# FS5-07/08, Part I
## 202 (New)

**Proponent:** Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

*Proposed Change as Submitted:*

**PART I – IBC FIRE SAFETY**

**Add new definition as follows:**

**SECTION 202**
**DEFINITIONS**

**NONCOMBUSTIBLE MATERIAL.** A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

**Reason:** There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term. The codes that use the term are IMC, IBC, IRC, IFC, IEBC, IWUIC and IFGC. It is also used in an appendix of the performance code, but a definition in that code is probably not necessary. Throughout the ICC code system, the concept of "noncombustible material" is based on two aspects: (a) it should not ignite or burn when subjected to fire or heat and (b) it should pass the ASTM E 136 conditions. Therefore, the definition proposed addresses both of these aspects and is identical for all codes.

In the case of three codes, IMC, IBC and IWUIC, there are additional requirements or issues associated with the use of the term noncombustible material. It is proposed that these should be addressed outside of the definitions, in the relevant chapters. Separate proposals will be made to the IMC, IBC and IWUIC to suggest how to address these requirements for noncombustible materials.

For information purposes, the following is included in the IBC:

**703.4 Noncombustibility tests.** The tests indicated in Sections 703.4.1 and 703.4.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Type I, II, III and IV construction. The term "noncombustible" does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

**703.4.1 Elementary materials.** Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

**703.4.2 Composite materials.** Materials having a structural base of noncombustible material as determined in accordance with Section 703.4.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E 84 or UL 723 shall be acceptable as noncombustible materials.

Also, for information purposes, the following definitions are used for the term in ASTM E 176 (ASTM terminology of fire standards) and in NFPA 101 and 5000.

**ASTM E 176:**
**non-combustible**, *adj* — not capable of undergoing combustion under specified conditions. (Contrast combustible.)
DISCUSSION—In fire testing, non-combustibility is often assessed by means of ASTM E 136 or ISO 1182.
**NFPA 101 and NFPA 5000:**
**Noncombustible Material.** A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C, shall be considered noncombustible materials.

**Cost Impact:** This proposal should not increase the cost of construction.

**Analysis:** Review of proposed new standard ASTM E136-04 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

**PART I – IBC FIRE SAFETY**
**Committee Action:** **Disapproved**

**Committee Reason:** The committee felt that the proposed definition of noncombustible material was unclear as to what materials had to be tested for noncombustibility in accordance with ASTM E136.

**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 Southwest Research Institute requests Approved as Modified by this public comment for Part I.**

**Modify proposal as follows:**

**SECTION 202**
**DEFINITIONS**

**NONCOMBUSTIBLE MATERIAL.** A material that~~, under the conditions anticipated,~~ will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

**Commenter's Reason:** The concept of "noncombustible materials" and "noncombustibility" in terms of types of construction is widely used throughout the International Codes. While the IRC, IMC, and IWUIC all contain definitions of the term, they are all different from each other. In contrast, the IBC, IFC, IEBC and IFGC do not contain a separate definition, even though they use the terminology "noncombustible materials". There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term.

In common usage, the term "noncombustible" is used to denote materials which do not ignite or are not capable of sustaining combustion. The common Dictionary definitions for "noncombustible" are typically as follows:

Noncombustible, adj – not capable of igniting and burning (Webster's Third New International Dictionary of the English Language, Unabridged, 2007)

In contrast to the common usage, the traditional use of the terminology and concept of "noncombustible materials" in the Codes has been based on acceptable performance when tested in accordance with ASTM E136, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C. Materials passing the test are permitted limited flaming and other indications of combustion. However, these have traditional been acceptable. Understandably, ASTM E136 does not replicate the full spectrum of actual building fire exposure conditions. However, this test method does provide an assessment indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

While each of the model I-Codes which reference the term "noncombustible" do have unique additional attributes, we are in agreement with the original proponent, that these are best addressed outside of the definition. For example, section 703.4 of the IBC does provide additional requirements and acceptance criteria which are specific to its own intent and contained in Sections 602.2, 602.3, and 602.4.

Final Action: AS AM AMPC____ D

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# FS5-07/08, Part II
## 202 (New), Chapter 15 (New)

**Proponent:** Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

*Proposed Change as Submitted:*

**PART II – IEBC**

**1. Add new definition as follows:**

**SECTION 202**
**DEFINITIONS**

**NONCOMBUSTIBLE MATERIAL.** A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

**2. Add standard to Chapter 15 as follows:**

**ASTM**

E 136-04 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C

**Reason:** There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term. The codes that use the term are IMC, IBC, IRC, IFC, IEBC, IWUIC and IFGC. It is also used in an appendix of the performance code, but a definition in that code is probably not necessary. Throughout the ICC code system, the concept of "noncombustible material" is based on two aspects: (a) it should not ignite or burn when subjected to fire or heat and (b) it should pass the ASTM E 136 conditions. Therefore, the definition proposed addresses both of these aspects and is identical for all codes.

In the case of three codes, IMC, IBC and IWUIC, there are additional requirements or issues associated with the use of the term noncombustible material. It is proposed that these should be addressed outside of the definitions, in the relevant chapters. Separate proposals will be made to the IMC, IBC and IWUIC to suggest how to address these requirements for noncombustible materials.

For information purposes, the following is included in the IBC:

**703.4 Noncombustibility tests.** The tests indicated in Sections 703.4.1 and 703.4.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Type I, II, III and IV construction. The term "noncombustible" does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

**703.4.1 Elementary materials.** Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

**703.4.2 Composite materials.** Materials having a structural base of noncombustible material as determined in accordance with Section 703.4.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E 84 or UL 723 shall be acceptable as noncombustible materials.

Also, for information purposes, the following definitions are used for the term in ASTM E 176 (ASTM terminology of fire standards) and in NFPA 101 and 5000.

**ASTM E 176:**
**non-combustible**, *adj* — not capable of undergoing combustion under specified conditions. (Contrast combustible)
DISCUSSION—In fire testing, non-combustibility is often assessed by means of ASTM E 136 or ISO 1182.
**NFPA 101 and NFPA 5000:**
**Noncombustible Material.** A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C, shall be considered noncombustible materials.

**Cost Impact:** This proposal should not increase the cost of construction.

**Analysis:** Review of proposed new standard ASTM E136-04 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

## PART II – IEBC
## Committee Action: Approved as Submitted

**Committee Reason:** The committee agrees with the proponent that there is a need for a consistent definition of "noncombustible" in the applicable codes.

## 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 Southwest Research Institute requests Approved as Modified by this public comment for Part II.

**Modify proposal as follows:**

**SECTION 202**
**DEFINITIONS**

**NONCOMBUSTIBLE MATERIAL.** A material that~~, under the conditions anticipated,~~ will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The concept of "noncombustible materials" and "noncombustibility" in terms of types of construction is widely used throughout the International Codes. While the IRC, IMC, and IWUIC all contain definitions of the term, they are all different from each other. In contrast, the IBC, IFC, IEBC and IFGC do not contain a separate definition, even though they use the terminology "noncombustible materials". There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term.

In common usage, the term "noncombustible" is used to denote materials which do not ignite or are not capable of sustaining combustion. The common Dictionary definitions for "noncombustible" are typically as follows:

**Noncombustible, adj** – not capable of igniting and burning *(Webster's Third New International Dictionary of the English Language, Unabridged, 2007)*

In contrast to the common usage, the traditional use of the terminology and concept of "noncombustible materials" in the Codes has been based on acceptable performance when tested in accordance with ASTM E136, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C. Materials passing the test are permitted limited flaming and other indications of combustion. However, these have traditional been acceptable. Understandably, ASTM E136 does not replicate the full spectrum of actual building fire exposure conditions. However, this test method does provide an assessment indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

While each of the model I-Codes which reference the term "noncombustible" do have unique additional attributes, we are in agreement with the original proponent, that these are best addressed outside of the definition. For example, Section 703.4 of the IBC does provide additional requirements and acceptance criteria which are specific to its own intent and contained in Sections 602.2, 602.3, and 602.4.

