identification shall be above any decorative ceiling or in concealed spaces, and shall include the wording: FIRE WALL, FIRE BARRIER OR FIRE PARTITION: PROTECT ALL OPENINGS, or other approved wording.

Reason: The purpose of the codes is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, etc. The concern that is addressed by this proposed code change is the need for installed fire-resistance rated assemblies to maintain their fire-resistance over the life of the building. Many people writing on fire safety issues complain about the fact that rated assemblies are often compromised over time. It can probably be assumed that most of that damage done to rated assemblies does not occur maliciously, with the intent to damage a needed safety feature. Rather, the installation of an incorrect replacement door or window, or the penetration of the assembly without proper firestopping, is probably done due to the lack of information regarding the assembly's fire rating. Without some type of identification, how can tradespeople, maintenance workers or inspectors determine that an assembly is being compromised and below minimum requirements? If the building's code-mandated fire compartmentation is below minimum requirements, then we can assume the building will not perform as designed with the proper protections for the occupants or the fire fighters responding.

Across the country fire departments are reducing staffing in an effort to meet more restrictive budgets. One of the areas where there have been reductions is the inspection capabilities. In Cleveland, Ohio, the fire department cut staffing by approximately one hundred positions in the last few years. The Fire Prevention Bureau levels have been cut by two thirds, this means the department is relying on the front line companies to identify code violations and then refer those violations to individuals with the expertise to follow up. The problem is the lack of ability for untrained personnel to identify rated partitions and barriers. There is simply a lack of funding for enhanced training. Clearly identifying rated barriers and partitions will help the fire fighter on his inspection to identify any unacceptable breaches to rated assemblies. He can then refer the structure for a follow up inspection by a higher trained individual with the ability to identify the exact need to bring the structure back to the "Minimum Standard" of protection for the occupants.

Cost Impact: The code change proposal will have minimal cost impact.

Committee Action: Disapproved

Committee Reason: See the comments provided with FS13-06/07 above. In addition, there was concern regarding the subjective "decorative ceiling or in concealed spaces" language of this proposal.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment 1:

Sean DeCrane, Cleveland Fire Fighters Association, IAFF Local #93, requests Approval as Submitted for Part I.

Commenter's Reason: Over the years there have been many proposals on this subject. Each time opponents raise new objections to minor details in an attempt to defeat the intent of the proposal. The author of the proposal is willing to make reasonable changes to make the intent palatable to the opponents. While the preservation of Fire Barriers and Fire Walls is vital to safe and effective fire fighting, identifying them in the field, during inspection, and on an emergency scene is very difficult. Requiring identification on these Fire Barriers, Fire Walls and Fire Partitions will allow inspection teams to readily identify their location and integrity. This will also allow responding companies to easily identify their locations during Pre-Plan inspections and will translate to more effective fire fighting tactics during an emergency response. Fire Fighters use this protection for staging areas and to identify means of egress during working fires.

Public Comment 2:

Tony Crimi, A.C. Consulting Solutions, Inc., representing International Firestop Council, requests Approval as Modified by this public comment for Part I.

Replace proposal with the following:

Add new text as follows:

703.5 Marking and identification. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:

1. Be located above any decorative ceiling, in concealed spaces or other approved location; and
2. Be repeated at intervals not exceeding 30 ft (9.14 m) measured horizontally along the wall or partition; and
3. Include lettering not less than 0.5 inch (12.7 mm) in height, incorporating the suggested wording: "FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS", or other approved wording.

(Renumber subsequent section)

Commenter's Reason: Building modifications, installed equipment, inspections, change orders and construction projects can all generate a need to identify whether a particular assembly is required to act as a barrier to smoke or fire. This proposed code change addresses the need for installed fire-resistance rated assemblies to maintain their fire-resistance over the life of the building. This code change would introduce (or in the case of some Jurisdictions, re-introduce) a requirement for Marking and Identification of walls required to have a fire resistance rating, or intended to serve as barriers to smoke movement. This proposal will aid code officials, maintenance workers and contractors with enforcement and compliance to Codes and Standards.

This revised proposal takes into account the Committees reasons for disapproval of FS13-06/07, FS-14-06/07, FS15-06/07, FS73-06/07, and FS94-06/07 which were all related to barrier labeling or marking. Establishing the requirement for identification of building elements installed specifically to prevent the movement of fire and/or smoke is beneficial to the AHJ's responsible for issuing C of O and for building managers, maintenance workers and contractors working in buildings during daily building operation, future building renovations or routine inspections. When buildings are engineered with fire rated walls and floors designed to contain smoke and/or fire, openings created in these assemblies by ducts, dampers, doors, windows, cable, conduit, pipe, ductwork, and installed equipment can compromise safety and jeopardize business continuity if not protected effectively. The addition of new through-penetrations over the life of a building is essentially inevitable, whether for wiring, plumbing or ventilation modifications. The tradesmen doing that work will not often be given the master plans of the building, and not know that their work may effective the performance of a critical building element. This can apply to several elements in a fire-resistive assembly such as dampers for ducts, firestopping, fire doors, and fire-rated glazing, which can easily be overlooked over the life of the building.

In providing testimony to the U.S. House of Representatives Committee on Science in the matter of NIST's investigation of the world trade center collapse, in October 2005, on the lessons learned and application of those experiences to improve building safety, the ICC President testified as follows:

> "NIST calls for more rigorous enforcement of codes. ICC believes a more appropriate term than enforcement is compliance. Enforcement is a means to achieve the goal of safe buildings, something embodied in compliance. There are other ways to secure compliance such as incentives or labeling that not only ensures the goal is reached but can secure results above and beyond simple enforcement of minimum codes and standards."[1]

Even if only in one small way, the addition of the proposed labeling during the construction phase of a building is of great benefit to over the course of the buildings life cycle and occupancy, and will facilitate ease of inspection throughout the life the building and during building renovation. Equally importantly, such identification marking also serves to alert trades people working within the building that, as penetrations are being made, the openings require additional consideration or protection.

The 1999 Standard Building Code contained requirements for the marking and identification of horizontal and vertical barriers required to either to have a fire-resistance rating or be effective barriers to the movement of smoke within a building. OSHA also has requirements for marking and labeling of safety features in buildings. Very similar language has also been a requirement of the Florida Building Code until the 2004 FBC. In those jurisdictions, the industry is already familiar with this requirement. Jurisdictions that have had this requirement in the past, have not reported widespread difficulties in trying to understand or enforce its application. To the contrary, in past cycles, we have heard testimony from those jurisdictions in support of this principal.

Final Action: AS AM AMPC____ D

FS14-06/07, Part II
IFC 703.5 (New)

Proposed Change as Submitted:

Proponent: Sean DeCrane, Cleveland Fire Fighters Association, IAFF Local #93

PART II - IFC

Add new text as follows:

703.5 Marking and identification. Firewalls, fire barriers and fire partitions required to have a fire-resistance rating shall be identified with signs or stenciling in a manner acceptable to the fire code official, Such identification shall be above any decorative ceiling or in concealed spaces, and shall include the wording: FIRE WALL, FIRE BARRIER OR FIRE PARTITION: PROTECT ALL OPENINGS, or other approved wording.

Reason: The purpose of the codes is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, etc. The concern that is addressed by this proposed code change is the need for installed fire-resistance rated assemblies to maintain their fire-resistance over the life of the building. Many people writing on fire safety issues complain about the fact that rated assemblies are often compromised over time. It can probably be assumed that most of that damage done to rated assemblies does not occur maliciously, with the intent to damage a needed safety feature. Rather, the installation of an incorrect replacement door or window, or the penetration of the assembly without proper firestopping, is probably done due to the lack of information regarding the assembly's fire rating. Without some type of identification, how can tradespeople, maintenance workers or inspectors determine that an assembly is being compromised and below minimum requirements? If the building's code-mandated fire compartmentation is below minimum requirements, then we can assume the building will not perform as designed with the proper protections for the occupants or the fire fighters responding.

Across the country fire departments are reducing staffing in an effort to meet more restrictive budgets. One of the areas where there have been reductions is the inspection capabilities. In Cleveland, Ohio, the fire department cut staffing by approximately one hundred positions in the last few years. The Fire Prevention Bureau levels have been cut by two thirds, this means the department is relying on the front line companies to identify code violations and then refer those violations to individuals with the expertise to follow up. The problem is the lack of ability for untrained personnel to identify rated partitions and barriers. There is simply a lack of funding for enhanced training. Clearly identifying rated barriers and partitions will help the fire fighter on his inspection to identify any unacceptable breaches to rated assemblies. He can then refer the structure for a follow up inspection by a higher trained individual with the ability to identify the exact need to bring the structure back to the "Minimum Standard" of protection for the occupants.

Cost Impact: The code change proposal will have minimal cost impact.

Committee Action: **Disapproved**

Committee Reason: The proposal contains no guidance as to the size or stroke of the required wording. The change would require signs or stenciling to be installed in a concealed location and provides no guidance as to where signs would go if there were no decorative ceiling present. In existing buildings, the lack of construction documents would be problematic since there would be no guidance as to what assemblies in the building were constructed as fire walls, fire barriers or fire partitions, thereby making such a requirement more appropriate for new buildings. The change also provides no requirement for on-going maintenance of the markings.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Sean DeCrane, Cleveland Fire Fighters Association, IAFF Local #93, requests Approval as Submitted for Part II.

Commenter's Reason: Over the years there have been many proposals on this subject. Each time opponents raise new objections to minor details in an attempt to defeat the intent of the proposal. The author of the proposal is willing to make reasonable changes to make the intent palatable to the opponents. While the preservation of Fire Barriers and Fire Walls is vital to safe and effective fire fighting, identifying them in the field, during inspection, and on an emergency scene is very difficult. Requiring identification on these Fire Barriers, Fire Walls and Fire Partitions will allow inspection teams to readily identify their location and integrity. This will also allow responding companies to easily identify their locations during Pre-Plan inspections and will translate to more effective fire fighting tactics during an emergency response. Fire Fighters use this protection for staging areas and to identify means of egress during working fires.

Public Comment 2:

Tony Crimi, A.C. Consulting Solutions, Inc., representing International Firestop Council, requests Approval as Modified by this public comment for Part II.

Replace proposal with the following:

Add new text as follows:

703.5 Marking and identification. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:

1. Be located above any decorative ceiling, in concealed spaces or other approved location; and
2. Be repeated at intervals not exceeding 30 ft (9.14 m) measured horizontally along the wall or partition; and
3. Include lettering not less than 0.5 inch (12.7 mm) in height, incorporating the suggested wording: "FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS", or other approved wording.

(Renumber subsequent section)

Commenter's Reason: Building modifications, installed equipment, inspections, change orders and construction projects can all generate a need to identify whether a particular assembly is required to act as a barrier to smoke or fire. This proposed code change addresses the need for installed fire-resistance rated assemblies to maintain their fire-resistance over the life of the building. This code change would introduce (or in the case of some Jurisdictions, re-introduce) a requirement for Marking and Identification of walls required to have a fire resistance rating, or intended to serve as barriers to smoke movement. This proposal will aid code officials, maintenance workers and contractors with enforcement and compliance to Codes and Standards.

This revised proposal takes into account the Committees reasons for disapproval of FS13-06/07, FS-14-06/07, FS15-06/07, FS73-06/07, and FS94-06/07 which were all related to barrier labeling or marking. Establishing the requirement for identification of building elements installed specifically to prevent the movement of fire and/or smoke is beneficial to the AHJ's responsible for issuing C of O and for building managers, maintenance workers and contractors working in buildings during daily building operation, future building renovations or routine inspections. When buildings are engineered with fire rated walls and floors designed to contain smoke and/or fire, openings created in these assemblies by ducts, dampers, doors, windows, cable, conduit, pipe, ductwork, and installed equipment can compromise safety and jeopardize business continuity if not protected effectively. The addition of new through-penetrations over the life of a building is essentially inevitable, whether for wiring, plumbing or ventilation modifications. The tradesmen doing that work will not often be given the master plans of the building, and not know that their work may effective the performance of a critical building element. This can apply to several elements in a fire-resistive assembly such as dampers for ducts, firestopping, fire doors, and fire-rated glazing, which can easily be overlooked over the life of the building.

> In providing testimony to the U.S. House of Representatives Committee on Science in the matter of NIST's investigation of the world trade center collapse, in October 2005, on the lessons learned and application of those experiences to improve building safety, the ICC resident testified as follows:
>
> "NIST calls for more rigorous enforcement of codes. ICC believes a more appropriate term than enforcement is compliance. Enforcement is a means to achieve the goal of safe buildings, something embodied in compliance. There are other ways to secure compliance such as incentives or labeling that not only ensures the goal is reached but can secure results above and beyond simple enforcement of minimum codes and standards."[1]

Even if only in one small way, the addition of the proposed labeling during the construction phase of a building is of great benefit to over the course of the buildings life cycle and occupancy, and will facilitate ease of inspection throughout the life the building and during building renovation. Equally importantly, such identification marking also serves to alert trades people working within the building that, as penetrations are being made, the openings require additional consideration or protection.

The 1999 Standard Building Code contained requirements for the marking and identification of horizontal and vertical barriers required to either to have a fire-resistance rating or be effective barriers to the movement of smoke within a building. OSHA also has requirements for marking and labeling of safety features in buildings. Very similar language has also been a requirement of the Florida Building Code until the 2004 FBC. In those jurisdictions, the industry is already familiar with this requirement. Jurisdictions that have had this requirement in the past, have not reported widespread difficulties in trying to understand or enforce its application. To the contrary, in past cycles, we have heard testimony from those jurisdictions in support of this principal.

Final Action: AS AM AMPC____ D

FS15-06/07, Part I

703.5 (New)

Proposed Change as Submitted:

Proponent: Sean P. DeCrane, Cleveland Fire Fighters Association, representing International Association of Fire Fighters, Local #93

PART I – IBC FIRE SAFETY

Add new text as follows:

703.5 Marking and Identification. Smoke Barriers and Smoke Partitions shall be identified with signs or stenciling in a manner acceptable to the building official. Such identification shall be above any decorative ceiling or in concealed spaces, and shall include the wording: SMOKE BARRIER or SMOKE PARTITION: PROTECT ALL OPENINGS, or other approved wording.

Reason: The purpose of the codes is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, etc. The concern that is addressed by this proposed code change is the need for installed Smoke Partition assemblies to maintain their resistance to the passage of smoke over the life of the building. Many people writing on fire safety issues complain about the fact that rated assemblies are often compromised over time. It can probably be assumed that most of that damage done to rated assemblies does not occur maliciously, with the intent to damage a needed safety feature. Without some type of identification, how can tradespeople, maintenance workers or inspectors determine that an assembly is being compromised? If the building's code-mandated smoke compartmentation is below minimum requirements then we can assume the building will not perform as designed with the proper protection for the occupants or the fire fighters responding.

Across the country fire departments are reducing staffing in an effort to meet more restrictive budgets. One of the areas where there have been reductions is the inspection capabilities. In Cleveland, Ohio, the fire department cut staffing by approximately one hundred positions in the last few years. The Fire Prevention Bureau levels have been cut by two thirds, this means the department is relying on the front line companies to identify code violations and then refer those violations to individuals with the expertise to follow up. The problem is the lack of ability for untrained personnel to identify rated partitions and barriers. There is simply a lack of funding for enhanced training. Clearly identifying rated Smoke Partitions will help the fire fighter on his inspection to identify any unacceptable breaches to rated assemblies. He can then refer the structure for a follow up inspection by a higher trained individual with the ability to identify the exact need to bring the structure back to the "Minimum Standard" of protection for the occupants.

Cost Impact: The code change proposal will have a minimal effect on the cost of construction.

Committee Action: **Disapproved**

Committee Reason: See the comments provided with FS13-06/07 above. In addition, this item was disapproved because it was a companion change to FS14 and this provides consistency with the action taken on FS14.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Sean DeCrane, Cleveland Fire Fighters Association, IAFF Local #93, requests Approval as Submitted for Part I.

Commenter's Reason: This proposal has been made in various forms over a number of past cycles and opponents have found small ways to prevent its passage despite the dangers of smoke in a fire setting. It is widely known that smoke kills. As stated in the original proposal, allowing for easier identification of Smoke Barriers and Partitions will assist in the inspection process. If a company officer is making a Pre-Plan Inspection and can identify non-compliant penetrations or openings in a Smoke Barrier he can refer the violation to the Fire Prevention Bureau for follow-up inspections and compliance. The identification of Smoke Barriers also allows the responding companies to properly identify safe areas, during rescue operations. This will assist fire fighter tactics and operations.
Local jurisdictions should be allowed to determine placement, size and style of identification.

Final Action: AS AM AMPC____ D

FS15-06/07, Part II
IFC 703.5 (New)

Proposed Change as Submitted:

Proponent: Sean P. DeCrane, Cleveland Fire Fighters Association, representing International Association of Fire Fighters, Local #93

PART II - IFC

Add new text as follows:

703.5 Marking and Identification. Smoke Barriers and Smoke Partitions shall be identified with signs or stenciling in a manner acceptable to the fire code official. Such identification shall be above any decorative ceiling or in concealed spaces, and shall include the wording: SMOKE BARRIER or SMOKE PARTITION: PROTECT ALL OPENINGS, or other approved wording.

Reason: The purpose of the codes is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, etc. The concern that is addressed by this proposed code change is the need for installed Smoke Partition assemblies to maintain their resistance to the passage of smoke over the life of the building. Many people writing on fire safety issues complain about the fact that rated assemblies are often compromised over time. It can probably be assumed that most of that damage done to rated assemblies does not occur maliciously, with the intent to damage a needed safety feature. Without some type of identification, how can tradespeople, maintenance workers or inspectors determine that an assembly is being compromised? If the building's code-mandated smoke compartmentation is below minimum requirements then we can assume the building will not perform as designed with the proper protection for the occupants or the fire fighters responding.

Across the country fire departments are reducing staffing in an effort to meet more restrictive budgets. One of the areas where there have been reductions is the inspection capabilities. In Cleveland, Ohio, the fire department cut staffing by approximately one hundred positions in the last few years. The Fire Prevention Bureau levels have been cut by two thirds, this means the department is relying on the front line companies to identify code violations and then refer those violations to individuals with the expertise to follow up. The problem is the lack of ability for untrained personnel to identify rated partitions and barriers. There is simply a lack of funding for enhanced training. Clearly identifying rated Smoke Partitions will help the fire fighter on his inspection to identify any unacceptable breaches to rated assemblies. He can then refer the structure for a follow up inspection by a higher trained individual with the ability to identify the exact need to bring the structure back to the "Minimum Standard" of protection for the occupants.

Cost Impact: The code change proposal will have a minimal effect on the cost of construction.

Committee Action: **Disapproved**

Committee Reason: The proposal contains no guidance as to the size or stroke of the required wording. The change would require signs or stenciling to be installed in a concealed location and provides no guidance as to where signs would go if there were no decorative ceiling present. In existing buildings, the lack of construction documents would be problematic since there would be no guidance as to what assemblies in the building were constructed as smoke barriers or smoke partitions thereby making such a requirement more appropriate for new buildings. The change also provides no requirement for on-going maintenance of the markings.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Sean DeCrane, Cleveland Fire Fighters Association, IAFF Local #93, requests Approval as Submitted for Part II.

Commenter's Reason: This proposal has been made in various forms over a number of past cycles and opponents have found small ways to prevent its passage despite the dangers of smoke in a fire setting. It is widely known that smoke kills. As stated in the original proposal, allowing for easier identification of Smoke Barriers and Partitions will assist in the inspection process. If a company officer is making a Pre-Plan Inspection and can identify non-compliant penetrations or openings in a Smoke Barrier he can refer the violation to the Fire Prevention Bureau for follow-up inspections and compliance. The identification of Smoke Barriers also allows the responding companies to properly identify safe areas, during rescue operations. This will assist fire fighter tactics and operations.
Local jurisdictions should be allowed to determine placement, size and style of identification.

Final Action: AS AM AMPC____ D

FS20-06/07
704.5

Proposed Change as Submitted:

Proponent: Laura Blaul, Orange County Fire and George Thomas, P.E., C.B.O, Pleasanton, CA, representing California Fire Chiefs Association and Tri-Chapter Code Committee

Revise as follows:

704.5 Fire-resistance ratings. Exterior walls shall be fire-resistance rated in accordance with Tables 601 and 602 and this section. ~~The fire-resistance rating of exterior walls with a fire separation distance of greater than 5 feet (1524 mm) shall be rated for exposure to fire from the inside.~~ The required fire-resistance rating of exterior walls ~~with a fire separation distance of 5 feet (1524mm) or less~~ shall be rated for exposure to fire from both sides~~.~~ for any of the following conditions:

1. Bearing walls.
2. Nonbearing exterior walls with a fire separation distance equal to 10 feet (3048 mm) or less.

For all other conditions the required fire resistance rating of exterior walls shall be rated for exposure to fire from the inside only.

Reason: This code change addresses our concerns about the present reduction for required fire resistance ratings of exterior walls more than 5 feet from a property line. We do not believe that past experience provides justification to permit the fire testing of exterior walls only from the interior side when the exterior walls of two buildings are within 10 feet of another wall. Several fires have been reported recently where combustible cladding on dwellings in close proximity to property lines have quickly ignited the building on the adjacent property. Not subjecting the exterior side of these exterior walls to the fire tested can only exacerbate the potential for fire spread.

The modification for bearing walls is related to our concern about fires that may break out of an opening in an exterior wall to expose the exterior wall from the outside, while simultaneously exposing the exterior wall from the inside. No standardized fire test presently evaluates such an exposure to determine a fire resistance rating for an exterior wall application. This type of exposure would be significantly more severe than the standard ASTM E119 fire exposure, yet Section 704.5 would allow the wall to be tested from the inside only if the fire separation distance is 5 feet or more. We believe that the exterior bearing wall application is critical from a structural stability perspective and should not allow the reduced fire testing presently permitted, even for fire separation distances greater than 5 feet.

The legacy code in the western portions of the country required that nonsymmetrical wall construction be tested for fire resistance from both sides, regardless of the fire separation distance, and the shortest duration obtained from the two tests was the rating applied the exterior wall. Although it is difficult to provide definitive fire loss data to show the importance of this one modification, it should be noted that the western states have the best fire loss records in country.

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

Committee Action: **Disapproved**

Committee Reason: The floor discussion focused on two separate issues, the asymmetrical assembly versus the protection of bearing wall issues that were raised by the proposal and during the testimony. Additionally the testimony focused on the spread of fire from the exterior and the affect it has on the exterior wall through window plumes. While the ASTM E 119 fire test may not be a good test for this type of exterior exposure, there was a lack of information or evidence provided to support the elimination of the asymmetrical construction. The asymmetrical construction has been used for a number of years by some of the legacy codes and the evidence should be available to show whether a problem has existed in those areas

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This item is on the agenda for individual consideration because an assembly action was successful and public comments were submitted.

Public Comment 1:

Laura Blaul, Orange County Fire Authority, representing California Fire Chiefs Association, requests Approval as Submitted.

Commenter's Reason: The committee acknowledged that ASTM E 119 fire test may not be a good test for exterior exposure fires but cited a lack of information or evidence to support the elimination of the asymmetrical construction. The membership, however, disagreed as demonstrated by a floor vote.

As proponents, we acknowledged that it is difficult to provide definitive fire loss data to show the importance of this one modification, but pointed out that it should be noted that the western states have one of the best fire loss records in country. We strongly believe, reinforced by experience, that nonsymmetrical wall construction must be tested for fire resistance from both sides, regardless of the fire separation distance, and the shortest duration obtained from the two tests must be the rating applied to the exterior wall in order to adequately protect property and occupants. We do not believe that past experience provides justification to permit the fire testing of exterior walls only from the interior side when the exterior walls of two buildings are within 10 feet of another wall. Several fires have been reported recently where combustible cladding on dwellings in close proximity to property lines have quickly ignited the building on the adjacent property. Not subjecting the exterior side of these exterior walls to the fire tested can only exacerbate the potential for fire spread.

The modification for bearing walls is related to our concern about fires that may break out of an opening in an exterior wall to expose the exterior wall from the outside, while simultaneously exposing the exterior wall from the inside. No standardized fire test presently evaluates such an exposure to determine a fire resistance rating for an exterior wall application. This type of exposure would be significantly more severe than the standard ASTM E119 fire exposure, yet Section 704.5 would allow the wall to be tested from the inside only if the fire separation distance is 5 feet or more. We believe that the exterior bearing wall application is critical from a structural stability perspective and should not be allowed the reduced fire testing presently permitted, even for fire separation distances greater than 5 feet.

Additional Substantiation:

n the way of additional substantiation, we'd like to point out that, according to NFPA and the U.S. Fire Administration, 50% of fires (801,000 in 2005) are outside fires which have increased by 10% in frequency between 2004 and 2005, despite an overall 3% decrease in the number of fires. In addition, there were another 290,000 vehicle fires in 2005. These outside fires (vehicles, tress, barbeques, trash/refuse, etc.) can and do impact structures which are often in close proximity. The most common cause is arson with open flame, natural, and electrical distribution as other contributing causes.

In addition, the IBC Commentary states the "…5 foot distance is based on a realistic fire plume from an opening as reported in a Canadian National Research Council paper by J.H. McGuire." While that paper was not located, a May 19, 2005 paper by the Council on full-scale fire experiments conducted to provide data to address spatial separation issues and measures to limit potential fire spread between houses. These experiments were conducted in response to "increasing pressure to allow new houses to be built closer together" to accommodate "rising land and infrastructure costs and the demand for affordable housing". Wall assemblies with different exterior finishing were positioned at various wall-to-wall and eave-to-eave separation distances. Results showed that with 5' and 8' separation, flashover took place in 2 min and 40 s and, 2 minutes later (before fire department response in most areas) flame impinged on the target wall. Combustibility of the wall as well as blocking of attic vents on the exposed wall were factors. Exterior gypsum drywall extending up to the roof to block attic ventilation was successful, as was aluminum siding over combustible waferboard sheathing. However, even with 8' separation, there was fire spread on the exposing wall in 3 min 18 s, spread into the attic space in 4 minutes, and full burning of the wall assembly within 5 minutes, when more combustible materials were used. The target wall showed thermal damage, as did the soffit (experiment ended at 6 minutes by request of city) and the researched felt "it was likely to be ignited if the experiment duration was allowed to continue longer".

Paper:
Full-Scale Fire Study of Spatial Separation
Research Report: IRC-RR-195
May 19, 2005
Joseph Z Su and Bruce C. Taber
Institute for Research in Construction
National Research Council Canada
Ottawa, Canada

Public Comment 2:

Michael A. Baker, City of Prescott, AZ, requests Disapproval.

Commenter's Reason: The proponent identifies the western states fire loss record is the best in the country. These western states have well over 5 million homes built with the current code language to test fire exposure only from the inside if greater than 5' from the property line. These homes have performed well during fires. The proponent indicates there is no way to provide data to show this is a problem. If there is no supporting data then it stands to reason that there is not a severity of crossover fires from one structure to another. Providing a 10' separation might provide additional fire protection but has no justification to change the current code text.

Public Comment 3:

Tom Rubottom, City of Lakewood, representing Colorado Chapter of ICC, requests Disapproval.

Commenter's Reason: The justification presented by the proponent to change the 2006 IBC Section 704.5 refers to several fires where combustible cladding on "dwellings" in "close proximity" to property lines have ignited buildings in adjacent properties. It is not clear if the proponent is referring to single family dwellings which are regulated by the IRC or apartment buildings and similar residential buildings regulated by the IBC. Also, "Close Proximity" to property line has not been identified.

The submitted proposal requires all load bearing exterior walls to be rated for fire exposure from both sides to protect the exterior wall from a fire breaking out through the exterior openings and exposing the exterior side to an interior fire. If the proposed revision is intended for residential occupancies, the IBC requires all residential occupancies to be provided with automatic fire sprinkler systems. This sprinkler protection should control an interior fire. If the concern is with other occupancies, no information or data has been provided by the proponent substantiating failure of exterior load bearing walls caused by interior fire break out through exterior openings.

Final Action: AS AM AMPC____ D

FS24-06/07
704.8, 704.12

Proposed Change as Submitted:

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

1. Delete and substitute as follows:

~~**704.8 Allowable area of openings.** The maximum area of unprotected or protected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8. Where both unprotected and protected openings are located in the exterior wall in any story, the total area of the openings shall comply with the following formula:~~

$$\frac{A}{a} + \frac{A_u}{a_u} \le 1.0 \quad \text{(Equation 7-2)}$$

~~where:~~
~~A = Actual area of protected openings, or the equivalent area of protected openings, A_e (see Section 704.7).~~
~~a = Allowable area of protected openings.~~
~~A_u = Actual area of unprotected openings.~~
~~a_u = Allowable area of unprotected openings.~~

~~**TABLE 704.8**~~
~~**MAXIMUM AREA OF EXTERIOR WALL OPENINGSa**~~

~~**704.8.1 Automatic sprinkler system.** In buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the maximum allowable area of unprotected openings in occupancies other than Groups H-1, H-2 and H-3 shall be the same as the tabulated limitations for protected openings.~~

~~**704.8.2 First story.** In occupancies other than Group H, unlimited unprotected openings are permitted in the exterior walls of the first story above grade facing a street that have a fire separation distance of greater than 15 feet (4572 mm) or facing an unoccupied space. The unoccupied space shall be on the same lot or dedicated for public use, shall not be less than 30 feet (9144 mm) in width and shall have access from a street by a posted fire lane in accordance with the *International Fire Code*.~~

704.8 Openings. Openings in exterior walls shall have a degree of opening protection based on the fire separation distance as specified in Table 704.8.

704.8.1 Allowable area of openings. The maximum area of unprotected and protected openings permitted in an exterior wall in any story of a building shall not exceed the percentages specified in Table 704.8.

Exceptions:

1. In other than Group H occupancies, unlimited unprotected openings are permitted in the exterior walls of the first story above grade facing a street that has a fire separation distance of greater than 15 feet (4572 mm), or facing an unoccupied space. Such unoccupied space shall be on the same lot or dedicated for public use, shall not be less than 30 feet (9144 mm) in width, and shall have access from a street by a posted fire lane in accordance with the *International Fire Code*.
2. Buildings whose exterior bearing walls, exterior nonbearing walls and exterior structural frame are not required to be fire-resistance rated shall be permitted to have unlimited unprotected openings.

704.8.2 Protected openings. Where required to be protected, fire doors and fire shutters shall comply with Section 715.4 and fire window assemblies shall comply with Section 715.5.

Exception: Opening protective assemblies are not required where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and the exterior openings are protected by a water curtain using automatic sprinklers approved for that use.

704.8.3 Unprotected openings. Where unprotected openings are permitted, windows and doors shall be constructed of any approved materials. Glazing shall conform to the requirements of Chapters 24 and 26.