Final Action: AS AM AMPC____ D

# FS5-07/08, Part III
## 202 (New), Chapter 45 (New)

*Proposed Change as Submitted:*

**Proponent:** Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

**PART III – IFC**

**1. Add new definition as follows:**

**SECTION 202**
**DEFINITIONS**

**NONCOMBUSTIBLE MATERIAL.** A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

**2. Add standard to Chapter 45 as follows:**

**ASTM**
E 136-04 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C

**Reason:** There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term. The codes that use the term are IMC, IBC, IRC, IFC, IEBC, IWUIC and IFGC. It is also used in an appendix of the performance code, but a definition in that code is probably not necessary. Throughout the ICC code system, the concept of "noncombustible material" is based on two aspects: (a) it should not ignite or burn when subjected to fire or heat and (b) it should pass the ASTM E 136 conditions. Therefore, the definition proposed addresses both of these aspects and is identical for all codes.

In the case of three codes, IMC, IBC and IWUIC, there are additional requirements or issues associated with the use of the term noncombustible material. It is proposed that these should be addressed outside of the definitions, in the relevant chapters. Separate proposals will be made to the IMC, IBC and IWUIC to suggest how to address these requirements for noncombustible materials.

For information purposes, the following is included in the IBC:

**703.4 Noncombustibility tests.** The tests indicated in Sections 703.4.1 and 703.4.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Type I, II, III and IV construction. The term "noncombustible" does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

**703.4.1 Elementary materials.** Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

**703.4.2 Composite materials.** Materials having a structural base of noncombustible material as determined in accordance with Section 703.4.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E 84 or UL 723 shall be acceptable as noncombustible materials.

Also, for information purposes, the following definitions are used for the term in ASTM E 176 (ASTM terminology of fire standards) and in NFPA 101 and 5000.

**ASTM E 176:**
**non-combustible**, *adj* — not capable of undergoing combustion under specified conditions. (Contrast combustible.)
DISCUSSION—In fire testing, non-combustibility is often assessed by means of ASTM E 136 or ISO 1182.
**NFPA 101 and NFPA 5000:**
**Noncombustible Material.** A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C, shall be considered noncombustible materials.

**Cost Impact:** This proposal should not increase the cost of construction.

**Analysis:** Review of proposed new standard ASTM E136-04 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

**PART III – IFC**
**Committee Action:** **Disapproved**

**Committee Reason:** The current definition should be retained. It has a long history of accommodating gypsum and other commonly recognized noncombustible materials and has not been shown to be a problem. This will also correlate with the disapproval action taken by the respective committees in Parts I, III, IV, V, VI and VII.

**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 Southwest Research Institute requests Approved as Modified by this public comment for Part III.**

**Modify proposal as follows:**

**NONCOMBUSTIBLE MATERIAL.** A material that~~, under the conditions anticipated,~~ will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** used throughout the International Codes. While the IRC, IMC, and IWUIC all contain definitions of the term, they are all different from each other. In contrast, the IBC, IFC, IEBC and IFGC do not contain a separate definition, even though they use the terminology "noncombustible materials". There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term.

In common usage, the term "noncombustible" is used to denote materials which do not ignite or are not capable of sustaining combustion. The common Dictionary definitions for "noncombustible" are typically as follows:

**Noncombustible, adj** – not capable of igniting and burning *(Webster's Third New International Dictionary of theEnglish Language, Unabridged, 2007)*

In contrast to the common usage, the traditional use of the terminology and concept of "noncombustible materials" in the Codes has been based on acceptable performance when tested in accordance with ASTM E136, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C. Materials passing the test are permitted limited flaming and other indications of combustion. However, these have traditional been acceptable. Understandably, ASTM E136 does not replicate the full spectrum of actual building fire exposure conditions. However, this test method does provide an assessment indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

While each of the model I-Codes which reference the term "noncombustible" do have unique additional attributes, we are in agreement with the original proponent, that these are best addressed outside of the definition. For example, section 703.4 of the IBC does provide additional requirements and acceptance criteria which are specific to its own intent and contained in Sections 602.2, 602.3, and 602.4.

Final Action: AS AM AMPC____ D

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# FS5-07/08, Part IV
## 202 (New), Chapter 8 (New)

*Proposed Change as Submitted:*

**Proponent:** Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

**PART IV – IFGC**

**1. Add new definition as follows:**

**SECTION 202**
**DEFINITIONS**

**NONCOMBUSTIBLE MATERIAL.** A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

**2. Add standard to Chapter 8 as follows:**

**ASTM**

E 136-04 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C

**Reason:** There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term. The codes that use the term are IMC, IBC, IRC, IFC, IEBC, IWUIC and IFGC. It is also used in an appendix of the performance code, but a definition in that code is probably not necessary. Throughout the ICC code system, the concept of "noncombustible material" is based on two aspects: (a) it should not ignite or burn when subjected to fire or heat and (b) it should pass the ASTM E 136 conditions. Therefore, the definition proposed addresses both of these aspects and is identical for all codes.

In the case of three codes, IMC, IBC and IWUIC, there are additional requirements or issues associated with the use of the term noncombustible material. It is proposed that these should be addressed outside of the definitions, in the relevant chapters. Separate proposals will be made to the IMC, IBC and IWUIC to suggest how to address these requirements for noncombustible materials.

For information purposes, the following is included in the IBC:

**703.4 Noncombustibility tests.** The tests indicated in Sections 703.4.1 and 703.4.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Type I, II, III and IV construction. The term "noncombustible" does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

**703.4.1 Elementary materials.** Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

**703.4.2 Composite materials.** Materials having a structural base of noncombustible material as determined in accordance with Section 703.4.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E 84 or UL 723 shall be acceptable as noncombustible materials.

Also, for information purposes, the following definitions are used for the term in ASTM E 176 (ASTM terminology of fire standards) and in NFPA 101 and 5000.

**ASTM E 176:**
**non-combustible**, *adj* — not capable of undergoing combustion under specified conditions. (Contrast combustible.)
DISCUSSION—In fire testing, non-combustibility is often assessed by means of ASTM E 136 or ISO 1182.
**NFPA 101 and NFPA 5000:**
**Noncombustible Material.** A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C, shall be considered noncombustible materials.

**Cost Impact:** This proposal should not increase the cost of construction.

**Analysis:** Review of proposed new standard ASTM E136-04 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

## PART IV – IFGC
## Committee Action: Disapproved

**Committee Reason:** The proposed definition uses subjective language and could cause confusion regarding materials such FRTW and gypsum board.

## Assembly Action: None

## *Individual Consideration Agenda*

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

*Public Comment:*

### Tony Crimi, A.C Consulting Solutions, Inc, representing Southwest Research Institute requests Approved as Modified by this public comment for Part IV.

**Modify proposal as follows:**

**NONCOMBUSTIBLE MATERIAL.** A material that~~, under the conditions anticipated,~~ will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The concept of "noncombustible materials" and "noncombustibility" in terms of types of construction is widely used throughout the International Codes. While the IRC, IMC, and IWUIC all contain definitions of the term, they are all different from each other. In contrast, the IBC, IFC, IEBC and IFGC do not contain a separate definition, even though they use the terminology "noncombustible materials". There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term.

In common usage, the term "noncombustible" is used to denote materials which do not ignite or are not capable of sustaining combustion. The common Dictionary definitions for "noncombustible" are typically as follows:

Noncombustible, adj – not capable of igniting and burning *(Webster's Third New International Dictionary of the English Language, Unabridged, 2007)*

In contrast to the common usage, the traditional use of the terminology and concept of "noncombustible materials" in the Codes has been based on acceptable performance when tested in accordance with ASTM E136, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C. Materials passing the test are permitted limited flaming and other indications of combustion. However, these have traditional been acceptable. Understandably, ASTM E136 does not replicate the full spectrum of actual building fire exposure conditions. However, this test method does provide an assessment indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

While each of the model I-Codes which reference the term "noncombustible" do have unique additional attributes, we are in agreement with the original proponent, that these are best addressed outside of the definition. For example, section 703.4 of the IBC does provide additional requirements and acceptance criteria which are specific to its own intent and contained in Sections 602.2, 602.3, and 602.4.

Final Action: AS AM AMPC____ D

# FS5-07/08, Part V
## 202

*Proposed Change as Submitted:*

**Proponent:** Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

**PART V – IMC**

**Delete definition and substitute as follows:**

**SECTION 202**
**DEFINITIONS**

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

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

**NONCOMBUSTIBLE MATERIAL.** A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

**Reason:** There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term. The codes that use the term are IMC, IBC, IRC, IFC, IEBC, IWUIC and IFGC. It is also used in an appendix of the performance code, but a definition in that code is probably not necessary. Throughout the ICC code system, the concept of "noncombustible material" is based on two aspects: (a) it should not ignite or burn when subjected to fire or heat and (b) it should pass the ASTM E 136 conditions. Therefore, the definition proposed addresses both of these aspects and is identical for all codes.

In the case of three codes, IMC, IBC and IWUIC, there are additional requirements or issues associated with the use of the term noncombustible material. It is proposed that these should be addressed outside of the definitions, in the relevant chapters. Separate proposals will be made to the IMC, IBC and IWUIC to suggest how to address these requirements for noncombustible materials.

For information purposes, the following is included in the IBC:

**703.4 Noncombustibility tests.** The tests indicated in Sections 703.4.1 and 703.4.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Type I, II, III and IV construction. The term "noncombustible" does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

**703.4.1 Elementary materials.** Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

**703.4.2 Composite materials.** Materials having a structural base of noncombustible material as determined in accordance with Section 703.4.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E 84 or UL 723 shall be acceptable as noncombustible materials.

Also, for information purposes, the following definitions are used for the term in ASTM E 176 (ASTM terminology of fire standards) and in NFPA 101 and 5000.

**ASTM E 176:**
**non-combustible**, *adj* — not capable of undergoing combustion under specified conditions. (Contrast combustible.)
DISCUSSION—In fire testing, non-combustibility is often assessed by means of ASTM E 136 or ISO 1182.
**NFPA 101 and NFPA 5000:**
**Noncombustible Material.** A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C, shall be considered noncombustible materials.

**Cost Impact:** This proposal should not increase the cost of construction.

**Analysis:** Review of proposed new standard ASTM E136-04 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

**PART V – IMC**
**Committee Action:** **Disapproved**

**Committee Reason:** There was no indication of how much heat or fire to be applied during testing. This definition could be misconstrued to allow gypsum board to be classified as noncombustible.

**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, representing Southwest Research Institute requests Approved as Modified by this public comment for Part V.**

**Modify proposal as follows:**

**NONCOMBUSTIBLE MATERIAL.** A material that~~, under the conditions anticipated,~~ will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

(Portions of proposal not shown remain unchanged.)

**Commenter's Reason:** The concept of "noncombustible materials" and "noncombustibility" in terms of types of construction is widely used throughout the International Codes. While the IRC, IMC, and IWUIC all contain definitions of the term, they are all different from each other. In contrast, the IBC, IFC, IEBC and IFGC do not contain a separate definition, even though they use the terminology "noncombustible materials". There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term.

In common usage, the term "noncombustible" is used to denote materials which do not ignite or are not capable of sustaining combustion. The common Dictionary definitions for "noncombustible" are typically as follows:

**Noncombustible, adj** – not capable of igniting and burning *(Webster's Third New International Dictionary of the English Language, Unabridged, 2007)*

In contrast to the common usage, the traditional use of the terminology and concept of "noncombustible materials" in the Codes has been based on acceptable performance when tested in accordance with ASTM E136, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C. Materials passing the test are permitted limited flaming and other indications of combustion. However, these have traditional been acceptable. Understandably, ASTM E136 does not replicate the full spectrum of actual building fire exposure conditions. However, this test method does provide an assessment indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

While each of the model I-Codes which reference the term "noncombustible" do have unique additional attributes, we are in agreement with the original proponent, that these are best addressed outside of the definition. For example, section 703.4 of the IBC does provide additional requirements and acceptance criteria which are specific to its own intent and contained in Sections 602.2, 602.3, and 602.4.

Final Action: AS AM AMPC____ D

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# FS5-07/08, Part VI
## 202

*Proposed Change as Submitted:*

**Proponent:** Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

**PART VI – IRC BUILDING/ENERGY**

**Delete definition and substitute as follows:**

**SECTION R202**
**DEFINITIONS**

~~**NONCOMBUSTIBLE MATERIAL.** Materials that pass the test procedure for defining noncombustibility of elementary materials set forth in ASTM E 136.~~

**NONCOMBUSTIBLE MATERIAL.** A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

**Reason:** There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term. The codes that use the term are IMC, IBC, IRC, IFC, IEBC, IWUIC and IFGC. It is also used in an appendix of the performance code, but a definition in that code is probably not necessary. Throughout the ICC code system, the concept of "noncombustible material" is based on two aspects: (a) it should not ignite or burn when subjected to fire or heat and (b) it should pass the ASTM E 136 conditions. Therefore, the definition proposed addresses both of these aspects and is identical for all codes.

In the case of three codes, IMC, IBC and IWUIC, there are additional requirements or issues associated with the use of the term noncombustible material. It is proposed that these should be addressed outside of the definitions, in the relevant chapters. Separate proposals will be made to the IMC, IBC and IWUIC to suggest how to address these requirements for noncombustible materials.

For information purposes, the following is included in the IBC:

**703.4 Noncombustibility tests.** The tests indicated in Sections 703.4.1 and 703.4.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Type I, II, III and IV construction. The term "noncombustible" does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

**703.4.1 Elementary materials.** Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

**703.4.2 Composite materials.** Materials having a structural base of noncombustible material as determined in accordance with Section 703.4.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E 84 or UL 723 shall be acceptable as noncombustible materials.

Also, for information purposes, the following definitions are used for the term in ASTM E 176 (ASTM terminology of fire standards) and in NFPA 101 and 5000.

**ASTM E 176:**
**non-combustible**, *adj* — not capable of undergoing combustion under specified conditions. (Contrast combustible.)
DISCUSSION—In fire testing, non-combustibility is often assessed by means of ASTM E 136 or ISO 1182.
**NFPA 101 and NFPA 5000:**
**Noncombustible Material.** A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C, shall be considered noncombustible materials.

**Cost Impact:** This proposal should not increase the cost of construction.

**Analysis:** Review of proposed new standard ASTM E136-04 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

## PART VI – IRC B/E
## Committee Action: Disapproved

**Committee Reason:** This proposal would require the Building Official to decide the conditions anticipated in order to evaluate that a product meets the criteria. This is too vague and would cause an enforcement issue.

## 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, representing Southwest Research Institute requests Approved as Modified by this public comment for Part VI.

**Modify proposal as follows:**

**NONCOMBUSTIBLE MATERIAL.** A material that~~, under the conditions anticipated,~~ will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

(Portions of proposal not shown remain unchanged.)

**Commenter's Reason:** The concept of "noncombustible materials" and "noncombustibility" in terms of types of construction is widely used throughout the International Codes. While the IRC, IMC, and IWUIC all contain definitions of the term, they are all different from each other. In contrast, the IBC, IFC, IEBC and IFGC do not contain a separate definition, even though they use the terminology "noncombustible materials". There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term.

In common usage, the term "noncombustible" is used to denote materials which do not ignite or are not capable of sustaining combustion. The common Dictionary definitions for "noncombustible" are typically as follows:

**Noncombustible, adj** – not capable of igniting and burning *(Webster's Third New International Dictionary of the English Language, Unabridged, 2007)*

In contrast to the common usage, the traditional use of the terminology and concept of "noncombustible materials" in the Codes has been based on acceptable performance when tested in accordance with ASTM E136, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C. Materials passing the test are permitted limited flaming and other indications of combustion. However, these have traditional been acceptable. Understandably, ASTM E136 does not replicate the full spectrum of actual building fire exposure conditions. However, this test method does provide an assessment indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

While each of the model I-Codes which reference the term "noncombustible" do have unique additional attributes, we are in agreement with the original proponent, that these are best addressed outside of the definition. For example, section 703.4 of the IBC does provide additional requirements and acceptance criteria which are specific to its own intent and contained in Sections 602.2, 602.3, and 602.4.