704.8.4 Mixed openings. Where both unprotected and protected openings are located in the exterior wall in any story of a building, the total area of openings shall be determined in accordance with the following:

$(Ap \div ap) + (Au \div au) \leq 1$ **(Equation 7-2)**

where:

Ap = Actual area of protected openings, or the equivalent area of protected openings, *Ae* (see Section 704.7).
ap = Allowable area of protected openings.
Au = Actual area of unprotected openings.
au = Allowable area of unprotected openings.

TABLE 704.8
MAXIMUM AREA OF EXTERIOR WALL
OPENINGS BASED ON FIRE SEPARATION DISTANCE
AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	**0 to less than 3[b]**			**3 to less than 5[c,d]**			**5 to less than 10[d,e]**		
DEGREE OF OPENING PROTECTION	UP NS	UP S[h]	P	UP NS	UP S[h]	P	UP NS	UP S[h]	P
ALLOWABLE AREA[a]	NP	NP	NP	NP	15%	15%	10%[g]	25%	25%

10 to less than 15[d,e,f]			**15 to less than 20[e,f]**			**20 to less than 25[e,f]**		
UP NS	UP S[h]	P	UP NS	UP S[h]	P	UP NS	UP S[h]	P
15%[g]	45%	45%	25%	75%	75%	45%	NL	NL

25 to less than 30[e,f]			**30 or greater**		
UP NS	UP S[h]	P	UP NS	UP S[h]	P
70%	NL	NL	NL	NR	NR

For SI: 1 foot = 304.8 mm.
UP, NS = Unprotected openings in buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
UP, S = Unprotected openings in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
P = Openings protected with an opening protective assembly in accordance with Section 704.8.1.
NP = Not permitted.
NL = No limit
NR = Not required

a. Values indicated are the percentage of the area of the exterior wall, per story.
b. For the requirements for fire walls of buildings with differing heights, see Section 705.6.1.
c. The maximum percentage of unprotected and protected openings shall be 25 percent for Group R-3 occupancies, as applicable in Section 101.2.

d. Unprotected openings shall not be permitted for openings with a fire separation distance of less than 15 feet for Group H-2 and H-3 occupancies.
e. The area of unprotected and protected openings shall not be limited for Group R-3 occupancies, as applicable in Section 101.2, with a fire separation distance of 5 feet or greater.
f. The area of openings in an open parking structure with a fire separation distance of 10 feet or greater shall not be limited.
g. Includes buildings accessory to Group R-3, as applicable in Section 101.2.
h. Not applicable to Group H-1, H-2 and H-3 occupancies.

704.8.5 Vertical separation of openings. (Text to remain unchanged--former Section 704.9)
704.8.6 Vertical exposure. (Text to remain unchanged--former Section 704.10)
704.9 Joints. (Text to remain unchanged--former Section 704.13)
704.10 Ducts and air transfer openings. (Text to remain unchanged--former Section 704.14
704.11 Parapets. (Text to remain unchanged--former Section 704.11)

2. Delete without substitution:

~~**704.12 Opening protection.** Windows in exterior walls required to have protected openings in accordance with other sections of this code or determined to be protected in accordance with Section 704.3 or 704.8 shall comply with Section 715.5. Other openings required to be protected with fire door or shutter assemblies in accordance with other sections of this code or determined to be protected in accordance with Section 704.3 or 704.8 shall comply with Section 715.4.~~

> ~~**Exception:** Opening protectives are not required where the building is protected throughout by an automatic sprinkler system and the exterior openings are protected by an approved water curtain using automatic sprinklers approved for that use. The sprinklers and the water curtain shall be installed in accordance with Section 903.3.1.1 and shall have an automatic water supply and fire department connection.~~

~~**704.12.1 Unprotected openings.** Where protected openings are not required by Section 704, windows and doors shall be constructed of any approved materials. Glazing shall conform to the requirements of Chapters 24 and 26.~~

Reason: This proposal is intended to clarify the provisions for the determination of opening protection requirements in exterior wall construction in a logical and understandable format. Presently, exterior wall opening protection requirements are fragmented in several sections and contain no clear charging language. General opening protection requirements are located in Section 704.12 while more specific allowable area of opening requirements are found in preceding Section 704.8. The latter provisions should be subordinate to the former. For legal purposes a defining charging statement should be provided.

One of the strengths of the International Building Code is the orderly method for the determination of opening protection requirements contained in the fire resistance assembly sections of Chapter 7. For instance, given the requirement for a fire wall, one would go to Section 705 for detailed construction provisions, to include openings at Section 705.8, penetrations at Section 705.9, joints at Section 705.10 and ducts and air transfer openings at Section 705.11. These sections in turn, reference one to the applicable sections for specific details for the various methods of maintaining continuity of construction. This proposal organizes exterior wall opening protection requirements in a similar fashion. This enhances user friendliness and technical accuracy as it supports a consistent procedure for the determination of opening protection requirements throughout Chapter 7.

A general description of the alterations is a follows:

Section 704.8: The section heading is more general and is consistent with Sections 705.8, 706.6, 707.7, 708.6, 709.5 and 710.5. The section provides general charging language for the determination of exterior wall opening protection requirements that is currently not stated.

Section 704.8.1: This specific provision was formally located in Section 704.8. Exception 1 is a generally applicable provision that was formally located in Section 704.8.2. Exception 2 is a generally applicable provision that was formally located in Table 704.8, Footnote i.

Section 704.8.2: This general charging provision is similar to that formally located in Section 704.12. The exception was formerly located in Section 704.12.

Section 704.8.3: This is a generally applicable provision that was formally located in Section 704.12.1.

Section 704.8.4: Minor editorial modifications have been made to the mixed opening provisions, such as, making the equation more simple and better identifying the equation variables.

Table 704.8: The format of Table 704.8 has been modified for purposes of the accurate determination of technical requirements. Perhaps most importantly, horizontal cells under each applicable fire separation distance entry value describe each possible degree of opening protection condition
and the allowable area for each such condition. Of particular importance is the introduction of a column recognizing unprotected openings in sprinklered buildings. This provision is currently only contained in the text at Section 704.8.1. Unfortunately, many code users seek requirements in the tables without consulting the charging text. The proposed table would minimize the possibility of erroneously determining the allowable area of unprotected openings in sprinklered buildings--a very common design condition. A subtle feature of the reformatted table is the threshold values for the listed fire separation distances. They have been adjusted to coincide with Table 602. For example, current Table 704.8 specifies a fire distance spread of, “greater than 5 to 10.” Conversely, Table 602 references, “equal to or greater than 5 to less than 10.” This modification will allow for the correct and relative determination of opening

protective assemblies which occur exactly at those threshold fire separation distances. The footnotes have been reorganized to coincide with the increasing fire separation distances. Numerous minor editorial changes have been made to clarify the understanding of technical intent (i.e. No Limit to No Requirement for protected openings greater than 30 feet).

Sections 704.8.5 and 704.8.6: Both sections which are applicable to openings in exterior walls have been incorporated into Section 704.8 (openings). These provisions were formerly located at Sections 704.9 and 704.10, respectively.

Sections 704.9 through 704.11: The remaining sections have been reorganized to be consistent with the continuity provisions of the other fire-resistance rated assembly sections. These provisions were formerly located at Sections 704.13, 704.14 and 704.11, respectively.

In summary, the proposed submittal will clarify the intent of the International Building Code by providing a logical organization of technical requirements while using accepted terminology and format. As previously stated, the proposal is not intended to achieve any technical changes. The proposed technical reorganization and language contained in this submittal would represent a significant improvement to the 2009 Edition of the International Building Code in this important and frequently applicable area.

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

Committee Action: Approved as Modified

Modify the proposal as follows:

Table 704.8 footnotes:

P = Openings protected with an opening protective assembly in accordance with Section ~~704.8.1~~ 704.8.2.

(Portions of proposal not shown remain unchanged)

Committee Reason: This provides a clear connection between Table 704.8 and the code text which currently exists in Section 704.8.1. The modifications will correct a section reference which is not correct. The committee also expressed their desire that the various headings be spelled out instead of abbreviated. Additionally the action taken with FS22-06/07 will be added into this table if both of the items do get approved at the final action hearings.

Assembly Action: None

Individual Consideration Agenda

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

Public Comment:

Maureen Traxler, City of Seattle Department of Planning and Development, requests Approval as Modified by this public comment.

Further modify proposal as follows:

704.8 Openings. Openings in exterior walls shall ~~have a degree of opening protection based on the fire separation distance as specified in Table 704.8~~ comply with Sections 704.8.1 through 704.8.6.

704.8.1 Allowable area of openings. The maximum area of unprotected and protected openings permitted in an exterior wall in any story of a building shall not exceed the percentages specified in Table 704.8.

Exceptions:

1. In other than Group H occupancies, unlimited unprotected openings are permitted in the ~~exterior walls of the~~ first story above grade ~~facing~~ either:
   - 1.1. Where the wall either faces a street ~~that~~ and has a fire separation distance of ~~greater~~ more than 15 feet (4572 mm); or
   - 1.2. Where the wall faces ~~facing~~ an unoccupied space. ~~Such~~ The unoccupied space shall be on the same lot or dedicated for public use, shall not be less than 30 feet (9144 mm) in width, and shall have access from a street by a posted fire lane in accordance with the *International Fire Code*.
2. Buildings whose exterior bearing walls, exterior nonbearing walls and exterior structural frame are not required to be fire-resistance rated shall be permitted to have unlimited unprotected openings.

704.8.2 Protected openings. Where openings are required to be protected, fire doors and fire shutters shall comply with Section 715.4 and fire window assemblies shall comply with Section 715.5.

Exception: Opening protective assemblies are not required where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and the exterior openings are protected by a water curtain using automatic sprinklers approved for that use.

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This comment proposes only editorial modifications. The charging language in Section 704.8 is revised to more accurately describe the scope of the section. The reference to Table 704.8 is misplaced in Section 704.8 because the table is only one of the requirements in the section, and because the table is referenced again in Section 704.8.1.

As proposed, exception 1 states that the street is required to have a fire separation distance; the modification clarifies that the wall is required to have a fire separation distance. The phrase "exterior walls" is deleted from exception 1 because that's the subject of the entire section, and opening protection isn't required anywhere else. Other edits are intended to make the exception read more clearly.

In Section 704.8.2, it is the openings that are required to be protected; fire doors and shutters are the method of protecting the openings.

Editor's note: The phrase "as applicable in Section 101.2" has been deleted from Table 704.8 Footnotes C, E and G of the original proposal. During the previous code cycle the Code Correlating Committee took action to delete this phrase from the IBC since it is not necessary. Therefore this phrase will not be added back into the code as a part of proposal FS24-06/07.

Final Action: AS AM AMPC____ D

FS25-06/07
704.10

Proposed Change as Submitted:

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

704.10 Vertical exposure. 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 ~~adjoining~~ building or ~~adjacent~~ structure ~~that is within a horizontal~~ based on assuming an imaginary line between them. The opening protectives are required where the fire separation distance ~~of~~ between the imaginary line and the adjacent building or structure is less than 15 feet (4572 mm) ~~of the wall in which the opening is located~~. Application of the exception to Section 704.3 for two or more buildings on the same lot as portions of one building is not permitted.

> **Exception**: Opening protectives are not required where the roof construction 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 ~~adjoining building~~ 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. Application of the exception to Section 704.3 for two or more buildings on the same lot as portions of one building is permitted.

Reason: The purpose of this proposal is to correct technical flaws in the current provisions on vertical exposure of the exterior walls of a building by an adjacent (lower) building or structure. The threshold for requiring opening protection is a horizontal fire separation distance of less than 15 feet. By definition (see Section 702.1), fire separation distance is measured from a building face to an interior lot line, the centerline of a public way, or an imaginary line between two buildings on the same lot. The current language does not establish the existence of an imaginary line from which to measure fire separation distance.

It is possible that an imaginary line could exist between the buildings. Section 704.3 requires the assumption of an imaginary line between two adjacent buildings on the same lot for the purpose of determining required wall and opening protection and roof covering requirements. The exception to Section 704.3, however, permits two or more buildings on the same lot to be considered portions of one building making the presence of an imaginary line moot.

The threshold for requiring opening protection in Section 704.10 is also a single horizontal fire separation distance of less than 15 feet. Since fire separation distance is measured between the faces of two buildings on the same lot and an imaginary line between them, there are always two fire separation distances, not just one fire separation distance. It is not clear from the current language which one of the fire separation distances is intended.

The proposal corrects these and other technical flaws by establishing the presence of an imaginary line between the buildings and by basing the requirement for opening protection on the fire separation distance between the imaginary line and the adjacent (lower) building or structure. Establishing an imaginary line eliminates the option of considering the buildings as portions of one building, which is permitted by the exception to Section 704.3. Instead, the fire separation distance between the imaginary line and higher building must be considered and fire resistance and opening protection will be required at the exterior wall of the higher building based on that fire separation distance (see Section 704.3). Consequently, opening protection may be required at areas of the exterior wall other than required by Section 704.10. It is also conceivable that opening protection may be prohibited or limited in area based on the more severe of the provisions in Sections 704.3 and 704.10. A sentence is added at the end of Section 704.10 making it clear that the exception to Section 704.3 is not permitted to be used in this case.

In the exception to Section 704.10, "of the adjacent building or structure" is added because it is not clear from the current language which roof construction is intended: the higher building or the adjacent (lower) building or structure. Also, "adjoining building" is replaced by "exterior wall facing the imaginary line" because the current language literally requires the roof construction of one of the buildings (which one is not clear) to be 1-hour fire-resistance-rated for a distance of 10 feet from the adjoining building, which could apply to the fire separation distance and not to any portion of the roof construction of either building.

The exception to Section 704.10 intends to exempt the requirements for opening protectives at the higher building provided the roof of the adjacent (lower) building or structure is 1-hour fire-resistance-rated for at least 10 feet from the exterior wall facing the imaginary line. If this exception is employed, it is reasonable to permit the exception to Section 704.3 permitting two or more buildings on the same lot to be considered as portions of the same building to also be employed. The proposal adds language making this clear.

The reference to "horizontal" for fire separation distance is deleted for consistency with use of "fire separation distance" without reference to "horizontal" elsewhere in the code (i.e., Section 704.5 and Table 704.8).

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

Committee Action: **Disapproved**

Committee Reason: The proponent requested disapproval so that he could continue to work with others to resolve some concerns. Additionally the committee did note that the last sentence of Section 704.10 was not clear.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Philip Brazil, Reid Middleton, Inc. representing himself, requests Approval as Modified by this public comment.

Replace proposal with the following:

704.10 Vertical exposure. 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 ~~adjoining~~ building or ~~adjacent~~ structure ~~that is within a horizontal~~ based on assuming an imaginary line between them. The opening protectives are required where the fire separation distance ~~of~~ between the imaginary line and the adjacent building or structure is less than 15 feet (4572 mm) ~~of the wall in which the opening is located~~.

Exceptions:

1. Opening protectives are not required where the roof construction 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 ~~adjoining building~~ 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 704.3 are not required to comply with Section 704.10.

Commenter's Reason: The public comment revises the original proposal by establishing that buildings on the same lot and considered as portions of one building in accordance with Section 704.3 are exempt from the requirements of Section 704.10. The original proposal prohibited application of the exception to Section 704.3 for buildings on the same lot from the basic requirement of Section 704.10, but permitted its application when compliance with the exception to Section 704.10 is chosen over the basic requirement. This public comment recognizes that the concept behind the exception to Section 704.3 is equally valid when applying the requirements of Section 704.10.

The exception to Section 704.3 permitting two buildings on the same lot to be considered as portions of the same building recognizes that two such buildings pose no greater hazard to the occupants than if they were combined into a single building of equivalent building area and building height. In the case of Section 704.3, the hazard to each building is fire exposure from the exterior wall of the opposite building. In the case of Section 704.10, the hazard to the higher building is fire exposure from the roof of the opposite (lower) building. Two buildings on the same lot that qualify for exemption from the requirements of Section 704.3 should also be permitted to qualify for exemption from the requirements of Section 704.10

Final Action: AS AM AMPC____ D

FS26-06/07
704.11

Proposed Change as Submitted:

Proponent: Joe Holland, Hoover Treated Wood Products, Inc.

704.11 Parapets. Parapets shall be provided on exterior walls of buildings.

Exceptions: A parapet need not be provided on an exterior wall where any of the following conditions exist:

1. The wall is not required to be fire-resistance rated in accordance with Table 602 because of fire separation distance.
2. The building has an area of not more than 1,000 square feet (93 m^2) on any floor.
3. Walls that terminate at roofs of not less than 2-hour fire-resistance-rated construction or where the roof, including the deck and supporting construction, is constructed entirely of noncombustible materials or fire-retardant-treated wood.
4. One-hour fire-resistance-rated exterior walls that terminate at the underside of the roof sheathing, deck or slab, provided:
   4.1. Where the roof/ceiling framing elements are parallel to the walls, such framing and elements supporting such framing shall not be of less than 1-hour fire-resistance-rated construction for a width of 4 feet (1220 mm) for Groups R and U and 10 feet (3048 mm) for other occupancies, measured from the interior side of the wall.
   4.2. Where roof/ceiling framing elements are not parallel to the wall, the entire span of such framing and elements supporting such framing shall not be of less than 1-hour fire-resistance-rated construction.
   4.3. Openings in the roof shall not be located within 5 feet (1524 mm) of the 1-hour fire-resistance-rated exterior wall for Groups R and U and 10 feet (3048 mm) for other occupancies, measured from the interior side of the wall.
   4.4. The entire building shall be provided with not less than a Class B roof covering.
5. In Groups R-2 and R-3 where the entire building is provided with a Class C roof covering, the exterior wall shall be permitted to terminate at the underside of the roof sheathing or deck in Type III, IV and V construction, provided:
   5.1. The roof sheathing or deck is constructed of approved noncombustible materials or of fire-retardant-treated wood for a distance of 4 feet (1220 mm); or
   5.2. The roof is protected with 0.625-inch (16 mm) Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members for a minimum distance of 4 feet (1220 mm).
6. Where the wall is permitted to have at least 25 percent of the exterior wall areas containing unprotected openings based on fire separation distance as determined in accordance with Section 704.8.

Reason: To allow the elimination of a parapet when the roof structure is constructed with FRTW.

FRTW has several unique characteristics that allow it to be used in roof construction: A fire can not be started with FRTW; when exposed to fire from an external source it will not spread the fire, once the external source of the fire is consumed or extinguished the FRTW will self extinguish.

Section 2303.2 of the IBC mandates FRTW be tested using ASTM E84. The material must have a Class A flame spread index (25 or less) (materials in the marketplace are in the 10 to 15 range). The test must be extended an additional 20 minutes. During the extended test, the flame front can not progress more than 10 ½ feet beyond the centerline of the burners and at the end of the 20 minutes it must not show any significant progressive combustion.

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

Committee Action: **Approved as Submitted**

Committee Reason: This proposal adds a recognized material that will not contribute to flame spread. Including this option provides additional choice to allow the use of fire-retardant-treated wood in lieu of a parapet.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Laura Blaul, Orange County Fire Authority and Lorin Neyer, California Office of Statewide Health Planning & Development, requests Disapproval.

Commenter's Reason: Fire retardant treated wood is tested and approved to ASTM E84 standards for determination of flame spread rating and smoke development. Noncombustible materials are tested and approved to ASTM E136 standards, far more restrictive than E84 standards. There is no equivalency between these 2 standards. In order to test the noncombustibility characteristics of FRTW, it must be tested and comply with recognized E136 standards in order to be qualified as a noncombustible material. Additionally, IBC §703.4.1 states “Materials required to be noncombustible shall be tested in accordance with ASTM E136”, so if FRTW is going to be accepted as an alternative to traditional noncombustible materials, it must also meet model code for ASTM E136 requirements.

Final Action: AS AM AMPC____ D

FS29-06/07
705.5.1

Proposed Change as Submitted:

Proponent: Philip Brazil, P.E., Reid Middleton, Inc., representing himself

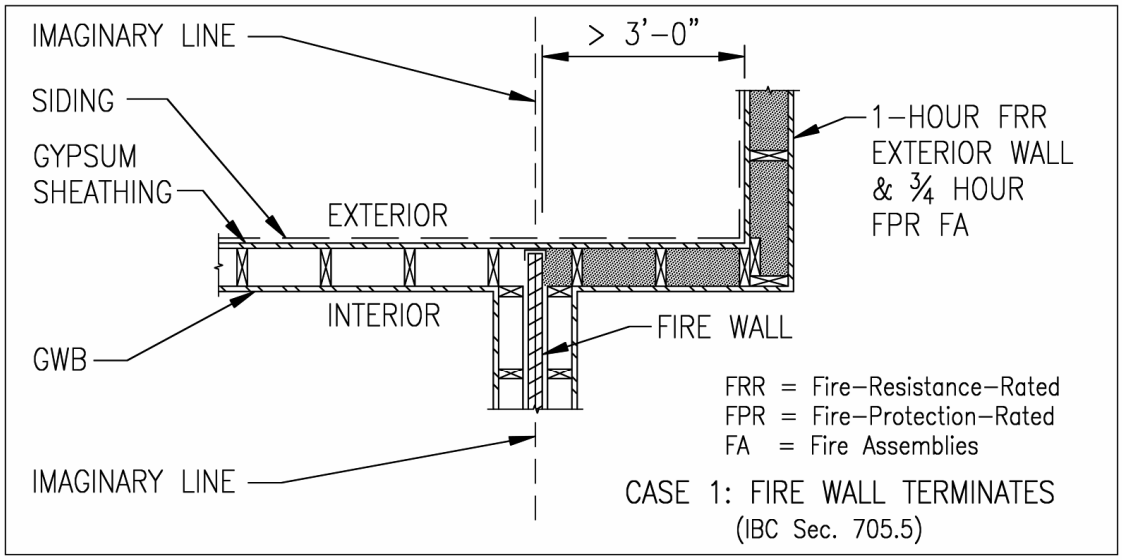
705.5.1 Exterior walls. Where the fire wall ~~intersects the~~ terminates within an exterior ~~walls the fire-resistance rating for the exterior walls on both sides of the fire wall shall have a 1-hour fire-resistance rating with 3/4-hour opening protection where opening protection is required. The fire-resistance rating of the exterior wall shall extend a minimum of 4 feet (1220 mm) on each side of the intersection of the fire wall to exterior wall~~ as permitted by Section 705.5, the buildings on either side of the fire wall shall be assumed to have an imaginary line between them. The location of the assumed imaginary line shall be such that the exterior wall and opening protection of each building shall comply with the criteria set forth in Sections 704.5 and 704.8. Such protection is not required for exterior walls ~~intersections~~ terminating at fire walls that form an angle equal to or greater than 180 degrees (3.14 rad) ~~do not need exterior wall protection~~.

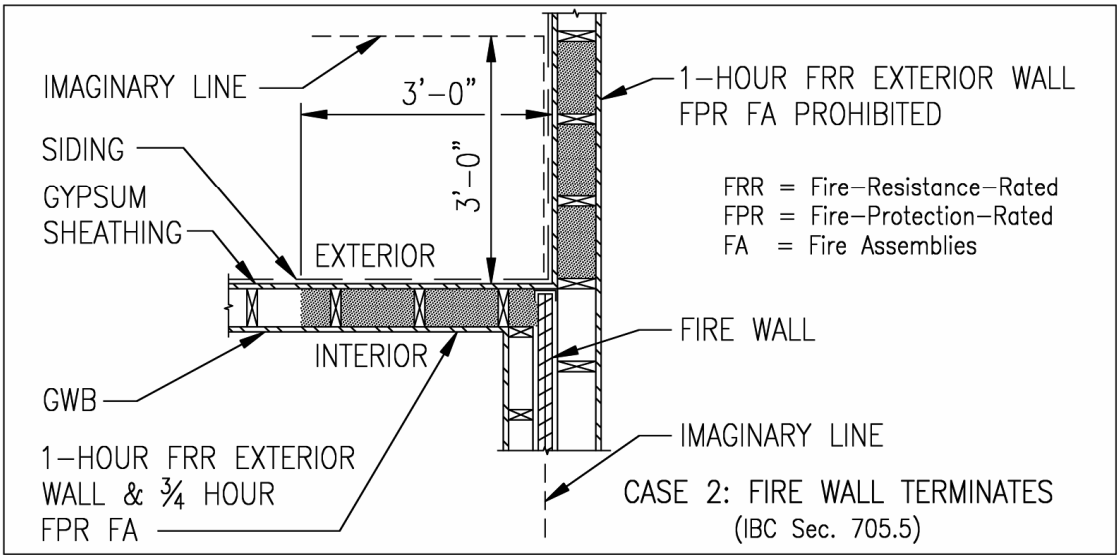
Reason: Section 705.1 states that each portion of a building separated by one or more fire walls complying with Section 705 shall be considered a separate building. Section 704.3 states that buildings on the same lot shall be assumed to have an imaginary line between them. This imaginary line is employed in the same fashion as a lot line is used between buildings on adjoining lots. It determines the required fire resistance and opening protection of exterior walls at buildings on the same lot. This approach is equally valid at portions of buildings considered separate buildings due to the presence of a fire wall. The purpose of this proposal is to establish requirements for the protection of exterior walls on either side of fire walls that are comparable to the requirements for buildings on the same lot.

The proposal also addresses several problematic aspects of the current provisions. Section 705.5.1 applies to exterior walls intersected by fire walls, not exterior walls where fire walls are permitted to terminate. Consequently, the current requirements are limited to the basic case of horizontal continuity: extension of the fire wall at least 18 inches beyond the exterior surface of the exterior walls. The current requirements do not apply when the exceptions to Section 705.5 are employed, which permit termination within the exterior wall (i.e., interior surface of exterior sheathing). The hazard addressed by Section 705.5.1, however, is more evident when the exceptions to Section 705.5 are employed rather than the basic case.

Determining the fire-resistance rating and opening protection of the exterior wall “where opening protection is required” is also problematic. The protection ought to be based on the proximity of the exterior wall on one side of the fire wall to the exterior wall on the other side of the fire wall, which is moot when the exterior angle formed by the exterior walls is equal or greater than 180 degrees.

The accompanying diagrams illustrate applications of the proposed changes requiring fire-resistance-rated construction at the exterior wall on either side of the fire wall but also permitting openings at certain fire separation distances from the imaginary line provided they are 3/4-hour fire-protection-rated assemblies. Once permitted, the allowable percentage of fire-protection-rated would be small at small fire separation distances, increasing at larger distances until unprotected openings are permitted.





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

Committee Action: **Approved as Modified**

Further modify proposal as follows:

705.5.1 Exterior walls. Where the fire wall terminates within an exterior wall as permitted by Section 705.5, the buildings on either side of the fire wall shall be assumed to have an imaginary line between them. The location of the assumed imaginary line shall be such that the exterior wall and opening protection of each building shall comply with the criteria set forth in Sections 704.5 and 704.8. Such protection is not required for exterior walls terminating at fire walls that form an angle equal to or greater than 180 degrees (3.14 rad).

Committee Reason: This proposal helps explain how to deal with these items where the fire wall terminates at the exterior wall.

Analysis: This item needs to be reviewed based on the committee's later action to approve FS31-06/07. Without public comments, there will be coordination issues, see FS31.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Philip Brazil, P.E., Reid Middleton, Inc., representing himself, requests Approval as Modified by this public comment.

Further modify proposal as follows:

~~**705.5.1**~~ **705.5.2 Exterior walls**. Where the fire wall terminates within an exterior wall as permitted by Section 705.5, the buildings on either side of the fire wall shall be assumed to have an imaginary line between them. The location of the assumed imaginary line shall be such that the exterior wall and opening protection of each building shall comply with the criteria set forth in Sections 704.5 and 704.8. Such protection is not required for exterior walls terminating at fire walls that form an angle equal to or greater than 180 degrees (3.14 rad).

Commenter's Reason: This public comment on FS29 was submitted to accommodate the action to be taken by the ICC voting members on Proposal FS31. At the 2006/2007 ICC Final Action Hearings, I will ask that FS29 be heard after FS31. If FS31 is approved as submitted, I will ask that FS29 be approved as amended by this public comment. If FS31 is disapproved, I will ask that FS29 be approved as modified by the Fire Safety committee. This public comment requesting approval as modified for FS29 does nothing more than repeat the language in FS29 as approved by the Fire Safety Committee and change the section number so that the provisions will follow Section 705.5.1 as approved in FS31. Please refer to the reason statement with my public comment on Proposal FS31 for further information.

Final Action: AS AM AMPC____ D

FS31-06/07
705.5.1

Proposed Change as Submitted:

Proponent: Peter Bemelen, PE, City and County of Denver, representing Colorado Chapter ICC

Delete and substitute as follows:

~~**705.5.1 Exterior walls.** Where the fire wall intersects the exterior walls, the fire-resistance rating for the exterior walls on both sides of the fire wall shall have a 1-hour fire-resistance rating with 3/4-hour opening protection where opening protection is required. The fire-resistance rating of the exterior wall shall extend a minimum of 4 feet (1220 mm) on each side of the intersection of the firewall to exterior wall. Exterior wall intersections at fire walls that form an angle equal to or greater than 180 degrees (3.14 rad) do not need exterior wall protection~~.

705.5.1 Exterior walls. Where the fire wall intersects exterior walls, the fire-resistance rating and opening protection of the exterior walls shall comply with one of the following:

1. The exterior walls on both sides of the fire wall shall have a 1-hour fire-resistance rating with ¾ hour protection where opening protections is required by Section 704.8 The fire-resistance rating of the exterior wall shall extend a minimum of 4 feet (1220 mm) on each side of the intersection of the firewall to exterior wall. Exterior wall intersections at fire walls that form an angle equal to or greater than 180 degrees (3.14 rad) do not need exterior wall protection.
2. Buildings or spaces on both sides of the intersecting firewall shall assume to have an imaginary lot line at the firewall and extending beyond the exterior of the firewall. The location of the assumed line in relation to the exterior walls and the firewall shall be such that the exterior wall and opening protection meet the requirements set forth in Section 704.5 and 704.8.

Reasons: Add flexibility to the provision. Add alternate method

The proposed language adds an alternate method to Section 705.5.1 by adding a similar application as allowed Section 704.3 by inclusion of assumed property lines for determination of exterior wall and opening protections. This application will add flexibility to the design and still meets the intent of the present code section, that is to prevent the spread of fire and smoke to the adjacent building at the fire wall. For example, a fire wall terminating at exterior walls that intersect at 90 degrees from each other, with construction type of II-B, would allow one exterior wall to have a one hour fire resistance rating without any openings for 10 ft and the other exterior wall and openings to be unprotected.

The proposed method has been an acceptable method for many years and presently is allowed per section 704.3 under similar circumstances.

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

Committee Action: **Approved as Submitted**

Committee Reason: This proposal provides a better clarification for how to handle walls which are at an angle greater than 180 degrees. This item needs to be reviewed based on the previous action to approve FS29-06/07.