Final Action: AS AM AMPC____ D

# FS5-07/08, Part VII
**202**

*Proposed Change as Submitted:*

**Proponent:** Marcelo M. Hirschler, GBH International, representing the American Fire Safety Council

**PART VII – IWUIC**

**SECTION 202**
**DEFINITIONS**

**Delete definition and substitute as follows:**

~~**NONCOMBUSTIBLE.** As applied to building construction material means a material that, in the form in which it is used, is either one of the following:~~

~~1. Material of which no part will ignite and burn when subjected to fire. Any material conforming to ASTM E 136 shall be considered noncombustible within the meaning of this section.~~
~~2. Material having a structural base of noncombustible material as defined in Item 1 above, with a surfacing material not over 1/8 inch (3.2 mm) thick, which has a flame spread rating of 50 or less. Flame spread rating as used herein refers to rating obtained according to tests conducted as specified in ASTM E 84.~~

~~"Noncombustible" does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to Item 1. No material shall be classed as noncombustible that is subject to increase in combustibility or flame spread rating, beyond the limits herein established, through the effects of age, moisture or other atmospheric condition.~~

**NONCOMBUSTIBLE MATERIAL.** A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

**Reason:** There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term. The codes that use the term are IMC, IBC, IRC, IFC, IEBC, IWUIC and IFGC. It is also used in an appendix of the performance code, but a definition in that code is probably not necessary. Throughout the ICC code system, the concept of "noncombustible material" is based on two aspects: (a) it should not ignite or burn when subjected to fire or heat and (b) it should pass the ASTM E 136 conditions. Therefore, the definition proposed addresses both of these aspects and is identical for all codes.

In the case of three codes, IMC, IBC and IWUIC, there are additional requirements or issues associated with the use of the term noncombustible material. It is proposed that these should be addressed outside of the definitions, in the relevant chapters. Separate proposals will be made to the IMC, IBC and IWUIC to suggest how to address these requirements for noncombustible materials.

For information purposes, the following is included in the IBC:

**703.4 Noncombustibility tests.** The tests indicated in Sections 703.4.1 and 703.4.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Type I, II, III and IV construction. The term "noncombustible" does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

**703.4.1 Elementary materials.** Materials required to be noncombustible shall be tested in accordance with ASTM E 136.

**703.4.2 Composite materials.** Materials having a structural base of noncombustible material as determined in accordance with Section 703.4.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E 84 or UL 723 shall be acceptable as noncombustible materials.

Also, for information purposes, the following definitions are used for the term in ASTM E 176 (ASTM terminology of fire standards) and in NFPA 101 and 5000.

**ASTM E 176:**
**non-combustible**, *adj* — not capable of undergoing combustion under specified conditions. (Contrast combustible.)
DISCUSSION—In fire testing, non-combustibility is often assessed by means of ASTM E 136 or ISO 1182.
**NFPA 101 and NFPA 5000:**
**Noncombustible Material.** A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C, shall be considered noncombustible materials.

**Cost Impact:** This proposal should not increase the cost of construction.

**Analysis:** Review of proposed new standard ASTM E136-04 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

**PART VII – IWUIC**
**Committee Action:** **Disapproved**

**Committee Reason:** The current definition should be retained. It has a long history of accommodating gypsum and other commonly recognized noncombustible materials and has not been shown to be a problem. This will also correlate with the disapproval action taken by the respective committees in Parts I, III, IV, V, VI and VII.

**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, representing Southwest Research Institute requests Approved as Modified by this public comment for Part VII.**

**Modify proposal as follows:**

**SECTION 202**
**DEFINITIONS**

**NONCOMBUSTIBLE MATERIAL.** A material that~~, under the conditions anticipated,~~ will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E 136 are considered noncombustible materials.

(Portions of proposal not shown remain unchanged.

**Commenter's Reason:** The concept of "noncombustible materials" and "noncombustibility" in terms of types of construction is widely used throughout the International Codes. While the IRC, IMC, and IWUIC all contain definitions of the term, they are all different from each other. In contrast, the IBC, IFC, IEBC and IFGC do not contain a separate definition, even though they use the terminology "noncombustible materials". There is a need for a consistent definition of "noncombustible material" in all ICC codes that use the term.

In common usage, the term "noncombustible" is used to denote materials which do not ignite or are not capable of sustaining combustion. The common Dictionary definitions for "noncombustible" are typically as follows:

**Noncombustible, adj** – not capable of igniting and burning *(Webster's Third New International Dictionary of the English Language, Unabridged, 2007)*

In contrast to the common usage, the traditional use of the terminology and concept of "noncombustible materials" in the Codes has been based on acceptable performance when tested in accordance with ASTM E136, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C. Materials passing the test are permitted limited flaming and other indications of combustion. However, these have traditional been acceptable. Understandably, ASTM E136 does not replicate the full spectrum of actual building fire exposure conditions. However, this test method does provide an assessment indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire.

While each of the model I-Codes which reference the term "noncombustible" do have unique additional attributes, we are in agreement with the original proponent, that these are best addressed outside of the definition. For example, section 703.4 of the IBC does provide additional requirements and acceptance criteria which are specific to its own intent and contained in Sections 602.2, 602.3, and 602.4.

Final Action: AS AM AMPC____ D

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# FS6-07/08
## 202 (New) [IFC 202 (New)]

*Proposed Change as Submitted:*

**Proponent:** Bill McHugh, Firestop Contractors International Association

**Add new definitions as follows:**

**SECTION 202 (IFC 202)**
**DEFINITIONS**

**COMPARTMENTATION.** Fire, smoke or fire-and smoke-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire, smoke, or fire and smoke or other hazards within a building and the spread of fire to or from buildings.

**Reason:** Fire and smoke resistance rated construction is referred to as compartmentation. The concept of compartmentation uses fire, smoke and other resistance rated construction to form cubes in buildings to protect against fire, smoke and other spread, allow occupant egress, fire department entry, provide occupant and fire department havens of safety. Effective Compartmentation, when properly designed installed, inspected and maintained, saves lives.

Compartmentation is used in the code in 405.4, 715.4.7.3, 3410.6.3, and related tables. Compartmentation is the word used to describe fire and smoke resistance rated horizontal assemblies and fire and/or smoke barriers, with protected openings and penetrations for fire safety, means of egress and general safety. Compartmentation is not currently defined in any chapter of the International Building Code.

The code must define key items used in construction, and that includes adding a definition for compartmentation into the building code. Since compartmentation is used in several chapters, the definition should be added to Chapter 2.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee indicated that the language within the proposed definition of "compartmentation" was confusing and therefore would be difficult to interpret and enforce. The confusing language includes "smoke-resistance-rated", "or other hazards" and "fire to and from buildings."

**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:**

**SECTION 202 (IFC 202)**
**DEFINITIONS**

**202 (New) COMPARTMENTATION**. Fire resistance-rated, smoke resistant, or both fire-resistance-rated and smoke-resistant ~~resistance-rated~~ construction separation of adjacent spaces to safeguard against the spread of fire, smoke, and or fire and smoke ~~or other hazards~~ within a building. ~~and the spread of fire to or from buildings.~~

**Commenter's Reason:** FCIA believes in the concept of Total Fire Protection, including Effective Compartmentation, Sprinklers, Detection & Alarm systems, as well as Occupant and Firefighter Education for fire and life safety.

FCIA listened to the very positive committee and assembly comments about this important definition in the International Family of Codes. We've modified the proposal to correct the language, and eliminated spread 'to or from buildings', as was commented in Palm Springs. Effective Compartmentation, whether fire-resistance-rated, smoke resistant, either or both, is an important concept in the code that is the overarching concept to fire-resistance. And, it's definition is nowhere in the codes, even though it is used in several places in Chapter 4, 5, and 34 to describe this important concept…Compartmentation.

Each Effective Compartmentation component or feature is discussed separately rather than a as a system in the code. Compartmentation components include the fire barrier, smoke barrier wall, the fire resistance rated floor, firestopping, rolling and swinging fire doors, fire rated glazing, fire, smoke or combination fire/smoke dampers with the supporting fire resistance rated columns and beams. This code change seeks to unify and describe the concept into one place so it can be referred to as a fire protection strategy in the code.