Analysis: Public comments may be needed to coordinate FS29 and FS31 and address any inconsistencies or conflicts which may result if both items are approved. Some committee members expressed that they liked the numbered list that this proposal provided as compared to FS29.

Assembly Action: **None**

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

Public Comment:

Philip Brazil, Reid Middleton, Inc. , representing himself, requests Disapproval.

Commenter's Reason: At the 2006/2007 ICC code development hearings, Proposal FS29 was approved as modified (slight editorial change) and Proposal FS31 was approved as submitted. I am the proponent of Proposal FS29. I don't believe Proposals FS29 and FS31 as currently written are compatible. ICC staff has indicated to me that the proposals will likely be submitted to the Code Correlation Committee for resolution unless action is taken at the final action hearings. Because of this, I have submitted public comments on Proposals FS29 and FS31.

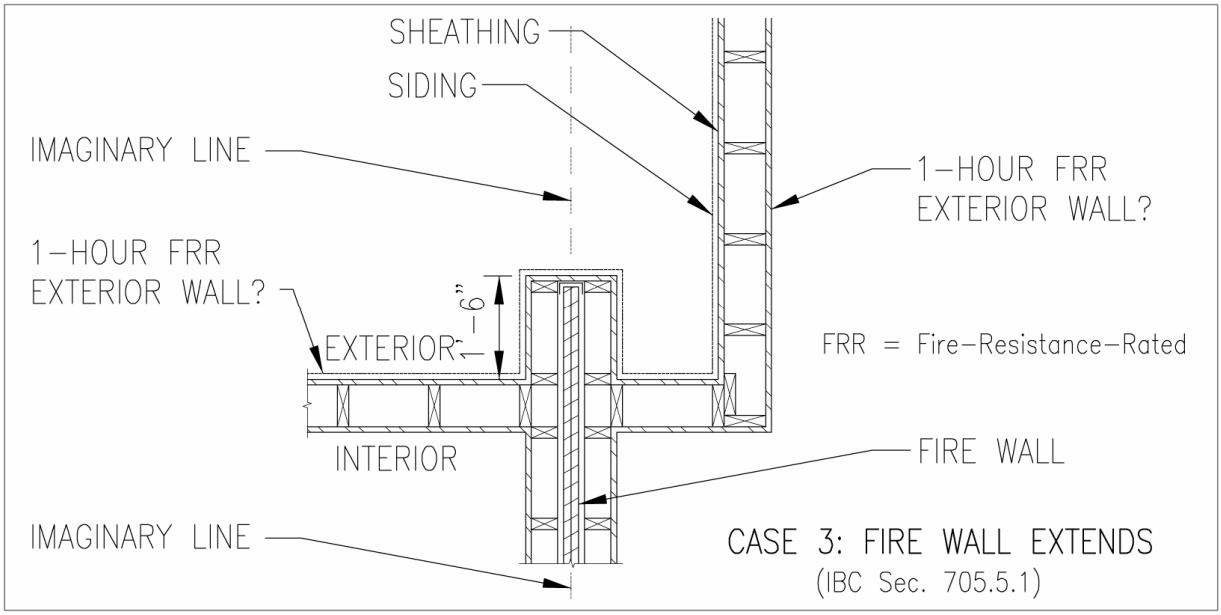
As the proponent of Proposal FS29, I am in support of its approval by the Fire Safety Committee. I am not opposed to Proposal FS31 so much as I don't believe it is warranted. Some of my reasoning can be found in the reason statement for FS29. I am requesting disapproval of FS31 in my public comment not with the expectation that it will be disapproved but to bring it before the voting members of ICC so that they can decide whether it is warranted. If you vote for approval of FS31 as submitted, I will ask for approval of FS29 as modified by my public comment. My public comment to FS29-06/07 does nothing more than repeat the language in FS29 as approved by the Fire Safety Committee and change the section number so that the provisions will follow Section 705.5.1 as approved in FS31. If you vote for disapproval of FS31, I will ask for approval of FS29 as modified.

IBC Section 705.5 requires fire walls to extend at least 18 inches beyond the exterior surface of exterior walls (i.e., intersecting fire walls). The exceptions to Section 705.5 permit a fire wall to terminate within the exterior wall, typically against the interior surface of the exterior wall's exterior side (i.e., penetrating fire walls). The former creates exterior walls on either side of the fire wall. The latter keeps the exterior wall intact.

Section 705.5.1 considers the design condition where the exterior walls on either side of an intersecting fire wall form an angle less than 180 degrees at their exterior surfaces, which is applicable to the basic requirement in Section 705.5. Section 705.5.1, however, does not consider the same design condition at penetrating fire walls. I consider the fire hazard to exterior walls higher at penetrating fire walls than at intersecting fire walls because the intersecting fire wall provides protection for the exterior walls while the penetrating fire wall does not. FS29 changes Section 705.5.1 from being about intersecting fire walls to being about penetrating fire walls.

The reason statement for FS29 does not directly address why protection is not warranted for intersecting fire walls but the accompanying diagram illustrates why it should be evident that there are architectural limits to creating a hazard needing to be addressed. The exterior walls in the diagram are not necessarily fire-resistance-rated. Fire resistance of the exterior walls on either side of the intersecting fire wall and protection of openings in the exterior walls are warranted if the fire wall alone does not provide sufficient protection for the areas of the building on either side it. In my opinion, the fire wall alone provides adequate protection of the building areas except for the rarest of architectural configurations.

Approval of Proposal FS31 as submitted will maintain requirements for protection of the exterior walls on either side of intersecting fire walls by replacing the current language in Section 705.5.1 with the language in the proposal. Disapproval of FS31 will eliminate the requirements.



Final Action: AS AM AMPC____ D

FS35-06/07
706.2.1

Proposed Change as Submitted:

Proponent: Kate Steel, Piedmont, CA, representing Fire & Safety Glazing Council

Revise as follows:

706.2.1 Fire-resistance-rated glazing. Fire-resistance-rated glazing, when tested in accordance with ASTM E 119 and complying with the requirements of Section 706, shall be permitted. Fire-resistance-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard, and the ~~identifier "W-XXX," where the "XXX" is the fire-resistance rating in minutes~~ classification required in Section 715.3.3. Such label or identification shall be issued by an approved agency and shall be permanently affixed to the glazing.

Reason: The Fire & Safety Glazing Council ("FGSC") is a division of the Americas Glass Association. Members of FGSC's Steering Committee represent building code officials, consumer safety advocates, testing and listing certification agencies, glazing manufacturers and distributors, and fire-rated door and frame manufacturers.

The current labeling system of W-XXX, D-NH/H NT/T -XXX and OH-XXX for fire-rated glazing products is confusing, and unworkable. Fire-rated glazing manufacturers and distributors and fire-rated door and frame manufacturers came to FSGC and asked FGSC to assist in developing a simple system that addresses the performance differences of glazing products and frame systems that will assist the end-user in selecting the proper product for specific end uses.

FGSC solicited the input of code officials, architects, fire-rated glazing and fire-rated door and frame manufacturers, test and certification agencies, and came up with a simple system that identifies the critical differences of the two types for fire performance recognized under the International Building Code and NFPA 80—fire-***resistance*** performance of building products tested to ASTM E119 (NFPA 251, UL 263) that protect against radiant heat transfer by limiting temperature rise to 250F degrees, distinct from fire-***protection*** performance of products tested NFPA 252 (UL 10b) and NFPA 257 (UL 9) that remain in the opening without through openings for the designated rating period, but don't protect against radiant heat transfer.

This proposed code change coordinates with proposed addition of a new section 715.3.3, which will require classification and labeling of glazing as "R" for meeting fire-resistance and limited temperature rise criteria in accordance with ASTM E119, or "P" for fire-protection testing of fire endurance capabilities to NFPA 252 and 257. The terms "resistance " and "protection" have become terms of performance distinctions under U.S. codes and the R and P classification system would help reinforce those distinctions.

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

Analysis: As written, this code change is related to and dependent on the approval of the proponent's code change FS103-06/07 which adds a new Section 715.3. Approval of this item without approval of the other code change would require modification.

Committee Action: **Disapproved**

Committee Reason: This action is taken based on the committee actions taken on FS103, FS117 and FS127. Because proposal FS103-06/07 was not approved, this provides consistency with the action taken on that item.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Donn Harter, Placerville, CA, representing Fire & Safety Glazing Council, requests Approval as Modified by this public comment.

Modify proposal as follows:

~~**706.2.1.**~~ **703.5 Fire-resistance-rated glazing.** Fire-resistance-rated glazing when tested in accordance with ASTM E119 and complying with the requirements of Section 706 shall be permitted. Fire resistance-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and the identifier "~~W-~~ R - XXX" where the "XXX" is the fire resistance rating in minutes. Such label or identification shall be issued by an approved agency and shall be permanently affixed.

Commenter's Reason: The Fire & Safety Glazing Council ("FGSC") is a division of the Americas Glass Association. Members of FGSC's Steering Committee represent building code officials, consumer safety advocates, testing and listing certification agencies, glazing manufacturers and distributors, and fire-rated door and frame manufacturers.

FGSC solicited the input of code officials, architects, fire-rated glazing and fire-rated door and frame manufacturers, test and certification agencies, and came up with a simple system that identifies the critical differences of the two types for fire performance recognized under the International Building Code and NFPA 80—an "R" designation and label to indicate fire-***resistance*** performance of

building products tested to ASTM E119 (NFPA 251, UL 263) that protect against radiant heat transfer by limiting temperature rise to 250F degrees, distinct from a "P" designation and label to indicate fire-***protection*** performance of products tested NFPA 252 (UL 10b) and NFPA 257 (UL 9) that remain in the opening without through openings for the designated rating period, but don't protect against radiant heat transfer.

The designation R, instead of W, reduces confusion when fire-resistance-rated glazing is used in fire door and window assemblies, and not as a wall assembly, as provided in the code change approved by the Fire Safety Committee as FS101-06/7 (See footnote below). FSGC members believe that users will be confused that "W" means window, and submit that it is more helpful to label the performance of the glazing as "R" for fire-resistance, which will then tell the user the glazing meets the fire endurance and temperature rise limit test acceptance criteria of ASTM E119, whether it is being used as a wall assembly, or a fire door or window opening protective.

This proposed code change coordinates with the proposed labeling of "P" for fire ***protection*** rated glazing tested for fire endurance capabilities to NFPA 252 and 257. The terms "resistance " and "protection" have become terms of performance distinctions under U.S. codes and the R and P labeling system would help reinforce those distinctions.

This Public Comment relates to Public Comment to FS103-06/07, FS116-06/07 and FS127-06/07.

Footnote listed from above:
The text of that public proposal and supporting reason is as follows:
715.2 Fire-resistance-rated glazing. ~~*Labeled f*~~ *Fire resistance-rated glazing tested as part of a fire-resistance-rated wall assembly in accordance with ASTM E119 and labeled in accordance with Section 706.2.1 shall be permitted in fire doors and fire window assemblies in accordance with their listings and shall not otherwise be required to comply with this section.*
***Reason**: Currently the code exempts fire-resistance rated glazing from the requirements of Section 715 because such glazing should not be considered an opening since it has been tested and meets the performance requirements for a fire resistance rated wall assembly. However, the current Code provisions do not clearly indicate that such glazing shall be permitted to be used wherever fire-protection-rated glazing is permitted. The purpose of this proposal is to make clear how fire-resistance rated glazing used in fire doors and fire window assemblies should be labeled. Confusion could exist as to whether it should be labeled with a "W" in accordance with 706.2.1, or a "D" in accordance with 715.4.6.3.1, or an "OH" in accordance with 715.5.8.1. The proposed revision makes clear that a fire resistance rated glazing is to be labeled "W" wherever it is used, including fire doors and fire window assemblies.*

The Council's public comment modification will replace the "W" referred to by proponent of FS101 with an "R" marking, to reduce confusion when fire-resistance rated glazing is used in door and window assemblies.

Editor's note: The only change that needs to be considered as a part of this public comment is the change in designation from "W" to "R". This section will be relocated from Section 706.2.1 to Section 703.5 based upon the action of FS36-06/07. FS36-06/07 was Approved as Submitted and did not receive a public comment. Therefore the final action for FS36-06/07 is Approved as Submitted and Section 706.2.1 from the 2006 IBC will be relocated to Section 703.5.

Final Action: AS AM AMPC____ D

FS39-06/07

706.3, 706.3.1, 706.3.2, 706.3.3, 706.3.4, 706.3.5, 706.3.6, 706.3.7, 706.3.8, 706.3.9, Table 706.3.9

Proposed Change as Submitted:

Proponent: Philip Brazil, P.E, Reid Middleton, Inc., representing himself

706.3 Fire-resistance rating. The required fire-resistance rating of *fire barriers* shall ~~comply with this section~~ be as specified by other sections of this code or the *International Fire Code*.

706.3.1 Shaft enclosures. The fire-resistance rating of the fire barrier separating building areas from a shaft shall comply with Section 707.4.

~~**706.3.2 Exit enclosures**. The fire-resistance rating of the fire barrier separating building areas from an exit shall comply with Section 1020.1.~~

~~**706.3.3 Exit passageway**. The fire-resistance rating of the separation between building areas and an exit passageway shall comply with Section 1021.1.~~

~~**706.3.4 Horizontal exit**. The fire-resistance rating of the separation between building areas connected by a horizontal exit shall comply with Section 1022.1.~~

~~**706.3.5 Atriums**. The fire-resistance rating of the fire barrier separating atriums shall comply with Section 404.5.~~

~~**706.3.6 Incidental use areas**. The fire barrier separating incidental use areas shall have a fire-resistance rating of not less than that indicated in Table 508.2.~~

~~**706.3.7 Control areas**. Fire barriers separating control areas shall have a fire-resistance rating of not less than that required in Section 414.2.3.~~

~~**706.3.8 Separation of mixed occupancies**. Where the provisions of Section 508.3.2 are applicable, the fire barrier separating mixed occupancies shall have a fire-resistance rating of not less than that indicated in Section 508.3.2 based on the occupancies being separated.~~

706.3.~~9~~1. Single occupancy fire areas. The fire barrier or horizontal assembly, or both, separating a single occupancy into different fire areas shall have a fire-resistance rating of not less than that indicated in Table 706.3.~~9~~1.

TABLE 706.3.~~9~~1
FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS

OCCUPANCY GROUP	FIRE-RESISTANCE RATING (hours)
H-1, H-2	4
F-1, H-3, S-1	3
A, B, E, F-2, H-4, H-5, I, M, R, S-2	2
U	1

Reason: Code change proposal FS2-04/05 (AMPC1) changed the concept of a fire barrier from being a fire containment assembly to begin a component of a fire containment assembly. This was accomplished by changing the definition of fire barrier from begin a vertical or horizontal assembly to being a wall assembly and by deleting the provisions for horizontal fire barriers. Consequently, a fire barrier does not necessarily provide a separation. In order for there to be a fire containment separation or enclosure, one or more fire barriers or one or more horizontal assemblies are needed, and a combination of fire barriers and horizontal assemblies may also be needed. Thus, the references in Sections 706.3.1 through 706.3.8 to fire barriers separating buildings and other areas are technically incorrect.

Section 706.3 states that the fire-resistance rating of fire barriers shall comply with this section (i.e., Sections 706.3.1 through 706.3.9). This implies that the required fire-resistance ratings for fire barriers are specified in Section 706.3. This is also technically incorrect because the IBC and IFC contain numerous requirements for fire-resistance ratings of fire barriers that are not specified in Sections 706.3.1 through 706.3.9. Sections 706.3.1 through 706.3.8 serve little purpose other than to reference other code sections where some of the required fire-resistance ratings are currently specified. Consequently, the references are superfluous. The one exception to this is Section 706.3.9, which provides technical provisions for fire barriers and horizontal assemblies between fire areas. The charging language for the technical provisions is found in Section 901.7.

Rather than eliminate the references to separations in Sections 706.3.1 through 706.3.8 and add approximately 40 additional sections after Section 706.3.9 referencing the required fire-resistance ratings for fire barriers elsewhere in the IBC and IFC, this proposal deletes Sections 706.3.1 through 706.3.8. A list of the provisions for fire barriers in the 2003 IBC and IFC can be found in the reason statement for code change proposal FS40-03/04.

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

Analysis: Copies of and information about code changes from previous code change cycles can be obtained at http://www.iccsafe.org/cs/codes.

Committee Action: Approved as Modified

Modify the proposal as follows:

706.3 Fire-resistance rating. The required fire-resistance rating of *fire barriers* shall be as specified by other sections of this code ~~or the International Fire Code~~.

~~**706.3.1 Shaft enclosures**. The fire-resistance rating of the fire barrier separating building areas from a shaft shall comply with Section 707.4.~~

706.3.1. Single occupancy fire areas. The fire barrier or horizontal assembly, or both, separating a single occupancy into different fire areas shall have a fire-resistance rating of not less than that indicated in Table 706.3.1.

TABLE 706.3.1
FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS

OCCUPANCY GROUP	FIRE-RESISTANCE RATING (hours)
H-1, H-2	4
F-1, H-3, S-1	3
A, B, E, F-2, H-4, H-5, I, M, R, S-2	2
U	1

(Portions of proposal not shown remain unchanged)

Committee Reason: As stated in the proponent's reason statement, this helps to continue with the clarifications which are needed as a result of code change FS2-04/05 during the previous cycle and addresses the fact that a single barrier does not form a separation. This will also help to resolve some of the reference conflicts by the elimination of the references which did not provide a complete listing of the requirements. The modification deleting Section706.3.1 simply addresses what was intended and stated in the reason statement while deleting the IFC removes an unneeded reference which is really not within the building official's control.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Laura Blaul, Orange County Fire Authority and Lorin Neyer California Office of Statewide Health Planning & Development, representing California Fire Chiefs, requests Disapproval.

Commenter's Reason: From a user's perspective, this section is a helpful reference to navigate through the code. It allows the user to gather specific information in one place to locate other requirements of similar conditions. Since this is only a reference tool, there is no duplication of language within the code. The user can then follow the requirements of interest without frustration of maneuvering through irrelevant sections of code just to get an answer.

Final Action: AS AM AMPC____ D

FS41-06/07
706.5, 706.5.1 (New), 706.5.2 (New)

Proposed Change as Submitted:

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

706.5 Continuity. Fire barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, such as the space above a suspended ceiling. ~~The supporting construction for fire barriers shall be protected to afford the required fire-resistance rating of the fire barrier supported, except for 1 hour fire resistance rated incidental use area separations as required by Table 508.2 in buildings of Type IIB, IIIB and VB construction. Hollow vertical spaces within a fire barrier shall be fireblocked in accordance with Section 717.2 at every floor level.~~

~~**Exceptions:**~~

1. ~~The maximum required fire-resistance rating for assemblies supporting fire barriers separating tank storage as provided for in Section 415.6.2.1 shall be 2 hours, but not less than required by Table 601 for the building construction type.~~
2. ~~Shaft enclosures shall be permitted to terminate at a top enclosure complying with Section 707.12.~~

706.5.1 Supporting Construction. The supporting construction for fire barrier walls shall be protected to afford the required fire-resistance rating of the fire barrier supported, except for 1-hour fire-resistance-rated incidental use area separations as required by Table 508.2 in buildings of Type IIB, IIIB and VB construction. Hollow vertical spaces within a fire barrier shall be fireblocked in accordance with Section 717.2 at every floor level.

Exceptions:

1. The maximum required fire-resistance rating for assemblies supporting fire barriers separating tank storage as provided for in Section 415.6.2.1 shall be 2 hours, but not less than required by Table 601 for the building construction type.
2. Shaft enclosures shall be permitted to terminate at a top enclosure complying with Section 707.12.

706.5.2 Fire Barrier and Floor/Ceiling Assembly Intersection. Gaps or voids created at the intersection of fire barrier walls and the underside of the floor or roof slab or deck above, shall be protected by an approved fire-resistant joint system designed to resist the passage of fire for a time period not less than the required fire-resistance rating of the fire barrier wall in which it is installed. These fire-resistant joint systems shall be tested in accordance with Section 713.3.

Reason: The purpose of this proposed Code change is to simplify section 706.5 and clarify that the fire-resistant joint installed at the intersection of the top of a rated vertical fire barrier and a horizontal roof, floor, or roof slab is required to have a fire resistance rating equal to that of the wall assembly. This code change proposal does not change any of the existing Code requirements.

As currently written, the Code requirement mixes three different concepts in section 706.5, and then further complicates the issue by adding an exception for certain incidental use areas, making it difficult to discern the requirements. The existing section mixes the notion of "continuity" with that of establishing the fire resistance rating of the supporting construction. In doing so, it clouds the issue of the required rating for the joint located at the top of the fire barrier wall.

This proposed changes separates the requirements for the continuity of the vertical fire barrier from the requirement for the fire resistance ratings of the supporting construction. The fire-resistant joint located at the intersection of the top of a vertical fire barrier wall and the bottom of a fire resistance rated or non-fire resistance rated horizontal roof assembly, floor assembly, or roof slab is a vertical extension of the fire barrier wall and is therefore required to have a fire resistance rating equal to that of the wall assembly. This issue is distinct from whether or not the supporting construction is required to have a fire resistance rating or not. It is directly analogues to the horizontal condition where the fire resistant joint is considered an extension of the rated horizontal assembly. This principle is historically well established in the model Codes, and is similar to the way in which exterior curtain wall and floor intersections are handled in section 713.4.

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

Committee Action: Disapproved

Committee Reason: While the proposed Section 706.5.1 provides an easy to follow style, the proposed Section 706.5.2 makes technical revisions without really explaining the reason. This proposed section would regulate a rated wall and a non-rated floor deck which is a different approach from the existing code. Section 706.5.2 really just needs to direct users to 713 for joints, but it is not needed because existing Section 706.9.2 already addresses this. The joint ratings should be placed into the existing section 706.9. The term "gaps and voids" are not defined and could get into very small joints in materials or other locations. The committee felt that existing Sections 706.8, 706.9 and 717.2 adequately handle most of the concerns.

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 proposal as follows:

706.5 Continuity. Fire barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, such as the space above a suspended ceiling.

706.5.1 Supporting Construction. The supporting construction for fire barrier walls shall be protected to afford the required fire-resistance rating of the fire barrier supported, except for 1-hour fire-resistance-rated incidental use area separations as required by Table 508.2 in buildings of Type IIB, IIIB and VB construction. Hollow vertical spaces within a fire barrier shall be fireblocked in accordance with Section 717.2 at every floor level.

Exceptions:

1. The maximum required fire-resistance rating for assemblies supporting fire barriers separating tank storage as provided for in Section 415.6.2.1 shall be 2 hours, but not less than required by Table 601 for the building construction type.
2. Shaft enclosures shall be permitted to terminate at a top enclosure complying with Section 707.12.

706.5.2 Fire Barrier and Floor/Ceiling Assembly Intersection. Joints installed at the intersection of fire barrier walls and the underside of the floor or roof slab or deck above, shall comply with Section 713. ~~Gaps or voids created at the intersection of fire barrier walls and the underside of the floor or roof slab or deck above, shall be protected by an approved fire-resistant joint system designed to resist the passage of fire for a time period not less than the required fire-resistance rating of the fire barrier wall in which it is installed. These fire-resistant joint systems shall be tested in accordance with Section 713.3.~~

Commenter's Reason: The existing section mixes the notion of "continuity" with that of establishing the fire resistance rating of the supporting construction. As a consequence, it also clouds the issue of the required rating for the joint located at the top of the fire barrier wall to provide continuity.

As currently written, the Code requirement mixes three different concepts in section 706.5, and then further complicates the issue by adding an exception for certain incidental use areas, making it difficult to sort out the requirements. This proposed change separates the requirements for the continuity of the vertical fire barrier from the requirement for the fire resistance ratings of the supporting construction. The fire-resistant joint located at the intersection of the top of a vertical fire barrier wall and the bottom of a fire resistance rated or non-fire resistance rated horizontal roof assembly, floor assembly, or roof slab is a vertical extension of the fire barrier wall and is therefore required to have a fire resistance rating equal to that of the wall assembly. This issue is distinct from whether or not the supporting construction is required

to have a fire resistance rating or not. It is directly analogues to the horizontal condition where the fire resistant joint is considered an extension of the rated horizontal assembly. This principle is historically well established in the model Codes, and is similar to the way in which exterior curtain wall and floor intersections are handled in section 713.4. The language in the proposed new section 706.5.2 has been further simplified to reflect comments received from the Committee during the last hearings.

Final Action: AS AM AMPC____ D

FS46-06/07

707.2, 712.1.1 712.3.3, 716.1.1 (IMC 607.1.1) and 716.1.1.1 (New), (IMC 607.1.1.1) (New)

Proposed Change as Submitted:

Proponent: Vickie Lovell, Delray, FL, representing Air Movement and Control Association

707.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.
2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening or stairway that is not a portion of the means of egress protected according to Item 2.1 or 2.2:
   2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator or stairway and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
   2.2. Where the opening is protected by approved power-operated automatic shutters at every penetrated floor. 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 907.11 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.
3. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable and vents protected in accordance with Section 712.4.
4. A shaft enclosure is not required for penetrations by <u>air</u> ducts protected in accordance with Section ~~712.4~~ <u>716.5</u>. Grease ducts <u>and other hazardous exhaust ducts</u> shall be protected in accordance with the *International Mechanical Code*.
5. In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with the provisions for atriums in Section 404.
6. A shaft enclosure is not required for approved masonry chimneys where annular space protection is provided at each floor level in accordance with Section 717.2.5.
7. In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following:
   7.1. Does not connect more than two stories.
   7.2. Is not part of the required means of egress system, except as permitted in Section 1020.1.
   7.3. Is not concealed within the building construction.
   7.4. Is not open to a corridor in Group I and R occupancies.
   7.5. Is not open to a corridor on nonsprinklered floors in any occupancy.
   7.6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
   7.7. Is limited to the same smoke compartment.
8. A shaft enclosure is not required for automobile ramps in open and enclosed parking garages constructed in accordance with Sections 406.3 and 406.4, respectively.
9. A shaft enclosure is not required for floor openings between a mezzanine and the floor below.
10. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section 713.

11. A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 8 or 9 in Section 1020.1.
12. Floor openings protected by floor fire doors in accordance with Section 711.8.
13. Where permitted by other sections of this code.

~~712.3.3~~ 712.1.1 **Ducts and air transfer openings.** Penetrations of fire-resistance-rated walls by ducts that are not protected with dampers shall comply with Sections 712.2 through 712.3.~~1~~ 4. Penetrations of horizontal assemblies not protected with a shaft as permitted by Exception #4 of Section 707, and are not required to be protected with fire dampers by other sections of the code, shall comply with Sections 712.4 through 712.4.4. Ducts and air transfer openings that are protected with dampers shall comply with Section 716.

716.1.1 (IMC 607.1.1) Ducts that penetrate fire resistance rated assemblies without dampers. Ducts that penetrate fire-resistance-rated assemblies and are not required by this section to have dampers shall comply with the requirements of Sections 712.2 through 712.3.4. Ducts that penetrate horizontal assemblies not required to be contained within a shaft and are not required by this section to have dampers shall comply with the requirements of Sections 712.4 through 712.4.4

716.1.1.1 (IMC 607.1.1.1) Ducts that penetrate non-fire resistance rated assemblies The space around a duct penetrating a non-fire resistance rated wall assembly shall be filled with an approved material to limit the free passage of smoke. The space around a duct penetrating a non-fire resistance rated floor assembly shall comply with 716.6.3.

Reason: The incorrect correlation between sections 707, 712 and 716 has lead to mis-interpretation of the requirements for fire dampers by code users.

Fire dampers and through penetration firestops are not equivalent alternatives for one another. However, either could be considered an alternative to a shaft enclosure, under specific, appropriate conditions. The 2006 Edition of the IBC outlines the minimum requirements as to when fire dampers are required, and specific conditions as to when dampers can be omitted due to other provisions in the code. But the code also states that when ducts are not enclosed in a shaft, and are permitted to penetrate a fire resistance rated assembly without fire dampers, the assembly still must be protected with through penetration protection. Unfortunately, due to the way the code is currently formatted, that is not clearly laid out.

The current hierarchy of code sections in the 2006 IBC that applies to ducts is as follows:

1. Section 707 - Shafts are acceptable, traditional protection for duct penetrations through floor assemblies.
2. Exception 4 of Section 707 permits alternate protection of ducts and directs the user to 712.4 for the protection of penetrations
3. Section 712.4 .1.3 directs the user to Section 716 specifically for protection of ducts and air transfer openings.

The correct and more user friendly hierarchy of code sections that applies to ducts in floor assemblies should be as follows:

Section 707 - Shafts are acceptable, traditional protection for duct penetrations through floor assemblies.
Exception 4 of Section 707 permits alternate protection of ducts other than shafts and should send the user directly to Section 716, "Ducts and Air Transfer Openings", where the protection requirements specifically for ducts are located, or to the Mechanical Code for protection for exhaust ducts.
Where Section 716 (or some other section of the code) does not require a fire damper in the duct, then the section should send the user to 712.4 for protection requirements of the duct.

We believe that these code change proposals help the code user to more quickly find the correct method of protection for ducts.

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

Committee Action: **Approved as Modified**

Modify the proposal as follows:

707.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.
2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening or stairway that is not a portion of the means of egress protected according to Item 2.1 or 2.2:
   - 2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator or stairway and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
   - 2.2. Where the opening is protected by approved power-operated automatic shutters at every penetrated floor. 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 907.11 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.

3. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable and vents protected in accordance with Section 712.4.
4. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section 712.4. Grease ducts shall be protected in accordance with the *International Mechanical Code*.
5. In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with the provisions for atriums in Section 404.
6. A shaft enclosure is not required for approved masonry chimneys where annular space protection is provided at each floor level in accordance with Section 717.2.5.
7. In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following:
   7.1. Does not connect more than two stories.
   7.2. Is not part of the required means of egress system, except as permitted in Section 1020.1.
   7.3. Is not concealed within the building construction.
   7.4. Is not open to a corridor in Group I and R occupancies.
   7.5. Is not open to a corridor on nonsprinklered floors in any occupancy.
   7.6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
   7.7. Is limited to the same smoke compartment.
8. A shaft enclosure is not required for automobile ramps in open and enclosed parking garages constructed in accordance with Sections 406.3 and 406.4, respectively.
9. A shaft enclosure is not required for floor openings between a mezzanine and the floor below.
10. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section 713.
11. A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 8 or 9 in Section 1020.1.
12. Floor openings protected by floor fire doors in accordance with Section 711.8.
13. Where permitted by other sections of this code.

(Existing 712.3.3) 712.1.1 Ducts and air transfer openings. Penetrations of fire-resistance-rated walls by ducts that are not protected with dampers shall comply with Sections 712.2 through 712.3.~~1~~ 4. Penetrations of horizontal assemblies not protected with a shaft as permitted by Exception #4 of Section 707, and ~~are~~ not required to be protected with fire dampers by other sections of the code, shall comply with Sections 712.4 through 712.4.4. Ducts and air transfer openings that are protected with dampers shall comply with Section 716.

716.1.1 (IMC 607.1.1) Ducts that penetrate fire resistance rated assemblies without dampers. Ducts that penetrate fire-resistance-rated assemblies and are not required by this section to have dampers shall comply with the requirements of Sections 712.2 through 712.3.4. Ducts that penetrate horizontal assemblies not required to be contained within a shaft and ~~are~~ not required by this section to have dampers shall comply with the requirements of Sections 712.4 through 712.4.4

716.1.1.1 (IMC 607.1.1.1) Ducts that penetrate non-fire resistance rated assemblies. ~~The space around a duct penetrating a non-fire resistance rated wall assembly shall be filled with an approved material to limit the free passage of smoke.~~ The space around a duct penetrating a non-fire resistance rated floor assembly shall comply with 716.6.3.

Committee Reason: This proposal helps to provide references and direction to the applicable code section. These revisions should help clarify the application of the various sections. The modifications eliminate the changes in Section 707.2 item 4 which was acted on in FS45-06/07. The revision in 716.1.1.1 eliminates the requirement being applied to walls and leaves it so it simply references existing requirements for floors in 716.6.3. The revisions in Sections 712.1.1 and 716.1.1 are strictly editorial.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David P. Tyree, American Forest and Paper Association, requests Approval as Modified by this public comment.

Further modify proposal as follows:

716.1.1 (IMC 607.1.1) Ducts that penetrate fire resistance rated assemblies without dampers. Ducts that penetrate fire-resistance-rated assemblies and are not required by this section to have dampers shall comply with the requirements of Sections 712.2 through 712.3.4. Ducts that penetrate horizontal assemblies not required to be contained within a shaft and not required by this section to have dampers shall comply with the requirements of Sections 712.4 through 712.4.4.

716.1.1.1 (IMC 607.1.1.1) Ducts that penetrate non-fire resistance rated assemblies. The space around a duct penetrating a non-fire resistance rated assembly shall be filled with an approved material to limit the free passage of smoke. ~~The space around a duct penetrating a non-fire resistance rated floor assembly shall comply with 716.6.3.~~

(Portion of proposal not shown remain unchanged)

Commenter's Reason: There is virtually no reason to require a listed, labeled penetration fire stop system on a penetration of a non-rated assembly. This is particularly onerous for assemblies which are not even required to exist! Second, the proponent states that there is no cost impact of this change. Installation of these systems are now going to require certified installers as well as special inspections of the installation. In order for that be cost-nuetral, it has to be already occurring. If it is already being done, why is there an urgent rush to get it in the code? If it is NOT being done, it will most assuredly add significantly to costs

Final Action: AS AM AMPC____ D

FS47-06/07
707.2

Proposed Change as Submitted:

Proponent: Sarah A. Rice, C.B.O., Schirmer Engineering Corp., representing American Hotel & Lodging Association (AH&LA)

707.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.
2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening or stairway that is not a portion of the means of egress protected according to Item 2.1 or 2.2:
   2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator or stairway and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
   2.2. Where the opening is protected by approved power-operated automatic shutters at every penetrated floor. 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 907.11 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.
3. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable and vents protected in accordance with Section 712.4.
4. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section 712.4. Grease ducts shall be protected in accordance with the *International Mechanical Code*.
5. In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with the provisions for atriums in Section 404.
6. A shaft enclosure is not required for approved masonry chimneys where annular space protection is provided at each floor level in accordance with Section 717.2.5.
7. In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following:
   7.1. Does not connect more than two stories.
   7.2. Is not part of ~~the required means of egress system~~ an exit enclosure, except as permitted in Section 1020.1.
   7.3. Is not concealed within the building construction.
   7.4. Is not open to a corridor in Group I and R occupancies.
   7.5. Is not open to a corridor on nonsprinklered floors in any occupancy.
   7.6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
   7.7. Is limited to the same smoke compartment.
8. A shaft enclosure is not required for automobile ramps in open and enclosed parking garages constructed in accordance with Sections 406.3 and 406.4, respectively.

9. A shaft enclosure is not required for floor openings between a mezzanine and the floor below.
10. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section 713.
11. A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 8 or 9 in Section 1020.1.
12. Floor openings protected by floor fire doors in accordance with Section 711.8.
13. Where permitted by other sections of this code.

Reason: Section 707.2 contains 13 exceptions for when floor openings do not have to be enclosed in a shaft. Exception 7 specifically allows floor openings that meet the criteria outlined in 7.1 through 7.7 to not have to be enclosed in a shaft. Among the criteria is Exception 7.2 which reads "7.2 Is not part of the required means of egress system, except as permitted in Section 1020.1."

Using the term "means of egress" is incorrect and makes no sense, as by definition a means of egress is composed of 3 components; exit access, exit and exit discharge. If the floor opening cannot contain any part of the "required" means of egress system then it can't contain any of the exit access, exit or exit discharge for the building occupants – or in other words, circulation of occupants could never occur in that space as all spaces within a building are (with the exception of maybe small closets) either exit access, exit and exit discharge.

We feel that Exception 7.2 should read "7.2. Is not part of an exit enclosure, except as permitted in Section 1020.1."

The reference to Section 1020.1 within Exception 7.2 confirms the intent of this proposal is accurate. Section 1020 is Vertical Exit Enclosures, and more specifically Section 1020.1 contains exceptions for the enclosure requirements for vertical exits. Why reference those exceptions, if the portion of the means of egress that is being addressed in the sentence is not an "exit?"

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

Committee Action: Approved as Modified

Modify proposal as follows:

707.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this Section.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit and connecting four stories or less.
2. A shaft enclosure is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 for an escalator opening or stairway that is not a portion of the means of egress protected according to Item 2.1 or 2.2:
   2.1. Where the area of the floor opening between stories does not exceed twice the horizontal projected area of the escalator or stairway and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.
   2.2. Where the opening is protected by approved power-operated automatic shutters at every penetrated floor. 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 907.11 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.
3. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable and vents protected in accordance with Section 712.4.
4. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section 712.4. Grease ducts shall be protected in accordance with the *International Mechanical Code*.
5. In other than Group H occupancies, a shaft enclosure is not required for floor openings complying with the provisions for atriums in Section 404.
6. A shaft enclosure is not required for approved masonry chimneys where annular space protection is provided at each floor level in accordance with Section 717.2.5.
7. In other than Groups I-2 and I-3, a shaft enclosure is not required for a floor opening or an air transfer opening that complies with the following:
   7.1. Does not connect more than two stories.
   7.2. Is not part of ~~an~~ a required exit ~~enclosure~~, except as permitted in Section 1020.1.
   7.3. Is not concealed within the building construction.
   7.4. Is not open to a corridor in Group I and R occupancies.
   7.5. Is not open to a corridor on nonsprinklered floors in any occupancy.
   7.6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.
   7.7. Is limited to the same smoke compartment.
8. A shaft enclosure is not required for automobile ramps in open and enclosed parking garages constructed in accordance with Sections 406.3 and 406.4, respectively.
9. A shaft enclosure is not required for floor openings between a mezzanine and the floor below.
10. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section 713.
11. A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with Exception 8 or 9 in Section 1020.1.
12. Floor openings protected by floor fire doors in accordance with Section 711.8.
13. Where permitted by other sections of this code.

Committee Reason: This proposal helps to clarify the provisions regarding which part of the three-part means of egress system is excluded and being regulated by item 7.2. This will help to clarify situations such as those found in a mall building where there is a floor opening and the mall walkways occur adjacent to this opening. The modifications delete the word enclosure and limit the provision to "required" exits. This will clarify that supplemental stairs can be placed within the floor opening.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Thornberry, The Code Consortium, Inc., requests Disapproval.

Commenter's Reason: Although we may agree with the proponent of this code change proposal that Exception 7.2 may need some clarification in the wording, we do not believe that the modifications made by the original proponent or the Committee achieved the clarification that addresses the intent of that portion of the Exception to allow openings through a floor without a shaft enclosure. Therefore, we believe this code change proposal should be disapproved until more appropriate wording can be developed to clarify the means of egress system issue.

Certainly there is a significant difference between the required means of egress system and a required exit which is only one element of the means of egress system. We believe the original intent was that the opening was not to be used to contain a stairway or ramp that served as a part of the required means of egress. The current language appears to have been taken from the 1999 SBCCI Standard Building Code Section 705.2.2 Shaft Enclosures Exception 2.1. Therefore, we don't believe the wording should be changed without clearly understanding the intent of the Exception. Certainly its use as an exit stair is significantly different than if it is a means of egress stairway.

We do not agree with the proponent's Reason statement justifying the change which indicates that basically any portion of a building is part of the means of egress system and, therefore, any room containing an opening connecting two floors which is unenclosed would not qualify under the current wording to Exception 7.2. However, we believe it is clearly the intent of 7.2 that the opening itself not contain a means of egress element such as a stair or ramp. We see no problem with having a floor opening in a room without a shaft enclosure provided all the other conditions of Exception 7 are satisfied. Since the proposed code change as modified does not apparently meet the intent of the original code provision for Exception 7 for openings without enclosed shaft enclosures, we believe this code change proposal should be disapproved.

Final Action: AS AM AMPC____ D

FS51-06/07
707.14.1

Proposed Change as Submitted:

Proponent: Gregory J. Cahanin, Cahanin Fire & Code Consulting, representing Smoke Safety Council

707.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby shall separate the elevator shaft enclosure doors from each floor by fire partitions equal to the fire-resistance rating of the corridor and the required opening protection. Where other provisions of the Code do not require corridors to be fire-resistive, elevator lobbies shall be constructed as smoke partitions in accordance with Section 710, to provide an effective barrier to limit the transfer of smoke. 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 street floor, provided the entire street floor 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 707.2 are not required to have enclosed elevator lobbies.
3. Where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. In other than Group I-3, and buildings having occupied floors located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, 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.

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.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 707.14.2.

Reason: Lobbies served by corridors not required to be fire-resistance rated should meet the requirements for smoke partitions.

Several High-rise occupancies will not require fire-resistance rated corridors. Section 1017.1 and Table 1017.1 also have conditions that do not require corridors to have a fire-resistance rating.

The primary reason for lobby enclosures is to limit or prevent vertical smoke spread through elevator shafts. Lobby enclosures, which do not have a fire-resistance rating due to sprinklers or other considerations in the Code, should provide a barrier to limit the spread of smoke. Historically elevator shafts have provided an avenue for smoke spread in building fires resulting in loss of life. Lobby protection in accordance with Section 710 is therefore appropriate for lobbies.

Under the IBC many lobbies will open into non-rated corridors.

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

Committee Action: **Disapproved**

Committee Reason: As currently written, the proposal will only address the partition but does not address any door opening in the partition. The reason statement and testimony really does not explain what the problem is that is trying to be addressed. Because of the exceptions which currently exist, specifically exceptions 3 and 5, this proposal will have very limited application, if any.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Laura Blaul, Orange County Fire Authority and Lorin Neyer, California Office of Statewide Health, Planning & Development, representing California Fire Chiefs Association, requests Approval as Modified by this public comment.

Modify proposal as follows:

707.14.1 Elevator Lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects with more than three stories. The lobby shall separate the elevator shaft enclosure doors from each floor by fire partitions equal to the fire-resistance rating of the corridor and the required opening protection. Where other provisions of the Code do not require corridors to be fire ~~-resistive~~ resistance rated, elevator lobbies shall be constructed as smoke partitions in accordance with Section 710 with self- or automatic-closing doors ~~to provide an effective barrier to limit the transfer of smoke~~. 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 street floor, provided the entire street floor 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 707.2 are not required to have enclosed elevator lobbies.
3. Where additional doors are provided at the hoistway opening in accordance with Section 3002.6,.Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. In other than Group I-3, and buildings having occupied floors located more than 75 feet (22,860 mm) above the lowest level of fire department vehicle access, 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.
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.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 707.14.2.

Commenter's Reason: While agreeing with the intent of the original code change proposal, the clarification of a self- or automatic closing door further meets the intent of an effective barrier to limit the transfer of smoke. It is necessary to specify this requirement since Section 710 does not. The change from “fire-resistive” to the term “fire-resistance rated” provides consistency in code language.

Final Action: AS AM AMPC____ D

FS52-06/07
707.14.1

Proposed Change as Submitted:

Proponent: Bill Ziegert, Smoke Guard, division of RectorSeal

707.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby shall separate the elevator shaft enclosure doors from each floor by fire partitions equal to the fire-resistance rating of the corridor and the required opening protection. 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 street floor, provided the entire street floor 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 707.2 are not required to have enclosed elevator lobbies.
3. Where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. In other than Group I-2 and I-3, and buildings having occupied floors located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, 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.
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.
6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 707.14.2.

Reason: The purpose of the elevator lobby is to prevent smoke migration between floors. This change would clarify that elevator shaft smoke protection is required in I-2 occupancies.

Patients in hospitals and nursing homes are the least likely of building occupants to be able to provide self directed evacuation in a fire emergency. Currently the code requires the establishment of at least 2 smoke compartments on each floor which allows patients to be relocated to another area of the floor on the other side of the smoke barrier construction, however the elevator shaft penetrates the floor assemblies and the elevator hoistway doors allow excessive amounts of smoke to leak into the elevator shaft and then to other floors when the hoistway opening is not protected.

Many states and local jurisdictions already enforce a requirement such as this based upon either protection of entrances into corridors from smoke migration or alternately the requirement that the smoke compartments must seal all openings (vertical and horizontal) against the movement of smoke. Adding the proposed language to Exception 4 would insure uniform enforcement.

Cost Impact: The code change proposal will increase the cost of construction. There may be a cost increase in those jurisdictions not requiring this level of protection in I-2 occupancies now, however there is no cost increase for those jurisdictions already enforcing this requirement based upon other language in the IBC.

Committee Action: **Approved as Submitted**

Committee Reason: This proposal helps provide better smoke control within this occupancy which tends to use a “defend in place” method of protection instead of evacuation. The I-2 non-ambulatory occupants need the same level of protection as I–3. Since the I-2 and I-3 have similar smoke compartment rules, the committee felt that the requirements should be consistent here also and help stop the spread of smoke between stories. Because elevator doors have a large air-leakage rate, the elevator openings should be protected by a lobby.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

William Koffel, Koffel Associates, Inc., representing American Society for Healthcare Engineering of the American Hospital Association, requests Disapproval.

Commenter's Reason: The proponent infers that the code change proposal clarifies existing code requirements when in fact the proposal adds a requirement for elevator lobbies for Group I-2 occupancies. The proponent has provided no fire experience, test data, computer modeling, or fire risk assessment to document the need for elevator lobbies in Group I-2 occupancies. Instead, the proponent indicates that the code should be changed because some people are currently misapplying other provisions of the code to require elevator lobbies and because Group I-2 occupancies use a defend in place concept similar to Group I-3 occupancies.

With respect to the comparison to Group I-3 occupancies there are substantial differences between Group I-2 and Group I-3 occupancies. The fuel load in many Group I-3 occupancies is greater than that typically found in Group I-2 occupancies. The proponent also fails to discuss differences in the characteristics of the occupants that may impact the overall fire safety of the facility. For example, 62% of the fires that result in property damage in a Group I-3 occupancy are incendiary or suspicious in nature. In Group I-2 occupancies, 4.8% of the fires that result in property damage are incendiary or suspicious in nature. Of the fire fatalities that have occurred in care of the sick facilities (between 1980-1998), 82 percent of the occupants were in the room of origin.

Fairly recent code changes have addressed most of the fatal fire scenarios in Group I-2 occupancies by requiring quick response sprinklers in all smoke compartments containing sleeping rooms. Full scale fire tests conducted by NIST have indicated that quick response sprinklers in patient sleeping rooms are capable of maintaining tenability in the room of origin for most credible fire scenarios. The rigorous ongoing facility inspection process required for licensure, certification, and accreditation of health care occupancies further increases the reliability of fire protection features and systems such as smoke barriers and automatic sprinkler protection.

It should be noted that the Committee vote on this issue was 7 in support of Approval as Submitted and 6 opposed. Without some technical basis for the proposal, we encourage the ICC membership to support Disapproval of the item.

Final Action: AS AM AMPC____ D

FS54-06/07
707.14.1

Proposed Change as Submitted:

Proponent: Dave Frable, U.S. General Services Administration, representing U.S. General Services Administration

Revise as follows:

707.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby shall separate the elevator shaft enclosure doors from each floor by fire partitions equal to the fire-resistance rating of the corridor and the required opening protection. 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 street floor, provided the entire street floor 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 707.2 are not required to have enclosed elevator lobbies.
3. Where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. In other than Group I-3, and buildings having occupied floors located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, 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.
5. Enclosed elevator lobbies are not required to be installed in Group B occupancies that are more than 75 feet in height above the lowest level of fire department vehicle access, and are protected throughout by an automatic fire sprinkler system designed and installed in accordance with Section 903.3.1.1 and maintained in accordance with Section 903.5.

~~5.~~ 6. 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.

~~6.~~ 7. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 707.14.2.

Reason: The purpose of this code change is to acknowledge that Group B occupancies protected by an operational automatic fire sprinkler system provide an acceptable level of safety for building occupants and therefore do not warrant the need for enclosed elevator lobbies.

Previous research conducted by the National Institute of Standards and Technology (NIST) with consultation by Dr. John Klote, has shown that sprinklered fires do not represent a significant hazard to the building occupants because the automatic sprinklers activated and extinguished the fire prior to releasing a significant energy or mass. Little or no smoke or gases entered the hoistways, and none reached remote locations in any building regardless of height or other conditions examined.

Therefore, it can be concluded that smoke spread in shafts and elevator hoistways is not a problem in Group B occupancies protected throughout with an operational fire sprinkler system since the fire sprinklers both control the burning rate (and thus limit smoke production) and maintain near ambient temperature which limits the buoyancy forces that drive smoke to the shafts where stack affect may cause smoke spread to other floors. It is also widely accepted that operating fire sprinklers will prevent room flashover and full floor fires, and will limit the size of room fires[2]. This conclusion can also be substantiated from a paper presented by Dr. John Klote at the Elevator Symposium on Emergency Use of Elevators in March 2004 and in an article titled "Is There A Need to Enclose Elevator Lobbies In Tall Buildings?", written by Richard Bukowski in the August 2005 *Building Safety Journal*.

In addition, all high-rise fires where smoke spread has been a problem have either been in unsprinklered buildings or partially sprinklered buildings. A recent comprehensive analysis in 2005 of high-rise fires by NFPA identified that no fatalities had occurred for more than a decade in any U.S. high-rise occupancy (> 10 story) other than the 6 fatalities in the unsprinklered Cook County Office Building (2003); the 1 fatality in the unsprinklered First Interstate Bank Building (1991); and 3 firefighter fatalities in the partially sprinklered (unsprinklered on floor of fire origin and several floors above) Meridan Plaza Building (1991). The Murrah Federal Building (1995) and the World Trade Center (1993 & 2001) bombings were excluded from this analysis.

The recently issued NFPA 2005 report on sprinkler reliability also indicated that automatic fire sprinklers successfully operating in reported structural fires was an exemplary 93%. In addition, NFPA also reported that two-thirds of the reported automatic fire sprinkler system failures were because the automatic fire sprinkler systems were shut off.[4] Since the IBC requires the supervision of the automatic fire sprinkler system, one can conclude that the successful operation of an automatic fire sprinkler system designed and installed in compliance with the IBC requirements could be reasonably estimated at 98%. NFPA also reported that the percentage of successfully operating automatic fire sprinkler systems is probably higher since a large percentage of small fire extinguished by fire sprinklers are not reported. Therefore, for an automatic fire sprinkler system designed and installed in accordance with the IBC requirements, the successful operation of an automatic fire sprinkler system could be reasonably estimated at 98% or more.

Please also keep in mind that the purpose of the International Building Code is to provide minimum requirements to safeguard occupants of buildings from fire and other hazards attributed to the built environment that are based on sound technical documentation. Also keep in mind that fatalities are very rare in office buildings, even rarer in high-rise office buildings, and surpassingly rare in high-rise office buildings protected with an operational fire sprinkler system.

Last but not least, it should be noted that a similar proposal regarding the enclosure of elevator lobbies was also addressed by the National Fire Protection Association (NFPA) 101 Technical Committee on Industrial, Storage, and Miscellaneous (e.g., High-rise) Occupancies. The NFPA Technical Committee did not approve the proposal to separate elevator hoistways with smoke barriers in sprinkler high-rise buildings based on a lack of technical substantiation. In addition, on June 9, 2005 the NFPA membership approved the 2006 edition of NFPA 101 and supported the Technical Committee's decision to not include a requirement to separate elevator hoistways with smoke barriers in sprinkler high-rise buildings.

Based on all these points stated above, we strongly believe that it unreasonable to state that Group B occupancies protected throughout with automatic fire sprinkler system is not a rationale alternative to enclosed elevator lobbies and that automatic fire sprinklers are not an effective method for slowing or stopping the spread of smoke throughout a building protected throughout with an operational automatic fire sprinkler system. In addition, we believe the current requirement for enclosing elevator lobbies in Group B occupancies, protected throughout by an operational automatic fire sprinkler system has not been based on sound technical documentation and will significantly increase building construction and maintenance costs without increasing the overall safety to the building occupants.

References:

Klote, J.H., Analysis of the Consequences of Smoke Migration through Elevator Shafts, Use of Elevators in Fires and Other Emergencies Workshop. Proceedings. Co-Sponsored by American Society of Mechanical Engineers (ASME International); National Institute of Standards and Technology (NIST); International Code Council (ICC); National Fire Protection Association (NFPA); U.S. Access Board and International Association of Fire Fighters (IAFF). March 2-4, 2004, Atlanta, GA,

Guide on Methods for Evaluating Potential for Room Flashover, NFPA 555 2000 ed., Nat Fire Prot Assn, Quincy, MA.

Bukowski, R. W., Is There A Need to Enclose Elevator Lobbies In Tall Buildings?, Building Safety Journal, 26-31 pp, August 2005.

Rohr, K.D and Hall, J.R., Jr., U.S. Experience With Sprinklers and Other Fire Extinguishing Equipment, August 2005.

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

Committee Action: **Approved as Submitted**

Committee Reason: This proposal ties the exception to a specific occupancy which has a good fire record. The NIST analysis is new technical data that shows a justification for this proposal. The NIST study did address smoke flow in both winter and summer for this low-hazard occupancy. When combined with the excellent fire safety record for high-rise buildings, both sprinklered and unsprinklered, this exception appears justified and will help to eliminate this contentious issue which has come before the committee for several years.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This item is on the agenda for individual consideration because an assembly action was successful and public comments were received.

Public Comment 1:

Dave Frable, U.S. General Services Administration/Public Buildings Service, requests Approval as Submitted.

Commenter's Reason: As the proponent of the original code change proposal, I submit this comment to support the successful action of the Fire Safety Code Committee in Lake Buena Vista that recommended approval of this code change. The purpose of this code change is to acknowledge that Group B occupancies protected by an operational fire sprinkler system provide an acceptable level of safety for building occupants and therefore do not warrant the need for enclosed elevator lobbies. The Fire Safety Code Committee based their decision on technical research conducted by the National Institute of Standards and Technology (NIST) with consultation by Dr. John Klote and the excellent fire safety record of high-rise Group B occupancies protected by an operational sprinkler system.

The NIST/Klote report included mid-rise and high-rise elevator hoistways with top vents (sized as required in ANSI A17.1) and both summer (95 degrees F outdoor temps) and winter (3 degrees F outdoor temps) that would drive stack effect flows in those hoistways. The analysis showed that such flows will **NOT** result in untenable conditions beyond the fire floor with operating sprinklers regardless of whether elevator lobbies are provided.

Public Comment 2:

Lawrence Perry, representing BOMA International, requests Approval as Submitted.

Commenter's Reason: The committee recommendation for approval should be sustained. The proponent provided extensive technical support for the change, which is consistent with previous editions of the IBC. In a sprinklered high-rise office building, there is no record of any life safety hazard that would be mitigated by the addition of elevator lobbies on every floor.
Note that there is a separate code change proposal (G63-06/07) that would require at least one elevator to be provided with an enclosed lobby for use by the fire service in buildings exceeding 120 feet in height.

Public Comment 3:

Laura Blaul, Orange County Fire Authority and Lorin Neyer, California Office of Statewide Health Planning & Dev., representing California Fire Chief's Association, requests Disapproval.

Commenter's Reason: The Fire Prevention Officers Association of the California Fire Chiefs Association (Cal Chiefs) has submitted this comment to request that the ICC voting membership disapprove this Code Change Proposal which has been recommended for approval.

Basically, this code change proposal eliminates the requirement for enclosed elevator lobbies in high-rise Group B office buildings of any height. The conditions proposed by the new Exception for eliminating the enclosed elevator lobby are based on the installation of an automatic sprinkler system designed and installed in accordance with Section 903.3.1.1 and maintained in accordance with Section 903.5. However, those conditions do not offer anything above and beyond what is already currently required in the International Building Code (IBC) for such high-rise buildings. The entire basis for the proponent's arguments to eliminate the enclosed elevator lobbies relies on an "operational" automatic fire sprinkler system. The term "operational" is very significant since it assumes that the automatic sprinkler system will operate as intended and will control and/or extinguish the fire. However, that is not always the case even in Group B office buildings. We all know that office buildings undergo tenant modifications almost on a daily basis, especially in high-rise office buildings. These tenant modifications often require that the automatic sprinkler system be shut down, at least on the floor on which the modifications are being made. Modifications may occur on several floors throughout a high-rise building at any given time. Thus, there may be many areas of the building that do not have an "operational" automatic fire sprinkler system. Furthermore, in areas of the country subject to significant earthquakes, the automatic sprinkler system may not have a sufficient water supply available should an earthquake disrupt the municipal water supplies. Fires may also occur in concealed spaces or may be obstructed from the sprinkler discharge, yet the sprinkler system may still operate. Such fires can generate significant quantities of smoke which can migrate to areas remote from the source of the fire, enter the elevator shafts and travel throughout the building.

It should be noted that prior to the development of the IBC approximately two-thirds of the country had requirements for elevator lobbies in high-rise buildings. This helped contribute to the excellent fire performance of those buildings. And fire departments in those areas of the country found several uses for those enclosed elevator lobbies including using them as staging areas, as well as for areas for rescue assistance. Deleting these elevator lobbies would also potentially conflict with Section 1007.4 of the IBC which requires elevators used as a part of the accessible means of egress to be accessed from an area of refuge complying with Section 1007.6. This is basically a smoke protected enclosed elevator lobby. Prior to the 2006 edition of the IBC, a sprinkler trade-off was allowed to omit the accessible means of egress using elevators with protected elevator lobbies when the building was protected with an automatic sprinkler system. However, during the Final Action Hearings in Detroit, the membership overturned a Committee recommendation to disapprove deleting the sprinkler trade-off and overwhelmingly approved a code change to eliminate the automatic sprinkler system trade-off.

The proponent's reason statement also indicates that there are very few, if any, fatalities in a sprinklered high-rise building. However, fire fatalities are not the only concern in such buildings. In general, we are concerned with smoke inhalation and obscuration which can cause injury and/or panic and negatively impact efficient and effective evacuations, as well as hinder fire fighter and rescue personnel access.

In conclusion, we strongly believe that enclosed elevator lobbies are an essential component of an overall fire protection safety package for high-rise buildings which should not be traded off for the installation of an automatic sprinkler system that is already required by the code. Therefore, we strongly urge the membership to disapprove this code change proposal.

Public Comment 4:

Rick Thornberry, The Code Consortium, Inc., representing Alliance for Fire and Smoke Containment and Control (AFSCC), requests Disapproval.

Commenter's Reason: The Alliance for Fire and Smoke Containment and Control (AFSCC) is opposed to this proposed new automatic sprinkler system trade-off that will eliminate the requirement for the enclosed elevator lobbies in Group B high-rise office buildings. We are concerned that there are already a great number of sprinkler trade-offs which may have a significant impact on occupant and fire fighter safety should the automatic sprinkler system fail to operate as designed. For example, there are automatic sprinkler system trade-offs for Group B occupancies that allow corridors to not have a fire-resistance rating in accordance with Table 1017.1, allow an increased travel distance from 200 feet to 300 feet in accordance with Table 1016.1, allow an increase in the common path of egress travel from 75 feet to 100 feet, allow increased dead ends from 20 feet to 50 feet in accordance with Exception 2 to Section 1017.3, and allow the interior finish classification in corridors to be reduced from a Class B (flame spread index ≤ 75) to a Class C (flame spread index ≤ 200) in accordance with Table 803.5. So our question is: When is enough enough?

Although we are a strong believer in providing automatic sprinkler system protection in buildings, we don't believe sprinklers should be utilized for trade-offs that relate to life safety issues such as vertical smoke spread in high-rise buildings. Sprinklers are not infallible and do not perform adequately 100% of the time. In fact, the latest reliability studies conducted by William E. Koffel, P.E. of Koffel Associates, dated January 2006, and corroborated by Dr. John Hall of NFPA indicate that overall sprinkler system reliability is actually 89% rather than the 93% quoted in the proponent's reason for this code change. This is a difference of having a sprinkler failure occur in one of every nine fires in which a sprinkler system was involved and the fire was judged large enough to activate the sprinklers as compared to one of every fourteen fires. That is a significant difference especially when considering this very extreme trade-off which eliminates the protection of elevator shafts from vertical smoke travel throughout a high-rise building of any height.

We all know that smoke is produced in every fire, even when the sprinkler system operates. There are cases where the fire may be shielded or may occur in a concealed space. Or the fire may even occur in an unsprinklered area where smoke detection is substituted as allowed by Section 903.3.1.1.1 Exempt Locations. Of course, if the sprinkler system does not operate or does not operate adequately, there will be significant quantities of smoke produced at very high energy levels based on the temperature of the fire gasses which can readily spread throughout the building via the elevator hoistways and unenclosed lobbies. We all know that elevator hoistway doors are only designed to protect against fire spread, not against smoke spread. These doors have significant leakage rates which have been well documented by the National Research Council of Canada in their detailed and in-depth studies of smoke travel in high-rise buildings, especially as it relates to stack effect.

It should also be pointed out that current Exception 4 to Section 707.14.1 provides for a sprinkler exception for enclosed elevator lobbies in non-high-rise buildings. However, in those buildings the stack effect is not significant. What is more troubling about this new sprinkler trade-off being proposed as a new Exception 5 to this section is that it applies to high-rise office buildings of any height, even if they are super high-rise (> 420 feet in height). It has been well documented that the taller the building the greater and more severe the stack effect which causes smoke to spread vertically via the elevator shafts in these buildings. Very tall buildings also mean there is more of a chance that floors throughout the building will not have operational automatic sprinkler protection during tenant remodels and alterations when the systems are turned off.