Compartmentation, where it is left in the code, is an important concept to keep people safe in buildings as they remain in place, egress, or try to keep separate from fire and smoke threats. Whether it is during egress (stairwells, havens of safety, elevator lobbies and corridors), to keep entities safely separated (occupancy separations), or provide vertical migration protection and structural support, (fire resistance rated floors and supporting structure), compartmentation is equally important as Detection and Alarm Systems, Sprinklers and Occupant Education.

This new definition of "Compartmentation" brings the important concept of compartmentation into the building and fire codes as a system. We believe the modification reflects the feedback from the committee and assembly.

Final Action: AS AM AMPC____ D

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# FS11-07/08
## 703.6

*Proposed Change as Submitted:*

**Proponent:** Lawrence G. Perry, AIA, representing Building Owners and Managers Association (BOMA) International

**Delete without substitution as follows:**

~~**703.6 (Supp) 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;~~
~~2. Be repeated at intervals not exceeding 30 feet (914 mm) 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.~~

**Reason:** This proposal seeks to remove the provision requiring marking of fire rated assemblies that was added by a successful public comment at the Rochester Final Hearings. As approved, this new section will require markings on the following walls:

- Interior and exterior sides of exterior walls (where the walls are required to have a fire-resistance rating).
- All walls separating residential dwelling units from adjacent units or corridors.
- All walls separating hotel guest rooms from adjacent rooms or corridors.

As written, this new section also requires the markings of ceilings, and possibly floors, where these assemblies are part of a smoke barrier.

Some of the testimony on this issue noted that these markings would be hidden behind decorative ceilings, however, the approved language requires these markings at all rated positions, and only provides additional information as to where to locate the markings when decorative ceilings are provided.

Representatives from several jurisdictions last cycle indicated that they already require this; however, the text approved requires markings in far more locations, and in far more visible locations, than other local amendments and enforcement levels.

There is no evidence that providing these markings, will provide any reduction in the problem of trades creating openings and failing to properly seal them. If anything, this change will likely lead to a false sense of protection; someone seeing this marking, and not already understanding the complexity of fire rated assemblies, firestopping products and installation methods, will simply fill the opening with whatever material they have on hand.

BOMA has submitted a separate code change to address the concerns raised by the proponent of this change in a different manner; a proposed revision to IFC section 509.1 (and correlative change to IBC 911.1) would add, for buildings with fire command centers, information regarding the location of these rated wall assemblies to the schematic building plans that are already required to be provided.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee agreed that the requirements dealing with marking or signage identifying fire-resistance rated, or smoke, barriers or partitions were appropriate and should remain in the code. These assemblies should be identified for the construction trades to avoid breaching of the assemblies during construction that will occur during alterations, additions or repairs.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment 1:*

**Lawrence G. Perry, representing Building Owners and Managers Association (BOMA) International requests Approval as Submitted.**

**Commenter's Reason:** If this proposal is not Approved as Submitted, I can only hope that the proponents of these markings enforce the provisions as aggressively as they have supported this new text. While there may be jurisdictions that have adopted marking requirements, none do so to the extent that the text of this new section requires.

- Is it the intent of the ICC membership to mandate markings every 30' along the exterior side of buildings (where the exterior wall is rated due to construction type or separation distance)? This section requires such marking.
- Is it the intent of the ICC membership to mandate markings on all four walls, the floor, and the ceiling of every hotel room? This section requires such markings. (Although the Fire Safety Committee patted themselves on the back in their approval of FS10-07/08, noting that 'without this exception, the marking…in a typical hotel room would be required on all interior walls of the room', that code change provided an exception only for R-2, not R-1 Occupancies.)
- Is it the intent of the ICC membership to mandate markings throughout walls, ceilings and floors in locations visible to all occupants of a building? As written, the text requires marking above 'decorative ceilings', where provided, but does not exempt the requirement where there is no 'decorative ceiling'.

*Public Comment 2:*

**Michael Vieria, Willdan, representing Sacramento Valley Association of Building Officials (SVABO) requests Approved as Modified by this public comment.**

**Replace the proposal with the following:**

**703.6 (Supp) 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 accessible concealed floor, floor-ceiling, or attic spaces ~~or other approved location~~; and
2. Be repeated at intervals not exceeding 30 feet (914mm) measured horizontally along the wall or partition; and
3. Include lettering not less than 0.5 inch (12.7mm) in height, incorporating the suggested wording: "FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS", or other approved wording.

**Commenter's Reasons:** Concerns were raised at the code hearings in Palm Springs that the code text approved in Rochester was too broad and would require marking of all fire and smoke rated walls, barriers, and partitions, including exterior walls, corridors, etc. We believe the intent of the code was to protect those walls, barriers, and partitions in locations that generally were not visible to the building occupants, where utility piping, wiring, ducts, or other service elements are generally installed. We believe the proposed text clarifies the locations where the identification is necessary.

Final Action: AS AM AMPC____ D

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# FS16–07/08
## 704.5

**Proponent:** Gregory Lake, Sacramento Metropolitan Fire District, representing California Fire Chief's Association (Cal Chiefs)

**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 required fire-resistance rating of exterior walls with a fire separation distance of greater than ~~5 feet (1524 mm)~~ 10 feet (3048 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 (1524 mm) or~~ less than or equal to 10 feet (3048 mm) shall be rated for exposure to fire from both sides.

**Reason:** This code change proposal is a follow up to our previous Code Change FS20-06/07 which was recommended for disapproval by the Committee. We submitted a Public Comment for approval for discussion during the ICC Final Action Hearings in Rochester, N.Y. We were successful in overturning the Committee's recommendation for disapproval but failed to achieve the necessary 2/3 majority vote for approval by the narrow margin of 111 to 66. Because of the strong interest expressed by the Class A voting members at the hearings, we decided to resubmit this code change proposal for the Committee's consideration. However, in order to make the code change proposal more acceptable to the Committee, we deleted one of the provisions that required all exterior barring walls to have the fire resistance rating based on fire exposures to both the exterior face and the interior face. In other words, we revised the previous code change proposal to only increase the fire separation distance from 5 feet to 10 feet for the purpose of requiring such exterior walls within that fire separation distance to have their fire resistance rating determined by the fire exposures conducted on both sides of the wall. Thus, any exterior wall required to have a fire resistance rating which has a fire separation distance of more than 10 feet would only be required to have its fire resistance rating determine by fire exposure from the inside. We believe this to be the more critical element of our original code change in order to better prevent building to building fire spread where buildings are in close proximity to each other.

This code change addresses concerns about the provisions of Section 704.5 that permit the fire resistance rating of an exterior wall with a fire separation distance greater than 5 feet to be determine based on fire exposure only to the inside face of the wall. The concerns are based the provisions of Section 704.8, item 2, which permit an exterior wall that is not required to have a fire resistance rating to have unlimited unprotected openings. Since Table 602 permits non-fire resistance rated exterior walls in buildings of Types IIB and VB construction in all occupancy groups except H where the fire separation distance is 10 feet or greater, the potential exists for buildings with walls rated from the inside only to be exposed to significant levels of radiant heat. The radiant heat exposure will likely cause walls with combustible components to ignite and burn from the outside, and walls with noncombustible structural components to be reduced in strength. Regardless of the construction of the wall, the degradation caused to the wall may result in collapse and/or fire penetration of the wall by the fire before the time of the required fire-resistance rating has elapsed based on the fire-resistance rating being determined by interior fire exposure only.

To illustrate the impact of the provision of Section 704.5 of concern, assume two buildings of Group S-1 occupancy and Type VB construction are erected on either side of a property line. One building has a fire separation distance of 10 feet. Based on these parameters, Table 602 does not require a fire resistance rating for the exterior wall since it is set back 10 feet. Therefore, unlimited unprotected openings are permitted in the wall. The second building has a fire separation distance of 5.01 feet; therefore, Table 602 requires the exterior wall to have a fire resistance rating of 1 hour and unprotected openings are restricted to 10% of the wall area. However, Section 704.5 indicates that since the wall has a fire separation distance of greater than 5 feet, the fire-resistance rating of the wall only needs to be established for exposure to fire from the inside.