It should also be noted that Section 903.3.3 Obstructed Locations will allow sprinklers to be omitted beneath obstructions that are not more than four feet in width. Obviously, this condition could allow for combustibles shielded by such obstructions to burn unchecked and produce large quantities of smoke where the sprinkler system cannot distribute enough water, if any, to subdue the burning.

Several of the key statements in the proponent's reason rely upon an "operational" automatic fire sprinkler system for this trade-off. As noted above, sprinkler systems are not 100% operational at all times. Is the risk that one in every nine fires in a sprinklered building could result in a sprinkler system failure sufficient reliability to allow the trade-off for eliminating the enclosed elevator lobby protection?

In conclusion, the code requirements currently contained in the model building codes for high-rise buildings were originally developed in the early 1970s in an effort to be proactive to provide protection for high-rise buildings before we had a significant tragedy. Why would we want to begin to relax those requirements now based on the installation of an automatic sprinkler system which has been required for high-rise buildings for many years and which have been required to be maintained in accordance with Section 903.5 as specified in the proposed new Exception 5 to Section 707.14.1? Furthermore, the current International Building Code (IBC) does not contain a requirement for smoke control in high-rise buildings which was one of the original proposed fire protection systems developed as mentioned above in the early 1970s. Since we have already abandoned smoke control systems in high-rise buildings, why would we want to go another step further and delete one of the more important means for controlling vertical smoke spread in buildings: the enclosed elevator lobbies? The AFSCC urges disapproval of this code change proposal.

Final Action: AS AM AMPC____ D

FS58-06/07

707.14.2.1.1, 707.14.2.1.1 (New)

Proposed Change as Submitted:

Proponent: Gregory J. Cahanin, Cahanin Fire & Code Consulting, representing Smoke Safety Council

707.14.2.1 Pressurization requirements. Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.04 inches of water column and a maximum positive pressure of 0.06 inches of water column ~~with respect to adjacent occupied space on all floors~~ above the maximum probable stack effect pressure. This pressure shall be measured at the midpoint of each hoistway door, with all ground floor level hoistway doors open and all other hoistway doors closed. 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.

707.14.2.1.1 The maximum probable normal or reverse stack effect pressure shall be determined using altitude, elevation, weather history and interior temperatures.

Reason: The new requirements for pressurization failed to take into account a building's stack effect pressure that could be greater than the hoistway pressurization system rendering it ineffective. The pressure differential from the elevator shaft to the floor must be greater than the stack effect. The fire pressure on the fire floor must be less than the hoistway pressure in order for a differential to exist. Table 5.1 of the ASHRAE/SFPE Principals of Smoke Management Manual lists fire differential pressures of 0.05 to 0.11 inches of water.

The new 707.14.2.1.1 is taken from the language in Section 909.4.1 smoke control requirements now in the code. For northern climates stack effect in the winter would be the most severe anticipated condition for challenging the hoistway pressurization system. For southern climates where reverse stack effect is a greater concern the summer temperature would be utilized. Stack effect has been used in Section 909 for several editions of the IBC and is an accepted term in smoke control.

The ASHRAE/SFPE Principals of Smoke Management Manual provides nationally accepted methods of designing elevator pressurization systems as well as a calculative methodology for design of the system to be confirmed during acceptance testing. Testing would not have to be performed on a mean low or high temperature day, but could have collected data adjusted for more conservative mean temperature conditions to determine performance and system acceptance.

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

Committee Action: **Disapproved**

Committee Reason: Tying the proposal to the "maximum" probable pressure is an overly severe condition which is not necessary to be used as the design basis. Using the absolute "maximum" will involve designing for a condition which may only occur for a very short time over the course of a 100 year period. It would be better to design for a lower factor which could address the normally anticipated requirements without including the extremes. A design which can address the 98 or 99 percent of the cases which are anticipated would be much easier to determine and design for. Section 909.4 takes care of this issue by saying the design should take into consideration but does not require it to meet the extreme maximums. This proposal also does not address the limited pressure ranges which were considered as being too restrictive. This proposal keeps that narrow range but simply changes the number that it is measured from.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Frank Hertzog, Smoke Guard, Inc., representing Smoke Safety Council, requests Approval as Modified by this public comment.

Replace proposal with the following:

707.14.2.1 Pressurization requirements. Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.04 inches of water column and a maximum positive pressure of 0.06 inches of water column with respect to adjacent occupied space on all floors, as well as accounting for the stack and wind effect expected on the mean low temperature January day. This pressure shall be measured at the midpoint of each hoistway door, with all ground floor level hoistway doors open and all other hoistway doors closed. 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.

Commenter's Reason: In order to insure that the elevator shaft pressurization system works properly in all climate conditions it is necessary to account for differences in stack effect between the day of the test and that which might be expected during climatic conditions that will increase stack effect. This design option will be used in High Rise buildings and the difference in stack effect in a 10 story building on a day with moderate temperatures (~ 70 degrees) and the stack effect in the same building during normal winter days (~ 20 degrees) can be over 0.10 inches of water. If the test is taken during mild temperatures and meets the pressure limits (0.04" – 0.06" water), it is unlikely the same system will provide adequate pressurization during a colder day. In this situation with inadequate pressure to overcome the normal stack effect, smoke will still enter the shaft and be transmitted to other floors.

The language being proposed in this change is exactly the language that Washington State has used successfully for over 3 years now. They have been at the forefront of using the elevator shaft pressurization option as an alternative to the elevator lobby for many years now and recognize that in order to ensure the shaft always has a positive pressure, differing levels of stack effect must be considered beyond what exists on the day of the acceptance test.

Final Action: AS AM AMPC____ D

FS63-06/07

707.14.1, 707.14.2, 707.14.2.1, 707.14.2.2, 707.14.2.3, 707.14.2.3.1, 707.14.2.3.2, 707.14.2.3.3, 707.14.2.3.4, 707.14.2.4, 707.14.2.5

Proposed Change as Submitted:

Proponent: Rick Thornberry, P.E., The Code Consortium, Inc., representing Alliance for Fire and Smoke Containment and Control (AFSCC); Bill Ziegert, Smoke Guard, division of RectorSeal

Revise as follows:

707.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby shall separate the elevator shaft enclosure doors from each floor by fire partitions equal to the fire-resistance rating of the corridor and the required opening protection. 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 street floor, provided the entire street floor 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 707.2 are not required to have enclosed elevator lobbies.
3. Where additional doors are provided at the hoistway opening in accordance with Section 3002.6. Such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. In other than Group I-3, and buildings having occupied floors located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, 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.
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.
6. ~~Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 707.14.2.~~

~~**707.14.2 Enclosed elevator lobby pressurization alternative.** Where elevator hoistway pressurization is provided in lieu of required enclosed elevator lobbies, the pressurization system shall comply with this section.~~

~~**707.14.2.1 Pressurization requirements.** Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.04 inches of water column and a maximum positive pressure of 0.06 inches of water column with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all ground floor level hoistway doors open and all other hoistway doors closed. 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.~~

~~**707.14.2.2 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.~~

~~**707.14.2.3 Fan system.** The fan system provided for the pressurization system shall be as required by this section.~~

~~**707.14.2.3.1 Fire resistance.** When located within the building, the fan system that provides the pressurization shall be protected with the same fire-resistance rating required for the elevator shaft enclosure.~~

~~**707.14.2.3.2 Smoke detection.** The fan system shall be equipped with a smoke detector that will automatically shut down the fan system when smoke is detected within the system.~~

~~**707.14.2.3.3 Separate systems.** A separate fan system shall be used for each bank of elevators.~~

~~**707.14.2.3.4 Fan capacity.** The supply fan shall either be adjustable with a capacity of at least 1,000 cfm (.4719 m^3/s) per door, or that specified by a registered design professional to meet the requirements of a designed pressurization system.~~

~~**707.14.2.4 Standby power.** The pressurization system shall be provided with standby power from the same source as other required emergency systems for the building.~~

~~**707.14.2.5 Activation of pressurization system.** The elevator pressurization system shall be activated upon activation of the building fire alarm system or upon activation of the elevator lobby smoke detectors.~~

Reason: (Thornberry) The purpose of this proposed amendment is to eliminate Exception 6 to the requirements for elevator shaft door opening protection which allows the elevator hoistway to be pressurized as specified in Section 707.14.2 as an alternate to the elevator lobby protection specified in this section. We believe that elevator shaft pressurization is problematic at best. This is especially true for high-rise buildings where various environmental factors can disrupt the required level of pressurization specified by the code for elevator hoistways in order to provide adequate protection to prevent the migration of smoke via the elevator hoistway. Such conditions as outdoor air temperature, stack effect, and wind can cause the pressure differentials within the building to change over time and by location within the building, as well as by the amount of pressure difference that may result between the pressure in the elevator hoistway and the pressure in the building versus the outside air pressure. These are all complicating factors which make it very difficult to design an elevator hoistway pressurization system that will function as intended under any weather conditions at any time of the year regardless of

the outside temperature. There is also the potential that over-pressurization may occur which could cause the elevator hoistway doors to bind and not operate properly. The piston effect of elevators moving within the shaft also complicates elevator shaft pressurization. We believe it is more appropriate that elevator hoistway pressurization designs, if desired, be proposed on a case-by-case basis and evaluated as an alternate method so that appropriate scrutiny can be given to the design to assure that it will perform as intended to prevent smoke migration through the elevator hoistways under all reasonably expected conditions. This approach would be more appropriate than the prescriptive approach of "one size fits all" specified in Section 707.14.2 which we are proposing to delete.

(Ziegert) The purpose of this change is to eliminate one of the design options the code currently allows to replace the enclosed elevator lobby.

The purpose of the enclosed elevator lobby or the other design options permitted in Exceptions 3 and 5 are to form a barrier to keep smoke out of the elevator shaft allowing longer egress times and the use of the elevator system by emergency responders. The barriers used to enclose the lobby or to seal the hoistway door are all tested and labeled designs meeting specific performance requirements.

The design and subsequent proper operation of an elevator shaft pressurization system is very difficult to accomplish since every design is unique. Testimony from many mechanical design professionals (both US based as well as international) who have experience designing these systems is that the performance of the end product is always questionable as to whether it will meet the requirements established by the relevant code. This is primarily due to the excessive and variable leakage rates from the elevator hoistway door assemblies which causes significant pressure drops at each elevator door and level. This is the significant difference between a stair pressurization system, which is a well accepted design, and an elevator shaft pressurization system. In Canada this has been solved by requiring the use of empirical design formulas, however some Canadian fire protection engineers experienced with these designs question if proper protection is always provided. In Australia where this concept has been employed as an alternative to full scale building smoke control systems, design professionals also question the reliability and performance of these systems over the wide range of climates that affect the building stack effect found in the elevator shaft. There is very limited experience with these systems in the United States.

In addition, these systems must not only protect the building occupants from smoke migrating to other floors, they must provide a smoke free elevator shaft for the fire service emergency responders. One of the worst problems relative to Phase 2 elevator operation an emergency responder can face is to reach a floor close to the hazard and have the elevator doors not work properly and remain partially open inhibiting further use of the elevator system. This is a very real possibility in the upper floors of a building when the shaft pressurization system is over-pressurizing the shaft close to the pressure injection point and the door mechanisms cannot overcome the pressure forces causing the door operation to stall in a partially open position.

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

Committee Action: **Disapproved**

Committee Reason: Deleting this requirement takes away a prescriptive compliance option and provides less design flexibility. Jurisdictions that don't have the capacity to review or inspect more complex designs would have an added burden with the loss of this prescriptive option. Losing this option is likely to needlessly increase 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:

Rick Thornberry, The Code Consortium, Inc., representing Alliance for Fire and Smoke Containment and Control (AFSCC), requests Approval as Submitted.

Commenter's Reason: The Alliance for Fire and Smoke Containment and Control (AFSCC) is requesting that the Committee recommendation for disapproval be overturned and this code change proposal be approved. The effect of approving this code change proposal is to eliminate Exception 6 to Section 707.14.1 which allows the omission of enclosed elevator lobbies where the elevator hoistway is pressurized in accordance with the prescriptive provisions contained in Section 707.14.2. As currently prescribed in Section 707.14.2.1 the pressurization of the elevator hoistway must maintain a minimum positive pressure differential of between 0.04 inches of water column and 0.06 inches of water column with respect to the adjacent occupied space on all floors. However, the actual pressure difference necessary to be effective will vary depending upon the severity of the stack effect that occurs in the elevator hoistways. This is a function of the indoor air temperature and the outdoor air temperature. The most extreme and significant stack effect will occur in the winter when the temperature differences can be very large between the indoor and outdoor temperatures, especially in cold climate areas. And, of course, the taller the building, the more significant and greater the stack effect will be. No design criteria is prescribed to indicate that the pressure differential in the elevator hoistway is to be maintained based on a certain level of stack effect. So it is quite likely that in many cases the pressurization will be inadequate to counterbalance the significant stack effect that may occur, especially in very tall buildings in the depth of winter. It is inappropriate to prescribe such a design requirement for a system that truly needs an engineering approach to assure that it will function appropriately and prevent smoke migration via the elevator hoistways. Furthermore, over-pressurization in the elevator shafts may occur which could cause the elevator doors to bind in the open position, thus negating the effect of the pressurization system. Such an option in lieu of installing enclosed elevator lobbies should be evaluated on a case by case basis with an appropriate engineering evaluation and design to assure that the system works properly under the anticipated environmental conditions. Therefore, we believe this code change should be approved in order to eliminate this prescriptive exception which may not perform as intended.

Final Action: AS AM AMPC____ D

FS64-06/07
708.1

Proposed Change as Submitted:

Proponent: Rick Thornberry, P.E., The Code Consortium, Inc., representing Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

708.1 General. The following wall assemblies shall comply with this section:

1. Walls separating dwelling units in the same building.
2. Walls separating sleeping units in occupancies in Group R-1 hotel, R-2 and I-1 occupancies.
3. Walls separating tenant spaces in covered mall buildings as required by Section 402.7.2.
4. Corridor walls as required by Section 1017.1.
5. Elevator lobby separation as required by Section 707.14.1.
6. Residential aircraft hangars.
7. Walls separating enclosed tenant spaces.

Reason: This code change proposal is a follow up to our previously submitted Code Change Proposal FS55-04/05. That code change proposal was recommended for disapproval on a vote of 6 to 5. Discussions with several of the Committee members after the hearings indicated that the reason they voted to oppose the code change proposal was because it did not require the 1-hour tenant separation wall to be provided in all types of building construction, not just the fire-resistance rated types of building construction as proposed in FS55-04/05. Therefore, we have redrafted that code change proposal to respond to those Committee members who voted against it on that basis. Now we are proposing that the 1-hour tenant separation walls be provided in all buildings, regardless of the type of construction, where there are multiple tenants on the same floor. Thus, this code change proposal will require that where there are enclosed tenant spaces within a building, the walls separating such tenant spaces must be constructed as fire partitions.

By requiring these tenant separation walls to be a fire partition, they will be required to have a minimum 1-hour fire-resistance rating as required by Section 708.3. Although we are not that concerned about the fire-resistance, per se, we are concerned that a reasonably fire-resistant wall construction be provided to separate adjacent tenants for the reasons given in our previous code change proposal. The importance of this requirement is to protect tenants from one another in the event of an accidental fire developing in one tenant space and threatening the adjacent tenant spaces. We believe that every tenant has a right to a reasonable level of fire safety by having some minimal degree of fire-resistive protection to keep a fire in his/her neighbor from involving his/her space, at least in the early stages of the fire, until the fire department has had the chance to respond and control and extinguish the fire.

By specifying a fire partition, we get the 1-hour fire-resistance rating which means that the wall is required to be tested in accordance with ASTM E119 to meet the hose stream test. Walls that are less than 1-hour in fire-resistance rating are not required to meet the hose stream test in accordance with Section 11.1.1 of ASTM E119. We believe the hose stream test requirement is very important since it will result in a wall that has a minimum degree of structural integrity. The hose stream test subjects the wall to the cooling impact and erosion effects of a stream of water discharging from a specified size nozzle. Section X.5.9 Integrity of Appendix X5 Commentary of ASTM E119 states: “In this hose stream test, the ability of the construction to resist disintegration under adverse conditions is examined.”

Another critical component that comes with a 1-hour fire partition is its continuity as specified in Section 708.4. The essential element of the continuity requirement is that the wall must be constructed continuous from the floor to the underside of the floor or roof deck above. There is an exception to this condition when the entire ceiling is part of a fire-resistive ceiling assembly. This cuts off the most likely place where fire and smoke will spread in the early stages of fire, that is above the ceiling through the open spaces throughout the ceiling plenum, or at the head of the wall where it intersects the underside of the floor slab or roof deck above. However, that protection is provided by the joint protection requirements in Section 708.8 which refers to Section 713 for the protection of joints. If the wall stops at the underside of a ceiling that is part of a fire-resistive floor/ceiling assembly, then the ceiling itself serves to prevent fire and smoke from gaining early access to the ceiling plenum and spreading throughout the floor area to adjacent tenant spaces, at least until the fire department arrives on the scene and takes control of the fire.

Another added benefit is that penetrations which are generally a weak point in any fire-resistive rated assembly are also required to be protected in accordance with Section 708.7 which references Section 712 for protection of penetrations. And, finally, ducts and air transfer openings in fire partitions are also required to be protected with fire dampers in accordance with Section 708.9 which references Section 716 for the protection of ducts and air transfer openings.

We believe that a 1-hour tenant separation wall should be provided wherever there are multiple tenants on the same floor. Our earlier Code Change Proposal FS55-04/05 limited that application to only those cases where the building type of construction required a minimum 1-hour fire-resistance rating throughout, i.e. Types I, IIA, IIIA, IV, and VA. We felt that was a good place to start since all of the previous legacy model building codes had required such tenant separation walls to have a 1-hour fire-resistance rating in those types of construction. It was also interesting to note that the 1999 SBCCI Standard Building Code (SBC) had required 1-hour tenant separation walls for all types of building construction. Obviously, our preference is to see 1-hour tenant separation walls constructed as fire partitions wherever there are multiple enclosed tenant spaces in a building on the same floor. This will provide the tenants of the building with some assurance that they will have a minimal degree of protection from their neighbor should an accidental fire start in the adjacent tenant space. Therefore, we respectfully request the Committee approve this code change proposal as submitted.

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

Analysis: To view or download copies of code changes from a previous code development cycle go to http://www.iccsafe.org/cs/codes.

Committee Action: **Disapproved**

Committee Reason: This requirement is beyond the purpose of the IBC and is generally considered as a property protection issue. This requirement is not needed for the height, area and type of construction purposes of the code. The tenants always have the option of exceeding the minimum code requirement and providing this separation if they are concerned with their exposure from neighbors or wish to address business continuity issues. These items do not belong within a "minimum" code. Inclusion of this requirement may create confusion that a higher rated "occupancy separation" from Chapter 5 (Table 508.3.3) can be reduced to this 1-hour requirement where the occupancies are in adjacent tenant spaces. This proposal may create conflicts with other sections such as the non-separated use option or the corridor provisions. If multiple separate tenant spaces occur on each side of a non-rated corridor, this would seemingly require the walls between adjacent spaces to be rated but there would not be any requirement for a separation or construction on the side towards the corridor.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Thornberry, P.E., The Code Consortium, Inc., representing Alliance for Fire and Smoke Containment and Control (AFSCC), requests Approval as Submitted.

Commenter's Reason: The Alliance for Fire and Smoke Containment and Control (AFSCC) is submitting this Public Comment to request that the Committee recommendation for disapproval be overturned so that the ICC voting membership can approve this code change proposal as submitted. The effect of this code change proposal is to require that walls separating enclosed tenant spaces be constructed as a fire partition having a minimum 1-hour fire-resistance rating. This would be consistent with several of the previous legacy model building codes for buildings required to be of a fire-resistance rated type of construction. One of the legacy codes, the SBCCI Standard Building Code, specifically required enclosed tenant spaces to have a 1-hour fire-resistance rating separating them from adjacent tenants regardless of the building's type of construction. We are not aware of any problems that such a requirement caused with the construction of non-fire-resistance rated buildings.

Part of the Committee's reason for disapproving this code change states: "This requirement is beyond the purpose of the IBC and is generally considered as a property protection issue." However, Section 101.3 Intent of the IBC states that its purpose is "to establish the minimum requirements… {for} safety to life and property from fire…" Thus, property protection is certainly within the purpose and intent of the code. The Committee also states that such a requirement does not belong within a "minimum" code for the purpose of limiting the exposure to fire from neighbors or addressing business continuity should a fire occur in an adjacent tenant space. Then why was such a requirement included in the previous legacy codes? The Committee also indicates that this requirement may create confusion that a higher rated "occupancy separation" specified in Table 508.3.3 could be reduced to this 1-hour fire partition requirement where the different occupancies are in adjacent tenant spaces. However, Section 102.1 General states: "Where, in any specific case, different sections of this code specify different… requirements, the most restrictive shall govern." So that is a non-problem. The Committee's Reason statement also indicates that this code change proposal could create conflicts with other sections of the code such as the non-separated use option in Section 508.3 or the corridor provisions in Section 1017.1. Again, Section 102.1 General addresses this issue where it states: "Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable." Furthermore, in most cases there may actually be no conflict but simply a difference in requirements with the most restrictive being applicable as discussed above.

In summary, we do not believe that the Committee has provided sufficient reasons to disapprove this code change proposal which basically reinstates the tenant separation requirements from the previous legacy codes which were not included when the 2000 edition of the IBC was published. Therefore, we request the ICC voting membership approve this code change proposal as submitted for the reasons stated above, as well as in the original Reason statement for this code change.

Final Action: AS AM AMPC____ D

FS65-06/07
708.1

Proposed Change as Submitted:

Proponent: Lorin Neyer, Office of Statewide Health, Planning & Development, State of California, representing California Fire Chief's Association

Revise as follows:

708.1 General. The following wall assemblies shall comply with this section:

1. Walls separating dwelling units in the same building.
2. Walls separating sleeping units in occupancies in Group R-1 hotel, R-2 and I-1 occupancies.
3. Walls separating tenant spaces in covered mall buildings as required by Section 402.7.2.

4. Corridor walls as required by Section 1017.1.
5. Elevator lobby separation as required by Section 707.14.1.
6. Residential aircraft hangars.
7. Walls separating enclosed tenant spaces in buildings of Types I, IA, IIA, IV, or VA construction.

Reason: This code change will provide a minimum 1 hour fire resistance rated fire partition to separate tenants in multi-tenant buildings of Types I, IIA, IIIA, IV, and VA construction as previously provided in the 1997 ICBO UBC. Such compartmentation within multi-tenant buildings is a fundamental passive fire control mechanism that can be achieved at a minimal cost while providing better fire safety for the building occupants as well as property protection, while also helping the fire department to control and eventually extinguish a fire within the building.

This code change proposal actually reinstates the tenant separation wall requirement for a 1-hour fire resistance rating which was previously required by all three of the legacy model building codes upon which the IBC is based. In fact, the 1999 SBCCI Standard Building Code (SBC)
required all tenant spaces to be separated with 1-hour fire resistance rated walls regardless of the type of construction as specified in Section 704.3.1 of that code. The 1999 BOCA National Building Code (NBC) Table 602 required 1-hour fire resistance ratings for tenant separations in the BOCA construction Types 1, 2A, 2B, 3B, 4, and 5A which are required to be constructed as fire partitions. The 1997 ICBO Uniform Building Code (UBC) Table 6-A required all permanent partitions, which would include tenant separations, to have a 1-hour fire resistance rating for construction Types I, II-F.R., II-1 hour, III-1-hour, IV, and V-1-hour.

Since the state of California is in the process of adopting the International Building Code (IBC), we would like to see this code change proposal approved. It will help us in our adoption process by limiting the amount of state amendments we will find necessary to make in order to bring the IBC in line with the current level of fire and life safety we have historically enjoyed with Uniform Building Code (UBC) upon which our current state building code is based.

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

Committee Action: **Disapproved**

Committee Reason: This proposal establishes a higher level of protection without justifying the need. As this is written, if the space is not "enclosed" then there is no added protection required. A large single space can be wide open and safe but if multiple tenants are on a floor where a wall will be dividing the spaces, this proposed section would require the wall to be rated to protect the people and the space. If such a separation truly is needed, perhaps a smoke partition would be a better choice. While this proposal was tied to the UBC legacy code, it did not mention that the UBC did not require protected openings in the wall. The proposal does not explain how the tenant separation would be applied or why it would not be needed if the tenant spaces were on separate floors. Disapproving this item is consistent with the action taken on FS64-06/07 earlier. The proposal does not explain how spaces such as a bank within a grocery store or a fast-food restaurant within a retail store would be handled and if these "tenant spaces" would require separation.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Rick Thornberry, P.E., The Code Consortium, Inc., representing Alliance for Fire and Smoke Containment and Control (AFSCC), requests Approval as Modified by this public comment.

Modify proposal as follows:

708.1 General. The following wall assemblies shall comply with this section:

1. Walls separating dwelling units in the same building.
2. Walls separating sleeping units in occupancies in Group R-1 hotel, R-2 and I-1 occupancies.
3. Walls separating tenant spaces in covered mall buildings as required by Section 402.7.2.
4. Corridor walls as required by Section 1017.1.
5. Elevator lobby separation as required by Section 707.14.1.
6. Residential aircraft hangars.
7. Walls separating enclosed tenant spaces in buildings of Types I, ~~IA,~~ IIA, IIIA, IV, or VA construction.

Commenter's Reason: The Cellulose Insulation Manufacturers Association (CIMA) is submitting this Public Comment to support this code change proposal for approval as modified. The effect of approving this code change proposal (which was recommended for disapproval by the IBC Fire Safety Code Development Committee) would be to require tenant spaces which are provided with physical walls separating them from adjacent tenant spaces in buildings of the rated types of construction, i.e. Types I, IIA, IIIA, IV, and VA construction, to be constructed as a fire partition having a 1-hour fire-resistance rating. This Public Comment corrects what appears to be an editorial error to clarify that it applies to all of the rated types of construction. We view this code change as mainly a property protection issue. And property protection is a part of the purpose of the code as stated in Section 101.3 Intent which says: "The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare… and safety to life and property from fire…" Not only will the 1-hour fire partition constructed to separate adjacent enclosed tenants provide protection to a tenant against damage from a fire that may occur in another tenant, but it also serves to help contain the fire within a single tenant space, thus preventing damage to the rest of the building and allowing time for the responding fire department to arrive and extinguish the fire.

To a certain extent this is also a life safety issue since a 1-hour tenant separation fire partition will also provide additional time for occupants of a tenant space adjacent to another tenant space on fire to escape the immediate area of the fire and go to the exits before the fire can become a threat to their safety.

Finally, this is also a fire fighter safety issue since the responding fire department can utilize the 1-hour fire partitions separating tenant spaces as a point of attack from which they can stage their operations. This can also assist them in containing and controlling the fire prior to extinguishment by limiting the boundaries of the initial fire growth to the area of the enclosed tenant space into which an external attack can be made while the fire is being contained. This will help to minimize overall fire and smoke damage to the building and limit exposure of the fire fighters in their efforts to control and eventually extinguish the fire, while also attempting rescue and evacuation assistance.

For all these reasons, we believe this code change proposal should be approved as revised in accordance with this Public Comment.

Final Action: AS AM AMPC____ D

FS68-06/07
708.3

Proposed Change as Submitted:

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

708.3 Fire-resistance rating. Fire partitions shall have a fire-resistance rating of not less than 1 hour.

Exceptions:

1. Corridor walls ~~as~~ permitted to have a 0.5 hour fire-resistance rating by Table 1017.1.
2. Dwelling and sleeping unit separations in buildings of Type IIB, IIIB and VB construction shall have fire-resistance ratings of not less than $^1/_2$ hour in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

Reason: The purpose of this proposal is to clarify that Table 1017.1 reduces the fire-resistance rating by one-half hour, it does not eliminate the rating requirement for corridors in Group R occupancies.

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

Committee Action: **Disapproved**

Committee Reason: The reference to Table 1017.1 is more appropriate since that table does permit non-rated corridor walls for many occupancies when the occupant load is less than 10 or if other means of protection are provided. If the ratings exceptions are added, it raises the question of whether it is appropriate to only list the ½ hour exception or if the section should also address the non-rated corridors even though a non-rated corridor wall is not a fire partition. The committee felt that reference to Table 1017.1 in the existing exception is the correct and appropriate manner to address all possible scenarios.

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: The purpose of this proposal is to clarify that Table 1017.1 reduces the fire-resistance rating by one-half hour; it does not eliminate the rating requirement for corridors in Group R occupancies. During committee discussion in Orlando, and as indicated in the published reason for committee disapproval, there was a comment that this proposal may be inappropriate because it does not address non-rated corridors even though a non-rated corridor wall is not a fire partition. The committee felt that it was preferable to retain the current language as it addressed all possible scenarios. This was based on one committee member's comment that Table 1017.1 contained "0" rating requirements, which are also less than 1-hour. We contend that the current vague general provision creates more confusion than it corrects. As was indicated in the published reason, a non-rated corridor permitted by Table 1017.1 does not require a fire partition and as such, there is no reason to go to Section 708.3. In context, Exception 1 to Section 708.3 only applies to the reduction from the normally required one-hour fire partition rating to a one-half hour rating when specified by Table 1017.1. Approval of this proposal as submitted will clarify fire partition rating requirements and lend to uniformity in the interpretation and application of very important corridor wall rating requirements.

Final Action: AS AM AMPC____ D

FS70-06/07, Part I
704.8, 711.3.1 (New), 711.7.1 (New), 716.6 (IMC 607.6)

Proposed Change as Submitted:

Proponent: Gregory R. Keith, Professional heuristic Development, representing the Boeing Company

PART I – IBC FIRE SAFETY

1. Revise as follows:

708.4 Continuity. ~~The~~ Fire partition supporting construction shall be protected to afford the required fire-resistance rating of the wall supported, except for tenant and sleeping unit separation walls and corridor walls in buildings of Types IIB, IIIB and VB construction.

Fire partitions 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 or to the fire-resistance-rated floor/ceiling or roof/ceiling assembly above, and shall be securely attached thereto. If the partitions are not continuous to the sheathing, deck or slab, and where constructed of combustible construction, the space between the ceiling and the sheathing, deck or slab above shall be fireblocked or draftstopped in accordance with Sections 717.2 and 717.3 at the partition line. ~~The supporting construction shall be protected to afford the required fire-resistance rating of the wall supported, except for tenant and sleeping unit separation walls and corridor walls in buildings of Types IIB, IIIB and VB construction.~~

Exceptions:

1. The wall need not be extended into the crawl space below where the floor above the crawl space has a minimum 1-hour fire-resistance rating.
2. ~~Where the room side fire-resistance-rated membrane of the corridor is carried through to the underside of the floor or roof sheathing, deck or slab of a fire-resistance- rated floor or roof above, the ceiling of the corridor shall be permitted to be protected by the use of ceiling materials as required for a 1-hour fire-resistance- rated floor or roof system.~~
3. ~~Where the corridor ceiling is constructed as required for the corridor walls, the walls shall be permitted to terminate at the upper membrane of such ceiling assembly.~~
4. ~~4.~~ 2. The fire partition separating tenant spaces in a mall, complying with Section 402.7.2, are not required to extend beyond the underside of a ceiling that is not part of a fire-resistance-rated assembly. A wall is not required in attic or ceiling spaces above tenant separation walls.
5. ~~5.~~ 3. Fireblocking or draftstopping is not required at the partition line in Group R-2 buildings that do not exceed four stories in height, provided the attic space is subdivided by draftstopping into areas not exceeding 3,000 square feet (279 m^2) or above every two dwelling units, whichever is smaller.
6. ~~6.~~ 4 Fireblocking or draftstopping is not required at the partition line in buildings equipped with an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2, provided that automatic sprinklers are installed in combustible floor/ceiling and roof/ceiling spaces.

2. Add new text as follows:

711.3.1 Corridor construction. Corridor ceiling construction shall comply with one of the following:

1. The corridor ceiling shall be an element of a floor/ceiling or roof/ceiling assembly having not less than a 1-hour fire-resistance rating at the entire story.

   Exception: Where the room-side of the corridor partition extends to the underside of a floor or roof constructed of materials approved for a 1-hour fire-resistance rated floor/ceiling or roof/ceiling assembly, slab or deck above, the corridor ceiling shall be of ceiling materials as required for any 1-hour fire-resistance rated floor or roof system.

2. The corridor ceiling shall be constructed as required for the corridor walls. The room-side of the corridor partition shall extend to the upper ceiling membrane. The corridor-side of the corridor partition shall be permitted to extend to the lower ceiling membrane.

(Renumber subsequent sections)

711.7.1 Corridors. Ducts and air transfer openings that penetrate horizontal assemblies in fire-resistance rated corridors shall comply with the provisions of Section 716.5.4 for fire partitions.

3. Revise as follows:

716.6 (IMC 607.6) Horizontal assemblies. Penetrations by ducts and air transfer openings of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly shall be protected by a shaft enclosure that complies with Section 707 or shall comply with Sections 716.6.1 through 716.6.3.

Exception: Corridors in accordance with the provisions of Section 711.7.1

Committee Action: **Disapproved**

Committee Reason: The proposal does not clarify the requirements as intended by the proponent. The loss of exception 2 appears to create the need for the ceiling to extend throughout the area and not just within the corridor.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Gregory R. Keith, Professional heuristic Development, representing The Boeing Company, requests Approval as Modified by this public comment for Part I.

Modify proposal as follows:

708.4 Continuity. Construction supporting fire partitions ~~supporting construction~~ shall be protected to afford the required fire-resistance rating of the wall supported, except for tenant and sleeping unit separation walls and corridor walls in buildings of Types IIB, IIIB and VB construction.

Fire partitions 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 or to the fire-resistance-rated floor/ceiling or roof/ceiling assembly above, and shall be securely attached thereto. If the partitions are not continuous to the sheathing, deck or slab, and where constructed of combustible construction, the space between the ceiling and the sheathing, deck or slab above shall be fireblocked or draftstopped in accordance with Sections 717.2 and 717.3 at the partition line.

Exceptions:

1. The wall need not be extended into the crawl space below where the floor above the crawl space has a minimum 1-hour fire-resistance rating.
2. The fire partition separating tenant spaces in a mall, complying with Section 402.7.2, are not required to extend beyond the underside of a ceiling that is not part of a fire-resistance-rated assembly. A wall is not required in attic or ceiling spaces above tenant separation walls.
3. Fireblocking or draftstopping is not required at the partition line in Group R-2 buildings that do not exceed four stories in height, provided the attic space is subdivided by draftstopping into areas not exceeding 3,000 square feet (279 m2) or above every two dwelling units, whichever is smaller.
4 Fireblocking or draftstopping is not required at the partition line in buildings equipped with an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2, provided that automatic sprinklers are installed in combustible floor/ceiling and roof/ceiling spaces.

711.3 Fire-resistance rating. The fire-resistance rating of floor and roof assemblies shall not be less than that required by the building type of construction. Where the floor assembly separates mixed occupancies, the assembly shall have a fire-resistance rating of not less than that required by Section 508.3.2 based on the occupancies being separated. Where the floor 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 706.3.9. Floor assemblies separating dwelling units in the same building or sleeping units in ~~occupancies in~~ Group R-1, hotel ~~occupancies~~, R-2 and I-1 occupancies shall be a minimum of 1-hour fire-resistance rated construction.

Exception: Dwelling unit and sleeping unit separations in buildings of Type IIB, IIIB and VB construction shall have fire-resistance ratings of not less than ½ hour in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

~~**711.3.1 Corridor construction.**~~ Where corridor ceiling construction is required to be fire-resistance rated as required by Section 1017.1, such ceiling shall comply with one of the following:

1. The corridor ceiling shall be an element of a floor/ceiling or roof/ceiling assembly having not less than a 1-hour fire-resistance rating at the entire story.

Exception: Where the room-side of the corridor partition extends to the underside of a floor or roof constructed of materials approved for a 1-hour fire-resistance rated floor/ceiling or roof/ceiling assembly, slab or deck above, the corridor ceiling shall be of ceiling materials as required for any 1-hour fire-resistance rated floor or roof system.

2. The corridor ceiling shall be constructed as required for the corridor walls. The room-side of the corridor partition shall extend to the upper ceiling membrane. The corridor-side of the corridor partition shall be permitted to extend to the lower ceiling membrane.

(Renumber remaining sections)

711.7.1 Corridors. Ducts and air transfer openings that penetrate horizontal assemblies in fire-resistance rated corridors shall comply with the provisions of Section 716.5.4 for fire partitions.

716.6 (IMC 607.6) Horizontal assemblies. Penetrations by ducts and air transfer openings of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly shall be protected by a shaft enclosure that complies with Section 707 or shall comply with Sections 716.6.1 through 716.6.3.

Exception: Corridors in accordance with the provisions of Section 711.7.1.

Commenter's Reason: Current rated corridor ceiling construction requirements are very difficult to determine. This is primarily owed to the fact that ceiling construction details are presently contained within the continuity requirements for fire partitions in Section 708. Additionally, those requirements are very confusing as now articulated.

This proposal remedies the situation by creating more comprehensive charging language at Section 1017.1. Although corridor rating requirements apply to the ceilings, reference at Section 1017.1 is now only made to walls. The proposal creates cross-references to Section 711 for rated corridor ceiling requirements.

Corridor ceiling requirements currently contained in Exceptions 2 and 3 to Section 708.4 have been deleted. They have been relocated and modified in Section 711, horizontal assemblies. A new paragraph in Section 711.3 contains rated corridor ceiling construction requirements. Current Exception 2 to Section 708.4 is almost moot as currently stated. Section 708.4 permits fire partition wall construction to terminate at the underside of a fire-resistance rated floor/ceiling or roof/ceiling assembly. That general provision renders the labor-intensive exception as highly impractical, especially in buildings required to have a rated floor/ceiling or roof/ceiling assembly by Table 601 based on building type of construction. That exception has been historically intended to apply fire-resistance rated construction not occurring at the entire story. Condition 1 of Section 711.3 makes that distinction. The intent of former Exception 2 to Section 708.4 is now included as an exception to Condition 1 of Section 711.3.

During discussion of this proposal in Orlando, as indicated in the published reason for disapproval, there was both floor and committee comment that the proposal could be interpreted as requiring the ceiling to extend throughout the area and not just the corridor. This type of comment reinforces the concern that current provisions are misunderstood. In fact, the proposal achieves just the opposite. It states that if the ceiling is a portion of a rated assembly above the entire story, it may also serve as the ceiling of the corridor. If such were not the case, the exception or Condition 2 would serve as acceptable alternate methods of construction.

Essentially, the former and current exceptions are intended to allow for hybrid assemblies constructed of typical fire-resistance rated materials that represent continuous double membrane fire resistive construction. As is the case with the horizontal wall permitted in former Exception 3 to Section 708.4 and proposed condition 2 to Section 711.3, such construction techniques will likely not pass test as a rated horizontal assembly in accordance with the provisions of Section 703.2. In corridor construction, however, this is not a critical design criterion. This is due to the fact that the otherwise lowest common temporal denominator in rated corridor construction is the 20-minute fire door assembly. Such unorthodox assemblies easily exceed that time period and test or calculation would likely demonstrate at least 40 minutes of anticipated protection. It is not crucial to maintain a true 1-hour fire-resistance rating in an exit access component within which travel distance is being measured. This is also why 0.5-hour fire partitions are permitted in certain rated corridor wall construction. Given the somewhat counterintuitive aspect of this technical provision, it is suggested that applicable commentary explain these requirements and their associated logic. It should be noted that the proposed corridor ceiling construction requirements were contained in at least one legacy code. Unfortunately, some of the subtle construction details were lost in the IBC drafting process. This proposal corrects those inaccuracies and in doing so, greatly improves the usability and comprehensiveness of IBC means of egress provisions.

Final Action: AS AM AMPC____ D

FS70-06/07, Part II
1017.1

Proposed Change as Submitted:

Proponent: Gregory R. Keith, Professional heuristic Development, representing the Boeing Company

PART II – IBC MEANS OF EGRESS

1. Revise as follows:

1017.1 Construction. Corridors shall be fire-resistance rated in accordance with Table 1017.1. ~~The corridor w~~ Walls in corridors which are required to be fire-resistance rated shall comply with Section 708 for fire partitions. Ceilings in corridors which are required to be fire-resistance rated shall comply with Section 711 for horizontal assemblies.

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 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.

Reason: (IBC-FS and IBC-MOE) Current rated corridor ceiling construction requirements are very difficult to determine. This is primarily owed to the fact that ceiling construction details are presently contained within the continuity requirements for fire partitions in Section 708. Additionally, those requirements are very confusing as now articulated.

This proposal remedies the situation by creating more comprehensive charging language at Section 1017.1. Although everyone recognizes that corridor construction requirements apply to the ceilings, reference at Section 1017.1 is now only made to walls. The proposal cross references Section 711 for rated corridor ceiling requirements.

Corridor ceiling requirements currently contained in Exceptions 2 and 3 to Section 708.4 have been deleted. They have been relocated and modified in Section 711, horizontal assemblies. New Section 711.3.1 contains rated corridor ceiling construction requirements. Current Exception 2 to Section 708.4 is almost moot as currently stated. Section 708.4 permits fire partition wall construction to terminate at the underside of a fire-resistance rated floor/ceiling or roof/ceiling assembly. That general provision renders the labor intensive exception as highly impractical, especially in buildings required to have a rated floor/ceiling or roof/ceiling assembly by Table 601 based on building type of construction. That exception has been historically intended to apply fire-resistance rated construction not occurring at the entire story. Condition 1 of Section 711.3.1 makes that distinction. The intent of former Exception 2 to Section 708.4 is now included as an exception to condition 1 of Section 711.3.1. Additionally, Section 708.4 has been editorially reorganized. The current last sentence has been relocated to the beginning of the section. This is because the exceptions only potentially apply to the remaining two sentences.

Essentially, the former and current exceptions are intended to allow for hybrid assemblies constructed of typical fire-resistance rated materials that represent continuous double membrane fire resistive construction. As is the case with the horizontal wall permitted in former Exception 3 to Section 708.4 and proposed condition 2 to Section 711.3.1, such construction techniques will likely not pass test as a rated horizontal assembly in accordance with the provisions of Section 703.2. In corridor construction, however, this is not a critical design criterion. This is due to the fact that the otherwise lowest common temporal denominator in rated corridor construction is the 20 minute fire door assembly. Such unorthodox assemblies easily exceed that time period and test or calculation would likely demonstrate at least 40 minutes of anticipated protection. It is not crucial to maintain a true 1-hour fire-resistance rating in an exit access component within which travel distance is being measured. Given the somewhat counterintuitive aspect of this technical provision, it is suggested that applicable commentary explain these requirements and their associated logic. It should be noted that the proposed corridor ceiling construction requirements were contained in at least one legacy code. Unfortunately, some of the subtle construction details were lost in the IBC drafting process. This proposal corrects those inaccuracies and in doing so, greatly improves the usability and comprehensiveness of IBC means of egress provisions.

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

Committee Action: **Disapproved**

Committee Reason: The proposed reference to the ceiling or corridors could be interpreted to require a rated ceiling and would therefore not allow options currently permitted for fire partitions.

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 for Part II.

Commenter's Reason: Current rated corridor ceiling construction requirements are very difficult to determine. This is primarily owed to the fact that ceiling construction details are presently contained within the continuity requirements for fire partitions in Section 708. Additionally, those requirements are very confusing as now articulated.

This proposal remedies the situation by creating more comprehensive charging language at Section 1017.1. Although corridor rating requirements apply to the ceilings, reference at Section 1017.1 is now only made to walls. The proposal creates cross-references to Section 711 for rated corridor ceiling requirements.

Corridor ceiling requirements currently contained in Exceptions 2 and 3 to Section 708.4 have been deleted. They have been relocated and modified in Section 711, horizontal assemblies. A new paragraph in Section 711.3 contains rated corridor ceiling construction requirements. Current Exception 2 to Section 708.4 is almost moot as currently stated. Section 708.4 permits fire partition wall construction to terminate at the underside of a fire-resistance rated floor/ceiling or roof/ceiling assembly. That general provision renders the labor-intensive exception as highly impractical, especially in buildings required to have a rated floor/ceiling or roof/ceiling assembly by Table 601 based on building type of construction. That exception has been historically intended to apply fire-resistance rated construction not occurring at the entire story. Condition 1 of Section 711.3 makes that distinction. The intent of former Exception 2 to Section 708.4 is now included as an exception to Condition 1 of Section 711.3.

During discussion of this proposal in Orlando, as indicated in the published reason for disapproval, there was both floor and committee comment that the proposal could be interpreted as requiring the ceiling to extend throughout the area and not just the corridor. This type of comment reinforces the concern that current provisions are misunderstood. In fact, the proposal achieves just the opposite. It states that if the ceiling is a portion of a rated assembly above the entire story, it may also serve as the ceiling of the corridor. If such were not the case, the exception or Condition 2 would serve as acceptable alternate methods of construction.

Essentially, the former and current exceptions are intended to allow for hybrid assemblies constructed of typical fire-resistance rated materials that represent continuous double membrane fire resistive construction. As is the case with the horizontal wall permitted in former Exception 3 to Section 708.4 and proposed condition 2 to Section 711.3, such construction techniques will likely not pass test as a rated horizontal assembly in accordance with the provisions of Section 703.2. In corridor construction, however, this is not a critical design criterion. This is due to the fact that the otherwise lowest common temporal denominator in rated corridor construction is the 20-minute fire door assembly. Such unorthodox assemblies easily exceed that time period and test or calculation would likely demonstrate at least 40 minutes of anticipated protection. It is not crucial to maintain a true 1-hour fire-resistance rating in an exit access component within which travel distance is being measured. This is also why 0.5-hour fire partitions are permitted in certain rated corridor wall construction. Given the somewhat counterintuitive aspect of this technical provision, it is suggested that applicable commentary explain these requirements and their associated logic. It should be noted that the proposed corridor ceiling construction requirements were contained in at least one legacy code. Unfortunately, some of the subtle construction details were lost in the IBC drafting process. This proposal corrects those inaccuracies and in doing so, greatly improves the usability and comprehensiveness of IBC means of egress provisions.

Final Action: AS AM AMPC____ D

FS75-06/07
711.1, 712.4

Proposed Change as Submitted:

Proponent: Gregory R. Keith, Professional heuristic Development, representing The Boeing Company

Revise as follows:

711.1 General. Floor and roof assemblies required to have a fire-resistance rating shall comply with this section.

Exception: Nonfire-resistance-rated horizontal assemblies shall comply with Section 712.4.2.

712.4 Horizontal assemblies. Penetrations of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly shall be protected in accordance with Section 707 or this section.

Reason: This proposal is intended to clarify very important penetration requirements associated with the construction of horizontal assemblies. Fundamental charging language currently contained in Section 712.4 would indicate that penetrations in horizontal assemblies would only be protected in accordance with Section 707 with shaft enclosures. Obviously, penetrations could also be protected in accordance with Sections 712.4.1 and 712.4.2. Accordingly, the section is proposed to be amended to reflect both acceptable solutions.

Additionally, Section 712.4.2 provides penetration protection requirements for nonfire-resistance-rated horizontal assemblies. These provisions tend to go unnoticed as many persons do not necessarily associate protection requirements with nonrated assemblies. Section 711.5 lends to this confusion in stating, “Penetrations through fire-resistance-rated horizontal assemblies shall comply with Section 712.” The inference being, perhaps, that penetrations through nonfire-resistance-rated horizontal assemblies need not comply with Section 712. To assist users in the proper determination of penetration protection requirements in nonrated assemblies, a cross reference has been added to Section 711.1. The exception was not made to Section 711.5 as the general charging language in Section 711.1 would indicate that the provisions of the section would only apply to rated horizontal assemblies.

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

Committee Action: **Approved as Modified**

Modify the proposal as follows:

711.1 General. Floor and roof assemblies required to have a fire-resistance rating shall comply with this section. **~~Exception:~~** Nonfire-resistance-rated ~~horizontal~~ floor and roof assemblies shall comply with Section 712.4.2.

712.4 Horizontal assemblies. Penetrations of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly shall be protected in accordance with Section 707 or this section.

Committee Reason: This will help to flag the requirements which are applicable to non-rated assemblies in Section 712.4.2 so that they are not missed. Because Sections 711 and 712.4 are generally dealing with rated assemblies, the requirements which of 712.4.2 are often ignored or overlooked. Whether these items should be applied to penetrations of the roof is questionable. The modification eliminated the exception and made it the second sentence in Section 711.1. It also revised the text of the proposed exception to reference “floor and roof” assemblies.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Sarah A. Rice, Schirmer Engineering Corporation, requests Approval as Modified by this public comment.

Further modify proposal as follows:

711.1 General. Floor and roof assemblies required to have a fire-resistance rating shall comply with this section. Nonfire-resistance-rated floor and roof assemblies shall comply with Section 712.4.2.

712.4 Horizontal assemblies. Penetrations of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a shaft by Section 707.2 shall be protected in accordance with Sections 712.4.1 through 712.4.4 ~~shall be protected in accordance with Section 707 or this section.~~

Commenter's Reason: Both Code Changes FS75-06/07 and FS86-06/06 were accepted by the committee – The committee action on FS75-06/07 was AM and AS on FS86-06/07.

The proposed language above is intended to make sure that the language accepted in Code Changes FS75-06/07 and FS86-06/06 correlate. Concern has been expressed that since both code changes were accepted, there could be some correlation issues – this proposal simply brings the language from FS86-06/07 into FS75-06/07 thus eliminating any possible correlation issues.

Final Action: AS AM AMPC____ D

FS80-06/07, Part I
712.3.1, 712.4.1.1

Proposed Change as Submitted:

Proponent: Philip Brazil, P.E, Reid Middleton, Inc., representing himself

PART I – IBC FIRE SAFETY

Revise as follows:

712.3.1 Through penetrations. Through penetrations of fire-resistance-rated walls shall comply with Section 712.3.1.1 or 712.3.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space between the penetrating item and the fire-resistance-rated wall is permitted to be protected ~~as follows~~ by one of the following:

1. In concrete or masonry walls ~~where the penetrating item is a maximum 6-inch (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (0.0929 m^2)~~, concrete, grout or mortar is permitted where installed the full thickness of the wall or the thickness required to maintain the fire-resistance rating~~; or~~ , provided:
   1.1. The nominal diameter of the penetrating item is a maximum of 6 inches (152 mm);
   1.2. The area of the opening through the wall does not exceed 144 square inches (92 900 mm^2); and
   1.3. The aggregate area of openings through the wall does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.29 m^2) of wall area.
2. The material used to fill the annular space shall prevent 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 (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

712.4.1.1 Through penetrations. Through penetrations of fire-resistance-rated horizontal assemblies shall comply with Section 712.4.1.1.1 or 712.4.1.1.2.

Exceptions:

1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete~~,~~ or masonry items through a single fire-resistance-rated floor assembly are permitted where the annular space is protected with materials that prevent 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 (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly provided the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.3 m^2) of floor area.
2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter are permitted, provided:
   2.1. Concrete, grout or mortar is installed the full thickness of each floor or the thickness required to maintain the fire-resistance rating; and
   2.2. The aggregate area of openings through each floor does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.29 m^2) of floor.

~~The penetrating items shall not be limited to the penetration of a single concrete floor provided where the area of the any such opening through each the floor does not exceeds 144 square inches (0.0929 m^2).~~

3. Penetrations in multiple concrete floors by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter are permitted, provided:
   3.1. Concrete, grout or mortar is installed the full thickness of each floor or the thickness required to maintain the fire-resistance rating;
   3.2. The area of each opening through the floors does not exceed 144 square inches (92 900 mm^2); and
   3.3. The aggregate area of openings through each floor does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.29 m^2) of floor area.

~~3.~~ 4. Penetrations by listed electrical boxes of any material are permitted, provided such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.

Committee Action: **Disapproved**

Committee Reason: While the reorganization does make understanding the provisions easier, there was concern with the limitation in Sections 712.3.1 item 1.3 and 712.4.1.1 items 2.2 and 3.3. The concern was that the 100 square foot requirement would be too limiting due to the way that it may be used to limit the number of openings and the uncertainty regarding the way that it may be applied. With the statement that the area limitation is applied to "any" 100 square feet, it may create interpretation problems. While one person would look at a 10 foot by 10 foot area, the next may take the same wall and look at an area that is 1 foot by 100 foot. Therefore differences in interpretations and enforcement would be expected. While this limitation does currently exist within the code in other places, specifically Section 712.4.1.1 item 1, it would be a new requirement for the three locations mentioned above.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Philip Brazil, P.E., Reid Middleton, Inc., representing himself, requests Approval as Modified by this comment for Part I.

Replace the proposal with the following:

712.3.1 Through penetrations. Through penetrations of fire-resistance-rated walls shall comply with Section 712.3.1.1 or 712.3.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space between the penetrating item and the fire-resistance-rated wall is permitted to be protected ~~as follows~~ by one of the following:

1. In concrete or masonry walls ~~where the penetrating item is a maximum 6-inch (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (0.0929 m^2)~~, concrete, grout or mortar is permitted where installed the full thickness of the wall or the thickness required to maintain the fire-resistance rating, provided:

1.1. The nominal diameter of the penetrating item is a maximum of 6 inches (152 mm); and
1.2. The area of the opening through the wall does not exceed 144 square inches (92 900 mm^2).

2. The material used to fill the annular space shall prevent 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 (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

712.4.1.1 Through penetrations. Through penetrations of fire-resistance-rated horizontal assemblies shall comply with Section 712.4.1.1.1 or 712.4.1.1.2.

Exceptions:

1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete~~,~~ or masonry items through a single fire-resistance-rated floor assembly are permitted where the annular space is protected with materials that prevent 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 (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly provided the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.3 m^2) of floor area.
2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter are permitted, provided concrete, grout or mortar is installed the full thickness of each floor or the thickness required to maintain the fire-resistance rating.
~~The penetrating items shall not be limited to the penetration of a single concrete floor, provided the area of the opening through each floor does not exceed 144 square inches (92 900 mm^2).~~
3. Penetrations in multiple concrete floors by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter are permitted, provided:
3.1. Concrete, grout or mortar is installed the full thickness of each floor or the thickness required to maintain the fire-resistance rating; and
3.2. The area of each opening through the floors does not exceed 144 square inches (92 900 mm^2).
4. Penetrations by listed electrical boxes of any material are permitted, provided such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.

Commenter's Reason: The public comment retains the reorganization of the provisions in the original proposal while deleting the proposed limitations on aggregate area.

Final Action: AS AM AMPC____ D

FS80-06/07, Part II
IRC R317.3.1

Proposed Change as Submitted:

Proponent: Philip Brazil, P.E, Reid Middleton, Inc., representing himself

PART II – IRC BUILDING/ENERGY

Revise as follows:

R317.3.1 Through penetrations. Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section R317.3.1.1 or R317.3.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be permitted to be protected as follows:

1. In concrete or masonry wall or floor assemblies ~~where the penetrating item is a maximum 6 inches (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (92 900 mm^2)~~, concrete, grout or mortar is permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating, provided:
1.1. The nominal diameter of the penetrating item is a maximum of 6 inches (152 mm);
1.2. The area of the opening through the wall does not exceed 144 square inches (92 900 mm^2); and
1.3. The aggregate area of openings through the wall or floor assembly does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.29 m^2) of wall or floor area.
2. The material used to fill the annular space shall prevent 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 of water (3 Pa) at the location of the penetration for the time period equivalent to the fire resistance rating of the construction penetrated.

Reason: The use of concrete, grout or mortar to protect penetrations of fire-resistance-rated concrete and masonry walls and floor assemblies in lieu of listed through-penetration firestop systems is reasonable, to a point. The exceptions permitting this method of protection limit the diameter of the penetrating item and, in the cases of walls and multiple floors, limit the area of the opening through the wall or floor, which contains the penetrating item and the concrete, grout or mortar. What the exceptions fail to limit, however, is the aggregate area of openings through the wall or floor. Consequently, an unlimited number of openings are possible. This can lead to groups of openings close enough to each other that the effect can be similar to a single opening many times larger than any one of the individual openings. This could lead to premature failure of the fire-resistance-rated assembly.

The exceptions allowing the use of concrete, grout or mortar are intended for occasional penetrations located so that the distances between penetrating items are several times greater than the dimensions of individual openings. The proposal will place a reasonable limitation upon the aggregate area of openings ensuring that the intent is achieved in most cases.

In addition to the proposed limitation on aggregate area, the language of Exception #2 to IBC Section 712.4.1.1 is editorially rearranged into two exceptions. The current exception is effectively two exceptions, for a single concrete floor and for multiple concrete floors. The rearranged language specifies the limitations on multiple concrete floors separately, which are more severe than on a single concrete floor. The exceptions are also editorially revised so that they are more readily understandable to the code user. This is done by rearranging each group of limitations into a series of items. The phrase "are permitted" is also inserted in several areas so that the exceptions are uniformly stated in the form of complete sentences.

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

Committee Action: **Disapproved**

Committee Reason: There was insufficient technical justification provided to support this proposed code change. The language as submitted was somewhat confusing.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Philip Brazil, P.E., Reid Middleton, Inc., representing himself, requests Approval as Modified by this public comment for Part II.

Replace proposal with the following:

R317.3.1 Through penetrations. Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section R317.3.1.1 or R317.3.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be permitted to be protected as follows:

1. In concrete or masonry wall or floor assemblies ~~where the penetrating item is a maximum 6 inches (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (92 900 mm^2)~~, concrete, grout or mortar is permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating, provided:
   1.1. The nominal diameter of the penetrating item is a maximum of 6 inches (152 mm); and
   1.2. The area of the opening through the wall does not exceed 144 square inches (92 900 mm^2).
2. The material used to fill the annular space shall prevent 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 of water (3 Pa) at the location of the penetration for the time period equivalent to the fire resistance rating of the construction penetrated.

Commenter's Reason: The public comment retains the reorganization of the provisions in the original proposal while deleting the proposed limitations on aggregate area.

Final Action: AS AM AMPC____ D

FS85-06/07
702.1, 712.3.3 (New)

Proposed Change as Submitted:

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

1. Add new text as follows:

702.1 Definitions. The following words and terms shall, for the purposes of this chapter, and as used elsewhere in this code, have the meanings shown herein.

UTILITY BOXES. An enclosure constructed for indoor use to provide a degree of mechanical Protection to equipment or materials.

2. Add new text as follows:

712.3.3 Utility Boxes. Through penetrations shall comply with Section 712.3.1. Where walls or partitions are required to have a fire-resistance rating, membrane penetrations by utility boxes shall be 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 the instructions included in the listing.

(Renumber subsequent sections)

Reason: To add a new allowance which expands upon the ability to install utility boxes such as electrical panels, dryer exhaust boxes, washing machine hose connection boxes and manual fire alarm pull boxes in fire resistance rated assemblies when properly protected.

There are many types of utility boxes installed in fire resistance rated walls, where the membrane penetrations need to be protected. The addition of this new requirement will both permit these general utility boxes to be used and provide some assurance that any box or cabinet penetrations will not compromise the fire resistance rating of the wall.

The IBC currently permits both metallic and nonmetallic electrical boxes to be installed, under specified conditions, in fire resistance rated assemblies. Section 712.3.2 also permits 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. These membrane penetrations in fire resistance rated walls are permitted when evaluated for such installations and provided with the appropriate testing in accordance with Section 712. However, there still exists a need to introduce requirements to cover a variety of other types of general utility boxes such as fire or police alarm boxes, manual fire alarm boxes, switch boxes, valve boxes, special purpose boxes, electrical panels, washer and dryer boxes, and hose cabinets.

This code change proposal would create a direct parallel between the requirements for electrical outlet boxes and these utility boxes. The protection systems are to be tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listings. However, because these utility boxes can exceed 100 square inches aggregate area, both an F and T rating should be required in order to be directly equivalent to the fire resistance rating of the assemblies penetrated. Given that these are membrane penetrations, there is a greater likelihood that someone could unknowingly place or store combustible materials, potentially even furniture and bedding, directly in contact with the un-penetrated membrane on the opposite side of the wall. This could significantly increase threat of fire spread.

The information provided for each Classification would include the model numbers for the products, a description of the rated assemblies, the spacing limitations for the boxes and the installation details.

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

Committee Action: **Disapproved**

Committee Reason: The term “mechanical” protection which is used within the definition is not a defined or clear term. Therefore the committee was uncertain as to what this statement was intended to provide. This proposal would require a “T” rating for the wall which typically would only require an “F” rating or allow the use of a number of exceptions. There is also uncertainty regarding whether an electrical outlet box or a fire alarm box may also be considered as a “utility box.” If the definition would require an F and T rating for the outlet boxes that would be contrary to years of testing and also the provisions found Section 712.3.3 Exceptions 1 and 2. It may also seem inconsistent to permit an outlet box to use the typical methods of protection and yet require the F and T ratings for these utility boxes. The provision does not distinguish between the sizes of the box when establishing 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:

Tony Crimi, A.C. Consulting Solutions Inc. representing International Firestop Council, requests Approval as Modified by this public comment.