The opening limitations of the IBC, which were originally developed for the BOCA National Building Code (NBC), are intended to limit the radiant heat from a fire in an exposing building so that the radiant heat striking an exposed building does not exceed 12.5 kW/$m^2$. It is generally accepted that wood-based products can withstand exposure to this level of radiation in the presence of a pilot flame without igniting. If radiant heat levels exceed this amount, ignition is likely since "pilot flames" in the form of flying brands are likely to be present. Auto-ignition (without a flame present) of wood-based products generally occurs at radiation levels of 35 to 45 kW/$m^2$ after exposure for about 20 to 25 seconds.

During the development of the IBC, it was decided that if an exterior wall had no required fire-resistance rating, unlimited unprotected openings would be permitted. Since Table 602 does not require exterior walls of buildings (other than Group H) of Types IIB and VB construction to be fire-resistance rated where the fire separation distance is 10 feet or greater, 100% unprotected openings are permitted. Therefore, fires in these buildings are likely to expose adjacent buildings to considerably more radiant heat than 12.5 kW/$m^2$.

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

**Committee Action:** **Approved as Submitted**

**Committee Reason:** The committee agreed that a building wall with a fire separation distance of 10 feet or less could be exposed to a significant amount of radiant heat causing ignition of combustible components on the exterior wall or a reduction of strength in noncombustible structural elements within the exterior wall. Therefore, requiring a fire-resistance rating of an exterior wall to be from both sides where the wall has a fire separation distance of 10 feet or less is appropriate.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment 1:*

**Tim Pate, City & County of Broomfield Building Department, representing Colorado Chapter of ICC requests Approved as Modified by this public comment.**

**Modify proposal 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 required fire-resistance rating of exterior walls ~~with a fire separation distance of greater than 10 feet (3048 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 less than or equal to 10 feet (3048 mm) shall be rated for exposure to fire from both sides~~ due to fire separation distance shall comply with Tables 602 and 704.5.

**TABLE 704.5**
**FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS**

| | FIRE SEPARATION DISTANCE (FEET) | | |
|---|---|---|---|
| | 0 to 5 | Greater than 5 to 10 | Greater than 10 |
| Noncombustible exterior wall covering | Protected for exposure to fire from both sides | Protected for exposure to fire from inside | Protected for exposure to fire from inside |
| Combustible exterior wall covering | Protected for exposure to fire from both sides | Protected for exposure to fire from both sides | Protected for exposure to fire from inside |

**Commenter's Reason:** The proponent of Proposal Number FS-16 has requested revision of IBC Section 704.5 by requiring the exterior walls to have a fire resistance rating for fire exposure from both sides for walls with fire separation distance of 10 feet or less. The justification for the proposal is that combustible exterior walls and sidings will be subject to the heat flux radiated from an adjoining building. The noted concern is the fire in one building might expose the adjoining buildings with exterior combustible siding to higher heat flux than can be tolerated by the exterior siding.

The proponent states "The concerns are based the provisions of Section 704.8, item 2, which permit an exterior wall that is not required to have a fire resistance rating to have unlimited openings." It is unclear if the proponent is referring to Section 704.8.2 which allows unlimited unprotected openings in the first story of a building with fire separation distance of greater than 15 feet or the reference is to another section.

Assuming that the area of exterior openings in a building having a Type II-B construction is unlimited, the fire separation to this wall has to exceed 10 ft per Table 704.8, footnote i which refers to Table 602. In this case, if the adjoining building is of combustible construction and has a fire separation distance of 6 ft with combustible exterior wall covering, Table 1406.2.1.2 would require the combustible wall covering to tolerate 12.5 Kw/$m^2$ radiant heat flux.

1. The proposed revision, without substantiation, negatively impacts buildings designed with non-combustible exterior walls and wall covering.
2. IBC Section 1406.2.1.2 limits the amount of radiant heat flux on combustible exterior wall coverings. Table 1406.2.1.2 addresses the proponents concerns regarding combustible exterior sidings for fire separation distances of up to 25 ft.
3. Provisions of Table 704.8 for buildings with fire separation distance of greater than 5 ft to 10 ft limits area of exterior unprotected openings to 10% of the exterior wall area per story. This limitation controls the radiant heat flux exposure from one building to the adjoining based on size of unprotected exterior openings.
4. The proponent refers to buildings of construction Type of V-B and II-B with fire separation distance greater than 10 ft which might be the building of fire origin and might have unlimited exterior openings which could generate radiant heat flux and expose the adjoining building to high radiant heat flux. Assuming the exposed building has a combustible siding and has a fire separation distance of 5'-1" as noted in the proponent's justification, it would place the two buildings at 15'-1" and IBC Table 1406.2.1.2 mandates that the exterior combustible sidings of the exposed building tolerate radiant heat flux of 12.5 KW/$m^2$ .
5. The proponent is introducing fire resistance rated construction to address exterior wall covering materials. The proposed revision addresses proponent's concern and requires exterior walls with combustible exterior wall covering and with fire separation distance of 10 ft or less to be protected for fire exposure from both sides.

*Public Comment 2:*

**Sam W. Francis, American Forest & Paper Association, requests Disapproval.**

**Wayne R Jewell, City of Southfield, MI, representing himself, requests Disapproval.**

**Russ Wayman, San Carlos, CA, representing himself request Disapproval.**

**Commenter's Reason: (Francis)** The proponent has argued that testing exterior walls for fire resistance from both sides is important. However, there are no loss data included in the submittal to substantiate that claim. Moreover, the proponent notes that the increase proposed, from 5 feet to 10 feet fire separation distance, is based purely on the notion that it will be more acceptable to those who opposed the same type of proposal last cycle. That proposal was defeated at Final Action Hearings. No data were submitted to substantiate the number, 10 feet, except that opponents might like it better.

A review of NFIRS data on exposure fires shows that for the period from 1989 to 1999, the number of exposure fires declined by about 1/3.

**Figure 1: Change in Radiation with Distance from Property Line**


From a fire safety point of view, the primary mode of heat transfer between neighboring building facades will be by radiation. The radiation transfer decreases with the square of the distance.

Figure 1 shows the variation expected radiation as a function of distance from the property line. The radiation is normalized to that at 5 ft distance. As shown, the incident radiation at 10 ft distance from the property line is only 25% of that at 5 ft. In other words, this proposal quadruples the level of fire protection currently provided without any data for such change for a class of fire which has declined by 1./3.

**Commenter's Reason: (Jewell)** First, there was no data presented to substantiate the need for the change. What data of fire exposure of one property to the next has demonstrated that a fire resistance rating only required to be tested from one side has been a detriment to life or property. That conflagration has been a issue based on existing language. None, no data was presented to demonstrate that the long standing provisions of fire separation distance and fire resistance ratings provisions have cause loss.

Next this change adds language that an exterior wall shall be rated in accordance with "this section". Well Section 704 has NO rating provisions for exterior walls. Section 704 deals with openings in exterior walls, parapets, vertical separation etc., but no rating requirements for exterior walls. Approving this change will make reference to a section that has no requirements for fire resistance ratings of exterior walls. It is a dead end.

**Commenter's Reason: (Wayman)** The proponent of FS-16 has requested revision of IBC Section 704.5. The proposed revision requires the exterior walls to have a fire resistance rating for fire exposure from both sides for walls with fire separation distance of 10 feet or less. The reason for this proposal is that combustible exterior walls and sidings will be subject to the heat flux radiated form an adjoining building.

1. No statistical data has been provided showing that exterior walls constructed per 2006 IBC Section 704.5 with fire separation distance of between 5 and 10 ft have failed due to exterior fire exposure.
2. The proposed revision impacts buildings designed with non-combustible exterior walls covering.
3. IBC Section 1406.2.1.2 limits the amount of radiant heat flux on combustible exterior wall coverings as noted in Table 1406.2.1.2 for fire separation distance of up to 25 ft which should addresses the proponents concerns regarding combustible exterior sidings.
4. In a building having construction type of II-B with fire separation distance of 9 ft, the proposed change would require the exterior wall to be protected for fire exposure from both sides. The structural stability provisions of IBC Section 704.6 would require this wall to remain in place for the duration of the time indicated by the required fire rating. Consequently, the supporting floors, roofs, columns, walls, etc have to be fire rated where otherwise these elements would not be fire rated.

Final Action: AS AM AMPC____ D

# FS19-07/08
**704.8.6**

*Proposed Change as Submitted:*

**Proponent:** Gary Lampella, City of Redmond, OR, representing Oregon Building Officials Association

**Revise as follows:**

**704.8.6 (Supp) Vertical exposure**. For buildings ~~on the same lot~~ with a fire separation distance of less than 15 feet, opening protectives having a fire protection rating of not less than 3/4 hour shall be provided in every opening that is less than 15 feet (4572 mm) vertically above the roof of an adjacent building or structure ~~based on assuming an imaginary line between them~~. ~~The~~ For buildings on the same lot, opening protectives are required where the fire separation distance between the imaginary line as determined by Section 704.3 and the adjacent building or structure is less than 15 feet (4572 mm).

**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 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 704.8.6.

**Reason:** The purpose of this submittal is clean up inconsistent provisions between buildings on the same lot with and imaginary line for fire separation distance and the lack of the same provision for buildings on adjacent lots with real property lines. The purpose of assuming an imaginary line between buildings on the same lot is to mirror the fire separation distance of those buildings with actual property lines and determining opening and wall protection. Currently, the provisions of buildings on the same lot with an imaginary line have more restrictive requirements than those buildings with a real line.

If one is concerned about fire spread from one building to another, should the provisions be the same for a real lot line as opposed to an imaginary one? Yes, we believe so. The probability of a fire spreading from one building to another via openings and fire separation distance to other buildings is the same regardless of real or imaginary lines.

The first sentence of this section has been amended to include all buildings with a fire separation of less than 15 feet. The provision for buildings on the same lot has been moved to the last sentence with a reference to Section 704.3 that contains the provision for an imaginary line.

Based on the current code language, we can only assume that a recorded property line somehow adds an additional level of protection over and above an imaginary one.

**Cost Impact:** The code change proposal will increase the cost of construction. Added cost of protected openings or rated roof.

**Committee Action:** **Approved as Submitted**

**Committee Reason:** The committee agreed with the proponent in that this proposal cleans up inconsistencies between the provisions for buildings on the same lot with an imaginary line for fire separation distance and the lack of the same provision for buildings on adjacent lots with real property lines.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Homer Maiel, City of San Jose, CA, requests Disapproval.**

**Commenter's Reason:** While the proposal has some merit in regard to fire safety, it has some flaws when it comes to buildings on two separate properties with two separate ownerships. For example, assume that a multi-story building with non-protected openings is built at less than 15' of fire separation next to a vacant property. If a few years later the owner of the vacant property decides to build a single story building, then the multi-story building will be forced to upgrade all the windows that are less than 15' above the new roof to ¾(??) hour rating. This would create difficulty and hardship for the building owners, design architects, and AHJ to enforce the code requirements.

Final Action: AS AM AMPC____ D

# FS22-07/08, Part II

## 705.1.1, 402.7.3, 402.7.3.1, 402.7.3.2 (New), 402.7.3.3 (New)

**THIS CODE CHANGE WILL BE HEARD ON THE IBC GENERAL PORTION OF THE HEARING ORDER.**

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

*Proposed Change as Submitted:*

**Proponent:** Sarah A. Rice, Schirmer Engineering Corporation

**PART II – IBC GENERAL**

**Revise as follows:**

**402.7.3 Anchor building separation.** An anchor building shall be separated from the covered mall building by fire walls or party walls complying with Section 705.

**Exception:** Anchor buildings of not more than three stories above grade plane that have an occupancy classification the same as that permitted for tenants of the covered mall building shall be separated by 2-hour fire-resistive fire barriers complying with Section 706.

**402.7.3.1 Openings between anchor building and mall in Types I and II construction.** Except for the separation between Group R-1 sleeping units and the mall, openings ~~between~~ in the wall separating anchor buildings of Type ~~IA, IB, IIA and IIB~~ I or II construction and the mall need not be protected.

**402.7.3.2 Openings between anchor building and mall in Types III, IV or V construction.** Openings in the wall separating anchor buildings of Type III, IV or V construction and the mall shall be protected in accordance with provisions of Chapter 7 based upon the type of wall.

**402.7.3.3 Openings between anchor building and covered mall buildings, other than in the mall.** Openings in the wall separating anchor buildings construction and the covered mall building, in other than the mall, shall be protected in accordance with provisions of Chapter 7 based upon the type of wall.

**Reason:** It is becoming more common for the owner of an anchor building that is attached to a covered mall building to purchase the land upon which it sits. Once this occurs a "lot line" is created between the anchor building and the covered mall building and the fire wall that is constructed is regulated by Section 705.1.1 which prohibits the wall from having any openings.

Without openings the anchor store could not function in concert with the covered mall building as they have historically done so. The revisions proposed seek to coordinate how openings in the walls separating anchor buildings and covered mall buildings are to be addressed.

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

**PART II – IBC GENERAL**
**Committee Action:** **Disapproved**

**Committee Reason:** The definition of covered mall would already address the concern of differing ownership.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Wayne R, Jewel, City of Southfield, MI, representing self requests Approved as Modified by this public comment for Part II.**

**Modify proposal as follows:**

**402.7.3 Anchor building separation.** An anchor building shall be separated from the covered mall building by fire walls or party walls complying with Section 705.

**Exception:** Anchor buildings of not more than three stories above grade plane that have an occupancy classification the same as that permitted for tenants of the covered mall building shall be separated by 2-hour fireresistive fire barriers complying with Section 706.

**402.7.3.1 Openings between anchor building and mall ~~in Types I and II construction~~.** Except for the separation between Group R-1 sleeping units and the mall, openings between ~~in the wall separating~~ anchor buildings of Type IA, IB, IIA and IIB ~~I or II~~ construction and the mall need not be protected.

~~**402.7.3.2 Openings between anchor building and mall in Types III, IV or V construction.** Openings in the wall separating anchor buildings of Type III, IV or V construction and the mall shall be protected in accordance with provisions of Chapter 7 based upon the type of wall.~~

~~**402.7.3.3 Openings between anchor building and covered mall buildings, other than in the mall.** Openings in the wall separating anchor buildings construction and the covered mall building, in other than the mall, shall be protected in accordance with provisions of Chapter 7 based upon the type of wall.~~

**Commenter's Reason:** I am requesting to over turn the IBC General Committee's action of Disapproval on Part II of this proposed change so that the language of Section 402.7.3 will be correlated with the language recommended for approval by the IBC Fire Safety Committee to Section 705.1.1. Original proposed language for Section 402.7.3.1 is stricken and restored to current language. Proposed added Sections 402.7.3.2 and 402.7.3.3 are also stricken. This results in a simple correlation of the new exception with an existing section for Anchor Building separation under the mall provisions of chapter 4.

Final Action: AS AM AMPC____ D

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**NOTE: PART I REPRODUCED FOR INFROMATIONAL PURPOSES ONLY – SEE ABOVE**

**FS22-07/08, PART I – IBC FIRE SAFETY**

**Revise as follows:**

**705.1.1 Party walls.** Any wall located on a lot line between adjacent buildings, which is used or adapted for joint service between the two buildings, shall be constructed as a firewall in accordance with Section 705. Party walls shall be constructed without openings and shall create separate buildings.

**Exception:** Openings in a party wall separating an anchor building and a covered mall building shall be in accordance with Section 402.7.3.1.

**PART I – IBC FIRE SAFETY**
**Committee Action:** **Approved as Modified**

**Modify the proposal as follows:**

**705.1.1 Party walls.** Any wall located on a lot line between adjacent buildings, which is used or adapted for joint service between the two buildings, shall be constructed as a firewall in accordance with Section 705. Party walls shall be constructed without openings and shall create separate buildings.

**Exception:** Openings in a party wall separating an anchor building and a ~~covered~~ mall ~~building~~ shall be in accordance with Section 402.7.3.1.

**Committee Reason:** The committee agreed that based on the unique situation regarding ownership of anchor buildings in typical malls this exception was appropriate to include. Further, the modification appropriately clarifies that the separation requirements are intended to address the pedestrian way within the mall building.