Replace proposal with the following:

712.3.2 Membrane penetrations. Membrane penetrations shall comply with Section 712.3.1. 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 two-hour fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0103 m^2) in area provided the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m^2) for any 100 square feet (9.29 m^2) of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 in. (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)
1.2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose fill, rockwool or slag mineral wool insulation;
1.3. By solid fireblocking in accordance with Section 717.2.1;
1.4. By protecting both 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 in. (3.1 mm) unless listed otherwise. Such boxes on opposite sides of the wall or partition shall be separated as follows:
2.1. By a horizontal distance of not less than 24 inches (610 mm);
2.2. By solid fireblocking in accordance with Section 717.2.1;
2.3. By protecting both boxes with listed putty pads; or
2.4. By other listed materials and methods.

3. Membrane penetrations by 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 the instructions included in the listing.

~~3~~ 4. The annular space created by the penetration of an automatic sprinkler provided it is covered by a metal escutcheon plate.

Commenter's Reason: There are many other types of utility boxes and enclosures installed in fire resistance rated walls, where the membrane penetrations need to be protected. The addition of this new requirement will both permit these general utility boxes to be used and provide some assurance that any box or cabinet penetrations will not compromise the fire resistance rating of the wall. The original proposal submitted has been modified here to reflect the Committee's comments about the language introducing the defined term "Utility Box". Consequently, that definition has been eliminated from the proposal.

There still exists a need to introduce requirements to cover a variety of other types of general utility boxes such as dryer exhaust boxes, washing machine hose connection boxes, fire or police alarm boxes, manual fire alarm boxes, switch boxes, valve boxes, special purpose boxes, electrical panels and hose cabinets. This Code change proposals would treat these other box enclosures in a similar manner to what is already required in the charging statement in section 712.3.2. The protection systems are to be tested to demonstrate compare performance to fire-resistance-rated assemblies and installed in accordance with the instructions included in the listings.

The IBC currently permits both metallic and nonmetallic electrical boxes to be installed, under specified conditions, in fire resistance rated assemblies. Section 712.3.2 permits 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 charging statement in 712.3.2 states that "….recessed fixtures shall be installed such that the required fire resistance will not be reduced." Consequently, these provisions already require the F and T ratings to be applied. Exceptions 712.3.2 (1) through (3) impose additional restrictions on the size, type and use of electrical boxes specifically. However, for other types of boxes that may be installed, there is no such exception to the existing F and T (i.e. fire resistance) rating. Further, because these utility boxes can easily exceed the 100 square inches aggregate area limit that exists for electrical boxes, both an F and T rating should continue to be required in order to maintain the performance level directly equivalent to the fire resistance rating of the assemblies penetrated. Given that these are membrane penetrations, there is a greater likelihood that someone could unknowingly place or store combustible materials, potentially even furniture and bedding, directly in contact with the un-penetrated membrane on the opposite side of the wall. This could significantly increase threat of fire spread.

Final Action: AS AM AMPC____ D

FS87-06/07
712.4.1.1

Proposed Change as Submitted:

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

Revise as follows:

712.4.1.1 Through penetrations. Through penetrations of fire-resistance-rated horizontal assemblies shall comply with Section 712.4.1.1.1 or 712.4.1.1.2.

Exceptions:

1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents or concrete or masonry items through a single fire-resistance-rated floor assembly where the annular space is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E 119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period

equivalent to the fire-resistance rating of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly, provided the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.3 m^2) of floor area.

2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter, contained and located within the cavity of a wall, provided the concrete, grout or mortar is installed the full thickness of the floor or the thickness required to maintain the fire-resistance rating. The penetrating items shall not be limited to the penetration of a single concrete floor, provided the area of the opening through each floor does not exceed 144 square inches (92 900 mm^2).
3. Penetrations by listed electrical boxes of any material, provided such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.

Reason: The purpose of the code change is to provide greater consistency between the two options permitted by the Code as applicable to temperature rise performance of steel, ferrous or copper pipes or steel conduit penetrants through fire resistance-rated horizontal assemblies and to establish and maintain the minimum level of performance.

The code is currently inconsistent in the application of temperature rise criteria for continuous metallic penetrants such as pipes and steel conduit.

In the last three cycles, code committees have taken the position that temperature rise performance is required for these categories of penetrants, in some case, even when they are contained and located within the cavity of a wall. Various submissions were made to introduce an exception to the "T"-rating requirements similar to those that currently exist in 712.3.1, and 712.4.1.1 (Exception 1 & 2) into the horizontal assemblies of 712.4.1.1.2. These proposals would have created greater consistency between the technical requirements of these sections of the Code. In each case, this was ultimately rejected by both the Committee and the assembly, even though the proposed new exception was not a new concept, but had been derived from the National Building Code (1999) and the Standard Building Code (1999), and would have stipulated that metallic penetrants not be in direct contact with combustible materials. In doing this, the Committee has clearly established that their intent for the IBC was to not provide any exceptions from the T-ratings other than where the penetrant is within the cavity of a wall, as indicated in the exception to 712.4.1.1.2.

That being the case, since the steel, ferrous or copper pipes or steel conduits are identical in all of these provisions, it is a given that metal penetrants simply passing through a fill of concrete, grout, or mortar cannot provide a T-rating for any substantial heat conductive metal objects that have been run as a continuous item through the floors, due to the inherent thermal conductivity of the metal penetrants. Consequently, these concrete, grout, or mortar sealed penetrations without a T-rating must similarly only be acceptable if located within a chase wall. The complete lack of temperature rise limits on floor penetrations, as allowed in 712.4.1.1 Exceptions 1 and 2, is completely inconsistent with the Committee's actions over 3 cycles, and lowers the required level of performance of a fire resistance rated separation selectively based on firestopping methods rather than safety.

In an effort to provide the Fire Safety Committee with sufficient information to assess this proposed Code change, the International Firestop Council commissioned Underwriters' Laboratories Inc. to conduct a "Fact-Finding Investigation". The objective of this Fact-Finding investigation was to determine whether metallic through-penetrations sealed in accordance with IBC Section 712.4.1.1, Exception 2, using concrete, grout or mortar would develop temperatures in excess of the T- Rating requirements specified in ANSI/UL 1479 (ASTM E814). The results from the test clearly demonstrates that such an opening, complying with this IBC allowance, reaches temperatures in excess of 401°F in under 17 minutes, will reach temperatures in excess of 1160°F in a 3h Standard fire test exposure, and which is sufficient to ignite cotton waste. To put this into some context, in addition to the cotton waste specified in the ASTM E119 and ASTM E814 test methods, there are numerous materials which have auto ignition temperatures around or below 400°F. For example, with convective heating of wood, unpiloted ignition has been reported to be as low as 270°C and as high as 470°C. Some other typical flash ignition temperatures are as reported below:

FLASH IGNITION TEMPERATURE COMPARISON[1]

Material	^{0}C	^{0}F
CPVC	482	900
PVC, rigid	399	750
Polyethylene	343	650
White Pine	204	400
Paper	232	450

Having recognized that "t"-ratings are necessary, the Code needs to apply the same level of protection, regardless of the test method used to qualify the firestopping material. This proposed Code change will establish the minimum level of safety at the same level, regardless of whether firestopping is achieved by using concrete, grout, mortar or ASTM E814 tested materials and systems.

Bibliography: 1. Hilado, C.J., "Flammability Handbook for Plastics", Table 2.5, Third Edition, Technomic Publishing, 1982.

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

Committee Action: **Disapproved**

Committee Reason: These provisions are based on separate test data that Allied Tube had performed. The committee did not agree that these test showed that there was a problem. This may be a material specific issue which may need to be addressed. The public testimony indicated that the earlier testing was done on steel while later testing included copper which is a better conductor and would result in higher temperatures on the unexposed side. The proposal is not clear whether the wall cavity is required above, below or both above and below floor penetration. Because the sizes are limited and this has been accepted for years, the committee disapproved this item. Since this has been acceptable for years and was the only option available prior to F and T rated assemblies, there should be actual fire data to show that there are problems and failures.

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: The code is currently inconsistent in the application of temperature rise criteria for continuous metallic penetrants such as pipes and steel conduit penetrating fire separations. This inconsistency is not just a material specific issue. In the last three cycles, code committees have taken the position that temperature rise performance is required for these categories of penetrants, in some case, even when they are contained and located within the cavity of a wall. Various submissions were made to introduce an exception to the "T"-rating requirements that currently exists in 712.3.1, and 712.4.1.1 (Exception 1 & 2) for walls and horizontal assemblies, into 7.12.4.1.2. These proposals would have created consistency between the technical requirements of these sections of the Code and the level of protection provided by these different materials. In each case, these proposals were ultimately rejected by both the Committee and the assembly, even though the proposed exceptions had been derived from the National Building Code (1999) and the Standard Building Code (1999), and would have stipulated that metallic penetrants not be in direct contact with combustible materials.

In doing this, the Committee has clearly established that their intent for the IBC was to not provide any exceptions from the T-ratings other than where the penetrant is within the cavity of a wall, as indicated in the exception to 712.4.1.1.2. The purpose of this code change is to provide consistency between the two options permitted by the Code as applicable to temperature rise performance of steel, ferrous or copper pipes or steel conduit penetrants through fire resistance-rated horizontal assemblies and to establish and maintain the minimum level of performance.

Since the steel, ferrous or copper pipes or steel conduits are identical in regardless of the materials used to surround the annular space, it is a given that metal penetrants simply passing through a fill of concrete, grout, or mortar cannot provide a T-rating for any substantial heat conductive metal objects that have been run as a continuous item through the floors, due to the inherent thermal conductivity of the metal penetrants. Consequently, these concrete, grout, or mortar sealed penetrations without a T-rating must similarly only be acceptable if located within a chase wall. The complete lack of temperature rise limits on floor penetrations, as allowed in 712.4.1 Exceptions 1 and 2, is completely inconsistent with the Committee's actions over 3 cycles, and lowers the required level of performance of a fire resistance rated separation selectively based on firestopping methods rather than safety.

In an effort to provide the Fire Safety Committee with sufficient information to assess this proposed Code change, the International Firestop Council commissioned Underwriters' Laboratories Inc. to conduct a "Fact-Finding Investigation". The objective of this Fact-Finding investigation was to determine whether metallic through-penetrations permitted by the IBC and sealed in accordance with IBC Section 712.4.1, Exception 2, using concrete, grout or mortar would develop temperatures in excess of the T- Rating requirements specified in ANSI/UL 1479 (ASTM E814). The results from the test clearly demonstrates that such an opening, complying with this IBC allowance, reaches temperatures in excess of 401°F in under 17 minutes, will reach temperatures in excess of 1160°F in a 3h Standard fire test exposure, and which is sufficient to ignite cotton waste. While copper is more conductive than steel in these tests, the difference between the maximum temperatures measured would not likely exceed about 100 °F and is not sufficient to materially affect the test results.

To put this into some context, in addition to the cotton waste specified in the ASTM E119 and ASTM E814 test methods, there are numerous materials which have auto ignition temperatures around or below 400°F. For example, with convective heating of wood, unpiloted ignition has been reported to be as low as 270°C and as high as 470°C. Some other typical flash ignition temperatures are as reported below:

FLASH IGNITION TEMPERATURE COMPARISON[1]

Material	^{0}C	^{0}F
CPVC	482	900
PVC, rigid	399	750
Polyethylene	343	650
White Pine	204	400
Paper	232	450

Having recognized that "t"-ratings are necessary, the Code needs to apply the same level of protection, regardless of the test method used to qualify the firestopping material. This proposed Code change will establish the minimum level of safety at the same level, regardless of whether firestopping is achieved by using concrete, grout, mortar or ASTM E814 tested materials and systems.

Bibliography: 1. Hilado, C.J., "Flammability Handbook for Plastics", Table 2.5, Third Edition, Technomic Publishing, 1982.

Final Action: AS AM AMPC____ D

FS88-06/07
712.4.1.1.2

Proposed Change as Submitted:

Proponent: James P. Stahl Jr., Specified Technologies Inc.

712.4.1.1.2 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 and a 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 do not require a T-rating.
2. Floor penetrations that are not in direct contact with combustible material do not require a T-rating

Reason: To introduce Code language into Section 712.4.1.2 that provides an exception for the T Rating for floor penetrations when the penetrant is not directly in contact with combustible material.

When not in direct contact, heated penetrants pose little threat of igniting combustible materials . This proposed exception is very similar to language that appeared in the 1996 BOCA National Building Code relating to penetrations of floors under Section 714.2.3.

Logic dictates that T Ratings are important because heat conducted through penetrating items in fire resistive rated construction could potentially ignite combustible materials in contact with said penetrating items. The Code presently includes an exception for penetrants cast into a floor with concrete, grout, or mortar. Testing conducted by Underwriters Laboratories Inc. indicates that penetrants protected in this manner are incapable of providing T Ratings equal to the rating of the barrier. Firestop systems including products listed and labeled by accredited, third-party testing and certification agencies are more stringently tested than generic concrete, grout, or mortar products and must conform to rigorous follow up service programs where the quality of the products supplied are verified for ongoing conformance with the program. Despite that fact, listed and labeled firestop systems require a T Rating whereas concrete, grout, and mortar do not.

Previous editions of the BOCA National Building Code cited above included language that indicated T Ratings were not required when the penetrant was not in contact with combustible materials. This proposed revision maintains the intent of the Code to prevent a potentially unsafe condition from happening where carpeting or other combustible material is placed in contact with a penetrating item, while providing parity between tested and listed firestop systems and the use of generic concrete, grout, and mortar solutions.

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

Committee Action: **Disapproved**

Committee Reason: The proposal language is vague by limiting direct contact but not specifying a distance. The combustible could be separated by a very small distance and not be in “direct” contact but still be exposed. The proposal does not take into account the thickness of the assembly which will affect the protection. There are more and more products available which have higher T ratings. Most countries do require an equal F and T rating for these assemblies.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

James P. Stahl Jr. and Christopher DeMarco, Specified Technologies Inc., requests Approval as Modified by this public comment.

Modify proposal as follows:

712.4.1.1.2 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 and a 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 do not require a T-rating.
2. Floor penetrations that are ~~not in direct contact with~~ located a minimum 1 in. from combustible material do not require a T-rating.

Commenter's Reason: The committee rejected the original FS88-06/07 proposal on the basis that the language was too vague by limiting direct contact but not specifying a distance. Based on a review of test data with temperature data and cotton waste ignition testing, we believe that a minimum 1 in. separation should be acceptable.

The code presently allows generic concrete, grout, and mortar to be used to seal metallic pipes, conduits, or tubing in Section 712.4.1.1 without requiring a T Rating. Test data clearly shows that metallic penetrants firestopped with listed firestop systems that use third party (e.g. UL) classified materials do not pose any more of a high temperature ignition hazard than when the identical penetrants are sealed with concrete, grout, or mortar. . The code should therefore correct the different performance requirements for the two types of allowed penetration seals, making either option equally acceptable. If a T-Rating (maximum penetrant temperature limit of 400F) is not required for concrete, grout, or mortar, then the requirements for the more stringently tested and regulated firestopping materials should not have this requirement artificially imposed either.

The basis for this position is testing that has been conducted by UL using 2-1/2 in. thick lightweight concrete floor assemblies. That test data is described below.

In 2005, the International Firestop Council (IFC) sponsored a Fact Finding Investigation at UL to evaluate T Rating performance of copper tubes in lightweight concrete floors sealed with concrete, grout, and mortar. The IFC has furnished copies of the test report to interested parties. That report is dated February 16, 2005 and is identified under Project 05CA06187, File R22102. The test assembly was comprised of a 2-1/2 in. thick lightweight concrete floor. Three openings were included in the test assembly, each provided with a 6 in. trade size copper tube. The three openings were sealed with concrete, grout, and mortar, respectively. The sealing material was installed to the full thickness of the 2-1/2 in. thick floor consistent with the requirements of the code.

Specified Technologies Inc. (STI) sponsored a test at UL on March 6, 1997 that involved a very similar configuration with the exception that the annular space between the penetrating item and the periphery of the opening was sealed with a combination of mineral wool packing material and a 1/4 in. thickness of SpecSeal® LC150 Sealant, a listed and labeled firestopping sealant. The assembly was a 2-1/2 in. lightweight concrete slab. The copper tube was 6 in. trade size. This configuration is covered in a report dated May 6, 1997 under Project 96NK36561, File R14288.

Hilti Inc. sponsored a test at UL on August 29, 2000 with essentially the same configuration as the STI test except that the listed and labeled firestop sealant was identified as Hilti FS-ONE and it was applied to a 1/2 in. thickness. This report is dated March 29, 2001 under Project 00NK33428, File R13240.

Because of the similarity of the test assemblies, it is possible to directly compare the temperature performance of the sealed through-penetrations using both the concrete/grout or mortar solution, and using the significantly different firestop system. The test data also allows an observation of the safety of the proposed 1 inch spacing to any combustibles.

As shown in the table below, the test data clearly reveals that the time-temperature behavior of the penetrant is purely a function of the penetrating item. There is no way to make a conductive material such as a metallic pipe, conduit, or tube non-conductive. Therefore, such a penetrating item will conduct heat regardless of whether it is sealed with concrete, grout, and mortar or listed and labeled firestopping materials. To corroborate this statement, we reference the test data from the aforementioned test reports. As part of the investigation, thermocouples are placed directly on the copper tube 1 in. above the seal. Two thermocouples were positioned on each copper tube on opposite sides. The table below shows the temperatures for each thermocouple on the four copper tubes from the two test investigations. As confirmed from the test data, the temperatures on the copper tubes were comparable, but five of the six thermocouples on the copper tubes sealed with concrete, grout, and mortar were actually higher than the copper tube sealed with 1/4" thick firestop sealant and mineral wool. The 1/2" thick firestop sealant was actually lower than all of the copper tubes sealed with concrete, grout, or mortar.

Project, File	Opening	Material	Thermocouple Number	Temp @ 120 min
05CA06187, R22102	1	Concrete	1	1126.0°F
			2	1114.2°F
05CA06187, R22102	2	Grout	6	1112.7°F
			7	1152.0°F
05CA06187, R22102	3	Mortar	11	1122.6°F
			12	1122.4°F
96NK36561, R14288	2	1/4" Firestop Sealant	8	1113.5°F
			9	1056.4°F
00NK33428, R13240	A	1/2" Firestop Sealant	23	1065°F
			24	1081°F

An additional aspect of the IFC-sponsored UL Fact Finding Investigation was evaluation of whether the heat conducted through the copper tube would ignite cotton waste. The cotton waste ignition test is detailed in Standard ASTM E119, but is not a requirement of ASTM E814/UL 1479. During the IFC-sponsored fire test, the cotton waste was applied to various areas surrounding the penetrating item at random intervals. The cotton waste was applied for 10 to 30 seconds and observations were made regarding whether the cotton waste ignited during the exposure. When the cotton waste was applied directly to the penetrating item, ignition was observed. The UL Report dated February 16, 2005 explicitly states, "However, the temperatures which developed on the surface of the penetrating items on the unexposed side of the assembly resulted in ignition of the cotton waste when applied directly to the surface of the penetrating item and sealing material for 10 seconds." The UL Report dated February 16, 2005 goes on to state, "When the cotton waste was held 1 in. away from the penetrating item and sealing material for 30 seconds, ignition did not occur."

Each test assembly included thermocouples positioned 1 inch away from the penetrating item, in direct contact with the sealing material. The table below indicates the temperatures recorded at those thermocouples for both the tests using concrete/grout/mortar sealed penetrations, as well as in the firestop system sealed penetrations. The maximum temperatures recorded on the thermocouples spaced 1 in. from the penetrating item on all four copper tubes in both test assemblies were reasonably close to within 30°F. Once again, there is no significant temperature performance difference at the floor assembly itself between the copper pipes sealed with concrete, grout or mortar, and the penetrations sealed with a firestop system.

Project, File	Opening	Material	TC Number	TC Location	Max Temp @ 120 Min
05CA06187, R22102	1	Concrete	4	On Fill Material 1 in. from copper tube	857.1°F
05CA06187, R22102	2	Grout	9	On Fill Material 1 in. from copper tube	796.3°F
05CA06187, R22102	3	Mortar	14	On Fill Material 1 in. from copper tube	836.6°F
96NK36561, R14288	2	1/4" Firestop Sealant	10	On Fill Material 1 in. from copper tube	887.1°F
00NK33428, R13240	A	1/2" Firestop Sealant	25	On Fill Material 1 in. from copper tube	579°F

No cotton waste ignition test was conducted on the copper tube sealed with firestop sealant in the UL Report dated May 6, 1997. However, the maximum temperature reached on Thermocouple #10 (On Fill Material 1 in. from copper tube) at the time the test was terminated at 120 minutes was 887.1°F. The UL Report dated March 29, 2001 where the firestop sealant was applied to a greater depth of 1/2 in. was even lower at 579°F. The UL Report dated February 16, 2005 indicates that the cotton waste was held 1 in. away from the penetrating item and sealing material for 30 s. at 176 minutes and no ignition occurred. The temperature at 176 minutes for the thermocouples on the fill material 1 in. from the copper tube for the openings sealed with concrete, grout, and mortar were higher than the maximum temperature recorded on the fill material 1 in. from the copper tube for the firestop sealant. Thus, no ignition of cotton waste would be expected for the opening sealed with firestop sealant. The maximum temperature recorded at the 176 minute mark is shown in the table below:

Project, File	Opening	Material	TC Number	TC Location	Max Temp @ 176 Min
05CA06187, R22102	1	Concrete	4	On Fill Material 1 in. from copper tube	965.7°F
05CA06187, R22102	2	Grout	9	On Fill Material 1 in. from copper tube	878.5°F
05CA06187, R22102	3	Mortar	14	On Fill Material 1 in. from copper tube	925.2°F

The information contained within these two test reports supports the safety of providing a 1 in. spacing between combustible materials and the penetrating item, by demonstrating that the maximum temperatures recorded on the penetrating item as well as at a location 1 in. from the penetrating item are comparable for penetrants sealed with concrete, grout, and mortar as permitted by the code as well as penetrants sealed with firestop sealant. Additionally, as the firestop sealant thickness is increased, it provides even greater protection. The code has always included the exception for concrete, grout, and mortar. Therefore, if it isn't a hazard to seal the penetrating items with concrete, grout, or mortar without mandating a T-rating, then it can't be construed as a hazard to use a listed and labeled firestop material.

Public Comment 2:

James P. Stahl Jr. and Christopher DeMarco, Specified Technologies Inc., requests Approval as Modified by this public comment.

Modify proposal as follows:

712.4.1.1.2 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 and a 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 do not require a T-rating.
2. Floor penetrations that are ~~not in direct contact with combustible material~~ separated a minimum 1 in. from combustible material by an approved manner do not require a T-rating.

Commenter's Reason: The committee rejected the original FS88-06/07 proposal on the basis that the language was too vague by limiting direct contact but not specifying a distance. Based on a review of test data with temperature data and cotton waste ignition testing, we believe that a minimum 1 in. separation should be acceptable.

The code presently allows generic concrete, grout, and mortar to be used to seal metallic pipes, conduits, or tubing in Section 712.4.1.1 without requiring a T Rating. Test data clearly shows that metallic penetrants firestopped with listed firestop systems that use third party (e.g. UL) classified materials do not pose any more of a high temperature ignition hazard than when the identical penetrants are sealed with concrete, grout, or mortar. . The code should therefore correct the different performance requirements for the two types of allowed penetration seals, making either option equally acceptable. If a T-Rating (maximum penetrant temperature limit of 400F) is not required for concrete, grout, or mortar, then the requirements for the more stringently tested and regulated firestopping materials should not have this requirement artificially imposed either.

The basis for this position is testing that has been conducted by UL using 2-1/2 in. thick lightweight concrete floor assemblies. That test data is described below.

In 2005, the International Firestop Council (IFC) sponsored a Fact Finding Investigation at UL to evaluate T Rating performance of copper tubes in lightweight concrete floors sealed with concrete, grout, and mortar. The IFC has furnished copies of the test report to interested parties. That report is dated February 16, 2005 and is identified under Project 05CA06187, File R22102. The test assembly was comprised of a 2-1/2 in. thick lightweight concrete floor. Three openings were included in the test assembly, each provided with a 6 in. trade size copper tube. The three openings were sealed with concrete, grout, and mortar, respectively. The sealing material was installed to the full thickness of the 2-1/2 in. thick floor consistent with the requirements of the code.

Specified Technologies Inc. (STI) sponsored a test at UL on March 6, 1997 that involved a very similar configuration with the exception that the annular space between the penetrating item and the periphery of the opening was sealed with a combination of mineral wool packing material and a 1/4 in. thickness of SpecSeal® LC150 Sealant, a listed and labeled firestopping sealant. The assembly was a 2-1/2 in. lightweight concrete slab. The copper tube was 6 in. trade size. This configuration is covered in a report dated May 6, 1997 under Project 96NK36561, File R14288.

Hilti Inc. sponsored a test at UL on August 29, 2000 with essentially the same configuration as the STI test except that the listed and labeled firestop sealant was identified as Hilti FS-ONE and it was applied to a 1/2 in. thickness. This report is dated March 29, 2001 under Project 00NK33428, File R13240.

Because of the similarity of the test assemblies, it is possible to directly compare the temperature performance of the sealed through-penetrations using both the concrete/grout or mortar solution, and using the significantly different firestop system. The test data also allows an observation of the safety of the proposed 1 inch spacing to any combustibles.

As shown in the table below, the test data clearly reveals that the time-temperature behavior of the penetrant is purely a function of the penetrating item. There is no way to make a conductive material such as a metallic pipe, conduit, or tube non-conductive. Therefore, such a penetrating item will conduct heat regardless of whether it is sealed with concrete, grout, and mortar or listed and labeled firestopping materials. To corroborate this statement, we reference the test data from the aforementioned test reports. As part of the investigation, thermocouples are placed directly on the copper tube 1 in. above the seal. Two thermocouples were positioned on each copper tube on opposite sides. The table below shows the temperatures for each thermocouple on the four copper tubes from the two test investigations. As confirmed from the test data, the temperatures on the copper tubes were comparable, but five of the six thermocouples on the copper tubes sealed with concrete, grout, and mortar were actually higher than the copper tube sealed with 1/4" thick firestop sealant and mineral wool. The 1/2" thick firestop sealant was actually lower than all of the copper tubes sealed with concrete, grout, or mortar.

Project, File	Opening	Material	Thermocouple Number	Temp @ 120 min
05CA06187, R22102	1	Concrete	1	1126.0°F
			2	1114.2°F
05CA06187, R22102	2	Grout	6	1112.7°F
			7	1152.0°F
05CA06187, R22102	3	Mortar	11	1122.6°F
			12	1122.4°F
96NK36561, R14288	2	1/4" Firestop Sealant	8	1113.5°F
			9	1056.4°F
00NK33428, R13240	A	1/2” Firestop Sealant	23	1065°F
			24	1081°F

An additional aspect of the IFC-sponsored UL Fact Finding Investigation was evaluation of whether the heat conducted through the copper tube would ignite cotton waste. The cotton waste ignition test is detailed in Standard ASTM E119, but is not a requirement of ASTM E814/UL 1479. During the IFC-sponsored fire test, the cotton waste was applied to various areas surrounding the penetrating item at random intervals. The cotton waste was applied for 10 to 30 seconds and observations were made regarding whether the cotton waste ignited during the exposure. When the cotton waste was applied directly to the penetrating item, ignition was observed. The UL Report dated February 16, 2005 explicitly states, “However, the temperatures which developed on the surface of the penetrating items on the unexposed side of the assembly resulted in ignition of the cotton waste when applied directly to the surface of the penetrating item and sealing material for 10 seconds.” The UL Report dated February 16, 2005 goes on to state, “When the cotton waste was held 1 in. away from the penetrating item and sealing material for 30 seconds, ignition did not occur.”

Each test assembly included thermocouples positioned 1 inch away from the penetrating item, in direct contact with the sealing material. The table below indicates the temperatures recorded at those thermocouples for both the tests using concrete/grout/mortar sealed penetrations, as well as in the firestop system sealed penetrations. The maximum temperatures recorded on the thermocouples spaced 1 in. from the penetrating item on all four copper tubes in both test assemblies were reasonably close to within 30°F. Once again, there is no significant temperature performance difference at the floor assembly itself between the copper pipes sealed with concrete, grout or mortar, and the penetrations sealed with a firestop system.

Project, File	Opening	Material	TC Number	TC Location	Max Temp @ 120 Min
05CA06187, R22102	1	Concrete	4	On Fill Material 1 in. from copper tube	857.1°F
05CA06187, R22102	2	Grout	9	On Fill Material 1 in. from copper tube	796.3°F
05CA06187, R22102	3	Mortar	14	On Fill Material 1 in. from copper tube	836.6°F
96NK36561, R14288	2	1/4" Firestop Sealant	10	On Fill Material 1 in. from copper tube	887.1°F
00NK33428, R13240	A	1/2" Firestop Sealant	25	On Fill Material 1 in. from copper tube	579°F

No cotton waste ignition test was conducted on the copper tube sealed with firestop sealant in the UL Report dated May 6, 1997. However, the maximum temperature reached on Thermocouple #10 (On Fill Material 1 in. from copper tube) at the time the test was terminated at 120 minutes was 887.1°F. The UL Report dated March 29, 2001 where the firestop sealant was applied to a greater depth of 1/2 in. was even lower at 579°F. The UL Report dated February 16, 2005 indicates that the cotton waste was held 1 in. away from the penetrating item and sealing material for 30 s. at 176 minutes and no ignition occurred. The temperature at 176 minutes for the thermocouples on the fill material 1 in. from the copper tube for the openings sealed with concrete, grout, and mortar were higher than the maximum temperature recorded on the fill material 1 in. from the copper tube for the firestop sealant. Thus, no ignition of cotton waste would be expected for the opening sealed with firestop sealant. The maximum temperature recorded at the 176 minute mark is shown in the table below:

Project, File	Opening	Material	TC Number	TC Location	Max Temp @ 176 Min
05CA06187, R22102	1	Concrete	4	On Fill Material 1 in. from copper tube	965.7°F
05CA06187, R22102	2	Grout	9	On Fill Material 1 in. from copper tube	878.5°F
05CA06187, R22102	3	Mortar	14	On Fill Material 1 in. from copper tube	925.2°F

The information contained within these two test reports supports the safety of providing a 1 in. spacing between combustible materials and the penetrating item, by demonstrating that the maximum temperatures recorded on the penetrating item as well as at a location 1 in. from the penetrating item are comparable for penetrants sealed with concrete, grout, and mortar as permitted by the code as well as penetrants sealed with firestop sealant. Additionally, as the firestop sealant thickness is increased, it provides even greater protection. The code has always included the exception for concrete, grout, and mortar. Therefore, if it isn't a hazard to seal the penetrating items with concrete, grout, or mortar without mandating a T-rating, then it can't be construed as a hazard to use a listed and labeled firestop material.

Final Action: AS AM AMPC____ D

FS90-06/07
712.4.1.2

Proposed Change as Submitted:

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

Revise as follows:

712.4.1.2 Membrane penetrations. Penetrations of membranes that are part of a fire-resistance-rated horizontal assembly shall comply with Section 712.4.1.1.1 or 712.4.1.1.2. Where floor/ceiling assemblies are required to have a minimum 1-hour 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, ferrous or copper conduits, pipes, tubes or vents, or concrete or masonry items where the annular space is protected either in accordance with Section 712.4.1.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling membrane penetrations of maximum 2-hour fire-resistance-rated horizontal assemblies by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29m^2) of ceiling area, and the annular space between the ceiling membrane and the box does not exceed 1/8 inch (3.12 mm).
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 horizontal fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

~~3.~~ 4. 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 ceiling membrane and the box shall not exceed 1/8 inch (3.1 mm) unless listed otherwise.

~~4.~~ 5. The annular space created by the penetration of a fire sprinkler, provided it is covered by a metal escutcheon plate.

Reason: To add a new exception to the Code related to membrane penetrations of fire resistance rated assemblies in Section 712.4.1.2 for membrane penetrations.

The addition of this new exception will permit additional tested and listed systems to be used for membrane penetrations in fire resistance rated assemblies. Many of these systems already exist, and are being used in the marketplace. The IBC should recognize current common practice of a proven, regulated technology.

Section 712.4.1.2 of the IBC already permits several exceptions to the basic requirement for membrane penetrations to be installed so that the required fire resistance rating will not be reduced by the membrane penetrations. In the same way, Certification and Listing Agencies have published Listings covering proprietary compositions that are used to maintain the hourly ratings of fire resistive walls and partitions incorporating flush mounted devices such as outlet boxes, electrical cabinets, and mechanical cabinets penetrating membranes of fire resistance rated assemblies. The individual systems indicate the specific applications and the method of installation for which the materials have been evaluated. The basic standards used to investigate these products is ANSI/UL 263 and ASTM E119.

For example, UL classifies nonmetallic outlet boxes for installation in floors, walls and partitions, and/or ceilings in accordance with the provisions of NFPA 70, "National Electrical Code" (NEC). These systems are required to provide a degree of fire resistance when installed in the particular floors, walls and/or ceiling assemblies. The systems Listed for this application include nonmetallic outlet and switch boxes for use in fire resistance rated wall assemblies. Listing information includes the model numbers for the products, a description of the rated assemblies in which they can be used, the spacing limitations for the boxes and the installation details.

Product Listings specify the conditions under which Listed metallic outlet and switch boxes may be installed within fire resistance rated wall assemblies constructed with bearing and nonbearing wood or steel studs and gypsum board facings. Listings also exist for nonmetallic outlet boxes along with the conditions under which such outlet and switch boxes may be installed within fire resistive wall assemblies. With either type of outlet or switch box, it may be possible to install the boxes under less stringent conditions when such boxes are used in conjunction with wall opening protective materials. Use of wall opening protective materials may allow for any combination of; (1) reducing the spacing between boxes contained on opposite sides of the wall, (2) increasing the size of the boxes, (3) increasing the density of boxes installed, and/or (4) allowing the use of boxes on each side of staggered stud walls. The individual systems tested for compliance in these categories indicate the specific applications and the method of installation for which the materials have been evaluated.

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

Committee Action: **Approved as Submitted**

Committee Reason: This proposal provides additional flexibility with an additional design option. This will coordinate with the action taken on FS82-06/07 but address horizontal assemblies. See FS82-06/07 for additional comments.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jonathan C. Siu, City of Seattle, representing WABO Technical Code Development Committee, requests Approval as Modified by this public comment.

Modify proposal as follows:

712.4.1.2 Membrane penetrations. Penetrations of membranes that are part of a fire-resistance-rated horizontal assembly shall comply with Section 712.4.1.1.1 or 712.4.1.1.2. Where floor/ceiling assemblies are required to have a minimum 1-hour 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, ferrous or copper conduits, pipes, tubes or vents, or concrete or masonry items where the annular space is protected either in accordance with Section 712.4.1.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling membrane penetrations of maximum 2-hour fire-resistance-rated horizontal assemblies by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29m^2) of ceiling area, and the annular space between the ceiling membrane and the box does not exceed 1/8 inch (3.12 mm).
3. Membrane penetrations by electrical boxes of any size or type, which have been listed as part of an ~~wall~~ opening protective material system for use in horizontal fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.
4. 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 ceiling membrane and the box shall not exceed 1/8 inch (3.1 mm) unless listed otherwise
5. The annular space created by the penetration of a fire sprinkler, provided it is covered by a metal escutcheon plate.

Commenter's Reason: Editorial. The scope of this section is horizontal assemblies, so the term “wall opening protective” is not appropriate.

Final Action: AS AM AMPC____ D

FS98-06/07
Table 601, 714.1, 714.1.1 (New), 714.1.2 (New), 714.2, 714.2.1, 714.2.2, 714.3, 714.4

Proposed Change as Submitted:

Proponent: Paul K. Heilstedt, PE, Chair, representing ICC Code Technology Committee (CTC)

Revise as follows:

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A[d]	B	A[d]	B	HT	A[d]	B
~~Structural~~ Primary structural frame[a] See Section 714.1.1 Including columns, girders, trusses	3[b]	2[b]	1	0	1	0	HT	1	0
Bearing walls Exterior[f] Interior	3 3[b]	2 2[b]	1 1	0 0	2 1	2 0	2 1/HT	1 1	0 0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interior[e]	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction Including supporting beams and joists	2	2	1	0	1	0	HT	1	0
Roof construction Including supporting beams and joists	1½[c]	1[c,d]	1[c,d]	0[c,d]	1[c,d]	0[c,d]	HT	1[c,d]	0

For SI: 1 foot = 304.8 mm.

~~a. The structural frame shall be considered to be the columns and the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads. The members of floor or roof panels which have no connection to the columns shall be considered secondary members and not a part of the structural frame.~~

b. through g. (No change to current text – re-letter to become a. through f.)

714.1 Requirements. The fire-resistance rating of structural members and assemblies shall comply with this section and the requirements for the type of construction as specified in Table 601 and shall not be less than the rating required for the fire-resistance-rated assemblies supported by the structural members.

Exception: Fire barriers, fire partitions and smoke barriers as provided in Sections 706.5, 708.4 and 709.4, respectively.

~~**714.2 Protection of structural members.** Protection of columns, girders, trusses, beams, lintels or other structural members that are required to have a fire-resistance rating shall comply with this section.~~

714.1.1 Primary structural frame. The primary structural frame shall be the columns and other structural members including the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads.

714.1.2 Secondary members. The members of floor or roof construction which are not connected to the columns shall be considered secondary members and not part of the primary structural frame

~~**714.2.1**~~ **714.2 Individual encasement protection.** ~~Columns, g~~Girders, trusses, beams, lintels or other structural members that are required to have a fire-resistance rating and that support more than two floors or one floor and roof, or support a load-bearing wall or a nonload-bearing wall more than two stories high, shall be individually protected on all sides for the full length, including connections to other structural members, with materials having the required fire-resistance rating.

714.2.1 Alternative protection. The structural members that are required to have a fire-resistance rating and are not required to be provided individual encasement protection according to Section 714.2 ~~Other structural members required to have a fire-resistance rating~~ shall be protected by individual encasement protection, by a membrane or ceiling protection as specified in Section 711, or by a combination of both. ~~Columns shall also comply with Section 714.2.2.~~

~~**714.2.1.1**~~ **714.3 Membrane protection.** King studs and boundary elements that are integral elements in load-bearing walls of light-framed construction shall be permitted to have required fire-resistance ratings provided by the membrane protection provided for the load-bearing wall.

~~**714.2.2**~~ **714.4 Column protection ~~above ceilings~~.** Where columns are required ~~a~~ to be fire-resistance ~~rating~~ rated, the entire column, including its connections to beams or girders, shall be ~~protected~~ provided individual encasement protection on all sides for the full column length. Where the column extends through a ceiling, the fire resistance rating of the column shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

Reason: The ICC Board established the ICC Code Technology Committee (CTC) as the venue to discuss contemporary code issues in a committee setting which provides the necessary time and flexibility to allow for full participation and input by any interested party. The code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html Since its inception, the CTC has held six meetings - all open to the public.

This proposed change is a result of the CTC's investigation of the area of study entitled "Review of NIST WTC Recommendations". The scope of the activity is noted as:

Review the recommendations issued by NIST in its report entitled "Final Report on the Collapse of the World Trade Center Towers", issued September 2005, for applicability to the building environment as regulated by the I-Codes.

This proposal is intended to address NIST recommendation 7. For this specific proposed change, CTC is working in cooperation with the NIBS/MMC Committee to Translate the NIST World Trade Center Investigation Recommendations for the Model Codes. The CTC notes in their investigation that many of the recommendations contained in the NIST report require additional information for the CTC to further investigate. As such, CTC intends to continue to study the other NIST recommendations.

NIST Recommendation #7 is summarized as "NIST recommends the adoption and use of the structural frame approach to fire resistance ratings." While the IBC currently contains this approach, the NIST team recommends that the concept be reinforced by incorporating text similar to that contained in Footnote a to Table 601 into the pertinent code text for a higher visibility and understanding by code users.

The proposed modification to line 1, column 1 of Table 601 is not intended to revise the intent but to incorporate the revised term. In lieu of a footnote, reliance on the reference to the specific code text of Section 714.1.1 enables a better understanding of the requirements for the pertinent building elements.

The modifications to the subsections of Section 714 are intended to retain the current intent. The assemblies for floors and roofs are not consistently referred to as "panels" and the apparent intent is to deal with "floor and roof construction".

The modifications to the several subsections of Section 714 are intended to work in concert with the reference from Table 601 and consolidate text into a more efficient format without a change in intent.

714.1 – The section is revised by incorporating the requirement that the fire-resistance rating of structural members is to comply with "this section" and "Table 601".

714.1.1 – Existing section 714.2 is not necessary and contains no particular requirements which are not contained in Section 714.1. The text of Section 714.1.1 was revised to more closely resemble the current terminology in line 1 and footnote a of Table 601 which is "structural frame". The incorporation of "other structural members" in Section 714.1.1 is to place reliance on the function of the member to determine its inclusion in the primary structural frame although a laundry list of commonly understood members is retained for understanding of the intent. The structural members named in the existing laundry list are included in the subsections which apply to such members. It should be noted that this section, as does the current footnote, does not consider the lateral load resisting system as part of the structural frame within the context of fire resistance ratings.

714.1.2 – This text is based on the second sentence of existing Footnote a to Table 601.

714.2 – The proposal utilizes the text and concept contained in existing Section 714.2.1. The inclusion of "encasement" in the section title is to enhance the focus of the section's intent. The proposed deletion of "columns" from the laundry list is to eliminate the implication that columns are not required to be individually protected to their full height when protected by Section 711 - Horizontal Assemblies. Individual protection for columns is required by existing Section 714.2.2. This is addressed in proposed Section 714.4. The connections of these elements to other structural members are required to be protected for the continuity of protection.

714.2.1 – The proposal is based on the text in the second sentence of the existing Section 714.2.1 and is addressing those structural members which are not required to be individually protected according to proposed Section 714.2. The last sentence of existing Section 714.2.1 is not needed as proposed Section 714.4 exclusively deals with columns.

714.2.2 – The proposal requires columns to be individually protected for the full column length and columns are not permitted to be protected by membrane protection.

Bibliography:

Interim Report No. 1 of the CTC, Area of Study – Review of NIST WTC Recommendations, March 9, 2006.
National Institute of Standards and Technology. Final Report of the National Construction Safety Team on the Collapses of the World Trade Center Towers. United States Government Printing Office: Washington, D.C. September 2005.

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

Committee Action: **Approved as Submitted**

Committee Reason: This helps to address a couple of concerns which were raised by the NIST report on issues related to the World Trade Center. This item was considered to help with the concerns that the structural frame be better defined and addressed so that the level of fire protection is easier to determine. Having these elements better defined helps to clarify the fire protection required for the structural frame and secondary members. It also helps to clarify that the floor is not considered as being a part of the structural frame. This proposal does not contain any technical changes to the requirements but appropriately moves the definition for structural frame from the table footnote into the proposed sections 714.1.1 and 714.1.2.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Philip Brazil, P.E., Reid Middleton, Inc., representing himself, requests Approval as Modified by this public comment.

Modify proposal as follows:

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A [d]	B	A [d]	B	HT	A [d]	B
Primary structural frame [a] See Section 714.1.1 ~~Including columns, girders, trusses~~	3 [b]	2 [b]	1	0	1	0	HT	1	0

(Portions of proposed changes to table and footnotes not shown remain unchanged)

714.1 Requirements. The fire-resistance ratings of structural members and assemblies shall comply with this section and the requirements for the type of construction as specified in Table 601 ~~and~~. The fire-resistance ratings shall not be less than ~~the rating~~ required for the fire-resistance-rated assemblies supported by the structural members.

Exception: Fire barriers, fire partitions and smoke barriers as provided in Sections 706.5, 708.4 and 709.4, respectively.

714.1.1 Primary structural frame. The primary structural frame shall ~~be~~ consist of the following:

1. The columns ~~and other~~
2. Structural members ~~including the girders, beams, trusses and spandrels~~ having direct connections to the columns, including girders, beams, trusses, lintels and spandrels, and
3. Bracing members designed to carry gravity loads.

714.1.2 Secondary members. ~~The~~ Members of the floor ~~or~~ construction and roof construction ~~which~~ that are not connected to the columns, including structural members not having direction connections to the columns and bracing members not designed to carry gravity loads, shall be considered secondary members and not part of the primary structural frame.

714.2 Individual ~~encasement~~ protection. Girders, trusses, beams, lintels, spandrels and ~~or~~ other structural members ~~that are~~ required to have a fire-resistance rating and that support more than two floors or one floor and roof, or support a load-bearing wall or a nonload-bearing wall more than two stories high, shall be individually protected on all sides for the full length, including connections to other structural members, with materials having the required fire-resistance rating.

714.2.1 Alternative protection. The structural members that are required to have a fire-resistance rating and are not required to be ~~provided individual encasement protection according to~~ individually protected in accordance with Section 714.2 shall be protected ~~by individual encasement protection~~ in accordance with Section 714.2, by ~~a~~ the membrane or ceiling ~~protection as specified in~~ of a horizontal assembly in accordance with Section 711, or by a combination of both.

714.3 Membrane protection. King studs and boundary elements that are integral elements in load-bearing walls of light-framed construction shall be permitted to have required fire-resistance ratings provided by the membrane protection provided for the load-bearing wall.

714.4 Column protection. Where columns are required to be fire-resistance-rated, the entire column, including ~~its~~ connections to ~~beams or girders~~ other structural members, shall be ~~provided individual encasement protection~~ individually protected on all sides for the full column length. Where the column extends through a ceiling, the ~~fire resistance rating~~ individual protection of the column shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

Commenter's Reason: The purpose for this public comment is to make the proposal more technically sound. Reference to "columns, girders and trusses" in the item under "Building Element" for primary structural frame" at Table 601 is deleted because it is effectively replaced by the reference to Section 714.1.1 and conflicts with the references in Section 714.1.1 to columns, girders, beams, trusses and spandrels.

The revision to Section 714.1 is editorial. The revision to Section 714.1.1 may appear editorial but it is being done to make it clear which components of the structure are part of the structural frame. The current language implies that only girders, beams, trusses and spandrels having direct connections to the columns are part of the structural frame when the intent is that all structural members having direct connections to the columns are part of the structural frame. The listing of girders, beams, trusses and spandrels in Section 714.1.1 should be viewed as examples of such structural members. Note that "structural member" is not currently defined in the IBC.

Section 714.1.1 currently lists girders, beams, trusses and spandrels, but not lintels, as examples of structural members. Section 714.2 currently lists girders, beams, trusses and lintels, but not spandrels, as examples of structural members. The proposal correlates the lists for consistency. The listing of spandrels and lintels is, to a certain extent, superfluous but they should remain at least until a definition of "structural member" is added to the IBC by a future action of the membership.

Section 714.1.2 is revised because the current language does not make it clear whether structural members not having direction connections to the columns and bracing members not designed to carry gravity loads are members of the floor or roof construction such that they are considered secondary members. Note that horizontal bracing members typically are, but vertical bracing members typically are not, part of the floor or roof construction.

References to individual encasement protection in the remainder of the proposal are replaced with references to individual protection. Sections 714.2.1 and 714.4 reference individual encasement protection but the proposal does not contain technical provisions for it. The title of Section 714.2 is "individual encasement protection" but the provisions in the section do not mention it. Instead, individual protection on all sides of the structural member for its full length, including connections to other structural members, is specified. Referencing individual encasement protection without technical provisions for it amounts to referencing nothing at all. The language in Section 714.2 is technically sound and provides clear and understandable performance language to achieve effective fire-resistance-rated protection for structural members. Labeling it "individual encasement protection" would do nothing more than add a label to a requirement that is not in need of one.

Public Comment 2:

Maureen Traxler, City of Seattle Department of Planning and Development, requests Approval as Modified by this public comment.

Modify proposal as follows:

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
BUILDING ELEMENT	**A**	**B**	**A[d]**	**B**	**A[d]**	**B**	**HT**	**A[d]**	**B**
~~Primary~~ structural frame[a] See Section 714.1.1 Including columns, girders, trusses	3[b]	2[b]	1	0	1	0	HT	1	0

(Portions of proposed changes to table and footnotes not shown remain unchanged)

Add definition of "structural frame" to Section 702.

702 ~~**714.1.1 Primary**~~ **structural frame.** The ~~primary~~ structural frame ~~shall be~~ is the columns and other structural members including the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads.

Delete "definitions" from Section 714.1.1 and 714.1.2.

~~**714.1.1 Primary structural frame.** The primary structural frame shall be is the columns and other structural members including the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads.~~

~~**714.1.2 Secondary members.** The members of floor or roof construction which are not connected to the columns shall be considered secondary members and not part of the primary structural frame.~~

(Portions of proposal not shown remain unchanged)

Commenter's Reason: Proposed section 714.1.1 contains no substantive requirements; it is a definition only and belongs in Section 702. The definition of "secondary members" is unnecessary because the term is not used in the code, and there is no longer a reason to distinguish between primary and secondary structural frame. The definition of secondary members is also superfluous because it merely says that members that don't fall within the definition of primary members are secondary.

Final Action: AS AM AMPC____ D

FS100-06/07

714.8 (New), 714.8.1 (New), 714.8.2 (New), 714.8.3 (New), 714.8.3.1 (New, 714.8.3.2 (New), 714.8.4 (New), 714.8.5 (New)

Proposed Change as Submitted:

Proponent: William M. Connolly, State of New Jersey, Department of Community Affairs, Division of Codes and Standards, representing International Code Council Ad Hoc Committee on Terrorism Resistant Buildings

Add new text as follows:

714.8 Spray-Applied Fire Resistive Materials (SFRM). Spray-applied fire resistive materials shall comply with the 714.8.1 through 714.8.4.

714.8.1 Fire Resistance Rating. The application of SFRM shall be consistent with its fire resistance rating listing including, but not limited to, minimum thickness and dry density of the applied SFRM, method of application, substrate surface conditions, the use of bonding adhesives, sealants and reinforcing or other materials.

714.8.2 Manufacturer's Installation Instruction. The application of SFRM shall be in accordance with the manufacturer's installation instruction. The instructions shall include, but are not limited to, substrate temperatures and surface conditions, and SFRM handling, storage, mixing, conveyance, method of application, curing and ventilation.

714.8.3 Substrate condition. The SFRM shall be applied to a substrate in compliance with 714.8.3.1 through 714.8.3.2.

714.8.3.1 Surface Conditions. Substrates to receive SFRM shall be free of dirt, oil, grease, release agents, loose scale or paint, primers, paints and encapsulants other than those fire-tested and classified by a recognized testing agency, and any other condition that may prevent adequate adhesion. Primed, painted or encapsulated steel shall be allowed provided that testing has demonstrated that required adhesion is maintained.

714.8.3.2 Primers, Paints and Encapsulants. Where the SFRM is to be applied over primers, paints, or encapsulants other than those specified in the listing, the material shall be field tested in accordance with ASTM E 736. Where testing demonstrates that required adhesion is maintained, SFRM shall be permitted to be applied to primed, painted or encapsulated wide flange steel shapes in accordance with the following conditions:

1. The beam flange width does not exceed 12 in. (300 mm); or
2. The column flange width does not exceed 16 in. (400 mm); or
3. The beam or column web depth does not exceed 16 in. (400 mm).
4. The average and minimum bond strength values shall be determined based on a minimum of five bond tests conducted in accordance with ASTM E736. Bond tests conducted in accordance with ASTM E 736 indicate a minimum average bond strength of 80 percent and a minimum individual bond strength of 50 percent, when compared to the bond strength of the SFRM as applied to clean uncoated 1/8-in. (3-mm) thick steel plate.

714.8.4 Temperature. A minimum ambient and substrate temperature of 40°F (4.44°C) shall be maintained during and for a minimum of 24 hours after the application of the SFRM, unless the manufacturer's installation instructions allow otherwise.

714.8.5 Finished condition. The finished condition of SFRM applied to structural members or assemblies shall not, upon complete drying or curing, exhibit cracks, voids, spalls, delamination or any exposure of the substrate. Surface irregularities of spray-applied SFRM shall be deemed acceptable.

Reasons: This code change proposal is one of fourteen proposals being submitted by the International Code Council Ad Hoc Committee on Terrorism Resistant Buildings.

The purpose of this proposal is to increase the in-place durability of Spray Applied Fire Resistant Material (SFRM) by established code requirements for the application of the material. The Code currently lacks such provisions. The National Institute of Standards and Technology's (NIST) investigation of the World Trade Center (WTC) tragedy documented that the proximate cause of the actual collapse was the action of a building contents fire on light steel members in the absence of spray applied fire resistive material, which had been dislodged. Events far less dramatic than an airplane attack have been known to dislodge SFRM. Events as simple as an elevator movement, building sway or maintenance activities can dislodge SFRM if it is not adhered properly. Recommendation 6 of the NIST WTC Report calls for improvement of the in-place durability of SRFM. This proposal is one of three that seeks to achieve that objective. The other two are a proposal for a new Section 403.15 requiring higher bond strengths for SRFM in taller buildings, and a strengthened Section 1704.10 dealing with special inspections of SFRM installations. The proposed new Section 714.8 establishes for the first time in the Code specific requirements governing the application of SFRM.

Sections 714.8.1 and 714.8.2 require that application be in accordance with all terms and conditions of the listing and the manufacturer's instructions.

Section 714.8.3 deals with the very important issue of substrate. The in-place adhesion of SFRM can be reduced by a factor of 10 when applied over certain primers when compared to the adhesion obtained by the rated material applied on bare clean steel. The section specifies to a field test that must be performed to determine adhesion whenever the field substrate differs from that contemplated by the listing.

Section 714.8.4 specifies a minimum temperature for the application of SFRM.

Section 784.8.5 establishes requirements for the finished condition of SFRM.

These proposals are based upon existing industry guidelines that are presently being followed by many installers.

Bibliography:

Association of the Wall and Ceiling Industries International. Technical Manual 12-A: Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-resistive Materials; an Annotated Guide. Falls Church, Virginia: Association of the Wall and Ceiling Industries International. 1997, Third Edition.

National Institute of Standards and Technology. Final Report of the National Construction Safety Team on the Collapses of the World Trade Center Towers. United States Government Printing Office: Washington, D.C. September 2005.

Cost Impact: This proposal will not increase cost since these procedures are already being followed in responsible installations. This code text is needed to ensure that they are always followed.

Committee Action: Approved as Modified

Modify proposal as follows:

714.8 ~~Spray-Applied~~ Sprayed Fire Resistive Materials (SFRM). ~~Spray-applied~~ Sprayed fire resistive materials shall comply with the 714.8.1 through 714.8.4.

714.8.1 Fire Resistance Rating. The application of SFRM shall be consistent with its fire resistance rating listing including, but not limited to, minimum thickness and dry density of the applied SFRM, method of application, substrate surface conditions, the use of bonding adhesives, sealants and reinforcing or other materials.

714.8.2 Manufacturer's Installation Instruction. The application of SFRM shall be in accordance with the manufacturer's installation instruction. The instructions shall include, but are not limited to, substrate temperatures and surface conditions, and SFRM handling, storage, mixing, conveyance, method of application, curing and ventilation.

714.8.3 Substrate condition. The SFRM shall be applied to a substrate in compliance with 714.8.3.1 through 714.8.3.2.

714.8.3.1 Surface Conditions. Substrates to receive SFRM shall be free of dirt, oil, grease, release agents, loose scale or paint, primers, paints and encapsulants other than those fire-tested and classified by a recognized testing agency, and any other condition that ~~may~~ prevents ~~adequate~~ adhesion. Primed, painted or encapsulated steel shall be allowed provided that testing has demonstrated that required adhesion is maintained.

714.8.3.2 Primers, Paints and Encapsulants. Where the SFRM is to be applied over primers, paints, or encapsulants other than those specified in the listing, the material shall be field tested in accordance with ASTM E 736. Where testing of the SFRM with primers, paints or encapsulants demonstrates that required adhesion is maintained, SFRM shall be permitted to be applied to primed, painted or encapsulated wide flange steel shapes in accordance with the following conditions:

1. The beam flange width does not exceed 12 in. (300 mm); or
2. The column flange width does not exceed 16 in. (400 mm); or
3. The beam or column web depth does not exceed 16 in. (400 mm).
4. The average and minimum bond strength values shall be determined based on a minimum of five bond tests conducted in accordance with ASTM E736. Bond tests conducted in accordance with ASTM E 736 indicate a minimum average bond strength of 80 percent and a minimum individual bond strength of 50 percent, when compared to the bond strength of the SFRM as applied to clean uncoated 1/8-in. (3-mm) thick steel plate.

714.8.4 Temperature. A minimum ambient and substrate temperature of 40°F (4.44°C) shall be maintained during and for a minimum of 24 hours after the application of the SFRM, unless the manufacturer's installation instructions allow otherwise.

714.8.5 Finished condition. The finished condition of SFRM applied to structural members or assemblies shall not, upon complete drying or curing, exhibit cracks, voids, spalls, delamination or any exposure of the substrate. Surface irregularities of ~~spray-applied~~ SFRM shall be deemed acceptable.

Committee Reason: This proposal provides enforceable language to assure compliance with the code requirements. This helps to address the NIST report issue that testing is to un-primed steel but the actual field installation is done to steel with primers and therefore the adhesion is often greatly different. This proposal puts important provisions in the code and not just in the standard where the inspector often does not see them. The testimony did clarify that the size limitations of Section 714.8.3.2 items 1, 2, and 3 do not limit the size of members which may use SFRM but instead only limit the size of members which use this section and apply them to materials which are "other than those specified in the listing." The modifications help coordinate with changes made by FS156-06/07 regarding the term "sprayed" versus "spray-applied" and also included other changes which were believed to clarify the provisions and eliminate vague language.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Philip Brazil, P.E., Reid Middleton, Inc., representing himself, requests Approval as Modified by this public comment.

Further modify proposal as follows:

714.8 Sprayed Fire ~~Resistive~~ Resistant Materials (SFRM). Sprayed fire ~~resistive~~ resistant materials (SFRM) shall comply with ~~the~~ Sections 714.8.1 through 714.8.4.

714.8.1 Fire Resistance Rating. The application of SFRM shall be consistent with ~~its~~ the fire resistance rating and the listing including, but not limited to, minimum thickness and dry density of the applied SFRM, method of application, substrate surface conditions; and the use of bonding adhesives, sealants, ~~and~~ reinforcing or other materials.

714.8.2 Manufacturer's Installation Instruction. The application of SFRM shall be in accordance with the manufacturer's installation instructions. The instructions shall include, but are not limited to, substrate temperatures and surface conditions, and SFRM handling, storage, mixing, conveyance, method of application, curing and ventilation.

714.8.3 Substrate condition. The SFRM shall be applied to a substrate in compliance with Sections 714.8.3.1 through 714.8.3.2.

714.8.3.1 Surface Conditions. Substrates to receive SFRM shall be free of dirt, oil, grease, release agents, loose scale ~~or paint~~ and any other condition that prevents adhesion. The substrates shall also be free of primers, paints and encapsulants other than those fire-tested and ~~classified~~ listed by a nationally recognized testing agency ~~and any other condition that prevents adhesion~~. Primed, painted or encapsulated steel shall be allowed provided ~~that~~ testing has demonstrated that required adhesion is maintained.

714.8.3.2 Primers, Paints and Encapsulants. Where the SFRM is to be applied over primers, paints, or encapsulants other than those specified in the listing, the material shall be field tested in accordance with ASTM E 736. Where testing of the SFRM with primers, paints or encapsulants demonstrates that required adhesion is maintained, SFRM shall be permitted to be applied to primed, painted or encapsulated wide flange steel shapes in accordance with the following conditions:

1. The beam flange width does not exceed 12 in. (300 mm); or
2. The column flange width does not exceed 16 in. (400 mm); or
3. The beam or column web depth does not exceed 16 in. (400 mm).
4. The average and minimum bond strength values shall be determined based on a minimum of five bond tests conducted in accordance with ASTM E736. Bond tests conducted in accordance with ASTM E 736 shall indicate a minimum average bond strength of 80 percent and a minimum individual bond strength of 50 percent, when compared to the bond strength of the SFRM as applied to clean uncoated 1/8-in. (3-mm) thick steel plate.

714.8.4 Temperature. A minimum ambient and substrate temperature of 40ºF (4.44ºC) shall be maintained during and for a minimum of 24 hours after the application of the SFRM, unless the manufacturer's installation instructions allow otherwise.

714.8.5 Finished condition. The finished condition of SFRM applied to structural members or assemblies shall not, upon complete drying or curing, exhibit cracks, voids, spalls, delamination or any exposure of the substrate. Surface irregularities of SFRM shall be deemed acceptable.

Commenter's Reason: The purpose for the public comment is to make the proposed language more technically sound. In Section 714.8, "sprayed fire resistive materials" is changed to "sprayed fire resistant materials" for consistency with use of the latter term elsewhere in the IBC. In Section 714.8.1, "its fire resistance rating" is changed to "the fire resistance rating" because sprayed fire resistant materials are typically not listed for fire resistance ratings but are components of fire-resistance-rated deigns that include the structural member or element receiving the materials. In Section 714.8.3.1, "classified" is changed to "listed" for consistency with "listing" in Section 714.8.3.2. The first sentence of Section 714.8.3.1 is changed to two sentences to make it clear that listings by nationally recognized testing laboratories are applicable to primers, paints and encapsulants; but not to dirt, oil, grease, release agents and loose scale.

Final Action: AS AM AMPC____ D