**Assembly Action:** **None**

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# FS25-07/08
## 705.3.1 (New)

*Proposed Change as Submitted:*

**Proponent:** Jason Thompson, PE, National Concrete Masonry Association (NCMA), representing Masonry Alliance for Codes and Standards (MACS)

**Add new text as follows:**

**705.3 Materials.** Fire walls shall be of any approved noncombustible materials.

**Exception:** Buildings of Type V construction.

**705.3.1 Sources of ignition.** Where fire walls are constructed of combustible materials in buildings of Type V construction, potential sources of ignition of the combustible materials such as, but not limited to, gas vents, dryer vents, hot water piping, and electrical wiring, receptacles, switches, equipment and other electrical components, shall not be permitted to be installed within the interior of the fire wall assembly.

**Reason:** 705.3.1 The purpose of this code change proposal is to prohibit the installation of potential ignition sources within the wall cavities of fire walls constructed of combustible materials where allowed Type V construction by the Exception to Section 705.3. Although a combustible fire wall may be tested to achieve the minimum required fire resistance rating specified in Table 705.4 for the appropriate application, the combustible framing elements and combustible materials used to construct the fire wall would still be subjected to burning if they become ignited by an ignition source located within the fire wall cavity. This would not be the case for noncombustible constructed fire walls since there are no combustible materials to ignite even though the wall cavities of such fire walls may contain potential ignition sources. Since fire walls are intended to create separate buildings and are structurally independent of the buildings on either side of the fire wall that the fire wall creates, it follows that they should not be subject to burning and subsequent collapse caused by a fire originating within the fire wall. So that it follows that wherever combustible construction elements are used in a fire wall, ignition sources should be prohibited so that the structural integrity and fire resistance rating of the fire wall will not be compromised. Since the fire resistance test based on ASTM E119 does not have an ignition resistance component for combustible wall construction, it is incumbent upon the building code to set limits on the potential for the internal ignition of those combustible components and the subsequent derogation of the fire wall which is required to be structurally independent so as to completely separate the adjacent buildings under fire conditions. However, if a fire occurs within the fire wall, it will not be able to perform its intended function. Therefore, potential ignition sources should be prohibited within the framing cavities of combustible fire walls.

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

**Committee Action:** **Disapproved**

**Committee Reason:** Based on conflicts with directories of fire resistance rated assemblies, such as Underwriters Laboratories that allow certain components to be part of fire resistance rated assemblies, the committee agreed to disapprove this proposal.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment:*

**Jason Thompson, National Concrete Masonry Association (NCMA), representing Masonry Alliance for Codes and Standards (MACS) requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**705.3 Materials.** Fire walls shall be of any approved noncombustible materials.

**Exception:** Buildings of Type V construction.

**705.3.1 Sources of ignition.** Where fire walls are constructed of combustible structural elements ~~materials~~ in buildings of Type V construction, potential sources of ignition of the combustible structural elements ~~materials such as, but not limited to, gas vents, dryer vents, hot water piping, and electrical wiring, receptacles, switches, equipment and other electrical components,~~ shall not be permitted ~~to be installed~~ within the interior of the fire wall assembly.

**Commenter's Reason:** The Committee reason given for disapproving this code change proposal is based on conflicts with directories of fire-resistance rated assemblies such as the Underwriters Laboratories Fire-Resistance Directory that allow certain components to be part of the fire-resistance rated assemblies. However, we did not see that as a valid reason to disapprove this code change since this code change is focused in on fire walls that are used to separate buildings in the same structure. So other types of walls which contain various combustible components within them when they are tested to ASTM E119 or UL 263 to determine their fire-resistance rating can still be utilized in those other applications. Certainly, noncombustible fire walls that are tested with combustible components installed within the walls where such components do not contribute to the structural integrity of the wall should be allowed based on tests conducted in accordance with ASTM E119 or UL 263. However, for the very critical fire-resistance rated wall constructions that are used to create separated buildings (fire walls), we believe it is essential that any such walls that contain combustible construction materials used as the structural elements of the wall should not be allowed to contain sources of ignition. Such ignition sources may ignite the combustible construction causing a fire to start within the wall and thus jeopardize the integrity of the wall and its function as a fire wall to separate adjacent buildings. The issue here is to insure that the structural integrity of the elements supporting the wall which are internal to the wall are not subject to an internal ignition rather than from an external fire exposure source which is already adequately addressed by the ASTM E119 or UL 263 fire-resistance test methods. However, there is no standard test method to evaluate the performance of a wall constructed of combustible structural elements which are ignited from within the wall. So this code change proposal as modified by this Public Comment is intended to address that condition in order to insure that fire walls subdividing buildings of Type V construction will remain in place and structurally intact as intended by the code.

We have also revised the original code change proposal in order to eliminate the laundry list of potential sources of ignition which were objected to during the testimony on this code change proposal in Palm Springs, CA. We agree that, for example, dryer vents and hot water piping may not generate sufficient temperatures to cause ignition of the structural combustible elements of a fire wall of Type V construction. But certainly other ignition sources such as gas vents and electrical wiring which may short and arc could. Nevertheless, we felt that a laundry list would beg the question as to what are and what are not potential sources of ignition. We believe that should be left to the judgment of the code official. We also clarified that the combustible materials we're concerned with are those that form the structural elements that support the fire walls structurally since they are critical to the wall's ability to remain in place during a fire exposure while construction on either side of the wall may be collapsing as a result of the fire. Since fire walls are intended to prevent the spread of fire from one building to another, it is essential that their structural integrity be maintained under all fire conditions including a fire starting from within the wall construction itself. Therefore, we urge the ICC voting membership to approve this Public Comment which modifies our original code change proposal.

Final Action: AS AM AMPC____ D

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# FS26-07/08
## Table 705.4

*Proposed Change as Submitted:*

**Proponent:** Jerry R. Tepe, FAIA, JRT-AIA Architect, representing American Institute of Architects

**Revise as follows:**

**TABLE 705.4**
**FIRE WALL FIRE-RESISTANCE RATINGS**

(Portions of table not shown remain unchanged)

~~a. Walls shall be not less than 2-hour fire-resistance rated where separating buildings of Type II or V construction.~~

a. In Type II or V construction, walls are permitted to have a 2 hour fire-resistance-rating.

b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.4 and 415.5.

**Reason:** Footnote a is confusing and often not understood. Revised wording makes the intent of the footnote clearer.

**Cost Impact:** The code change proposal will not increase the cost of construction. Correct interpretation of the code will save costs.

**Committee Action:** **Approved as Submitted**

**Committee Reason:** The committee agreed with the proponent that current footnote "a" to Table 705.4 is confusing and often misinterpreted. The revised wording clarifies the footnote by indicated what is permitted rather than a minimum requirement.

**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 Approved as Modified by this public comment.**

**Modify proposal as follows:**

**TABLE 705.4**
**FIRE WALL FIRE-RESISTANCE RATINGS**

(Portions of table not shown remain unchanged)

a. In Type II or V construction, walls ~~are~~ shall be permitted to have a 2 hour fire-resistance-rating.
b. For Group H-1, H-2 or H3 buildings, also see Sections 415.4 and 415.5.

**Commenter's Reason:** The proposed language above is intended further clarify the meaning of this footnote through the use of mandatory language.

Final Action: AS AM AMPC____ D

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# FS31-07/08
## 705.6

*Proposed Change as Submitted:*

**Proponent:** Patrick Vandergriff, Vandergrigg Code Consulting Services representing Fairfield Residential, LLC

**Revise as follows:**

**705.6 Vertical continuity.** Fire walls shall extend from the foundation to a termination point at least 30 inches (762 mm) above both adjacent roofs.

**Exceptions:**

1. Stepped buildings in accordance with Section 705.6.1.
2. Two-hour fire-resistance-rated walls shall be permitted to terminate at the underside of the roof sheathing, deck or slab provided:
   2.1. The lower roof assembly within 4 feet (1220 mm) of the wall has not less than a 1-hour fire-resistance rating and the entire length and span of supporting elements for the rated roof assembly has a fire-resistance rating of not less than 1 hour.
   2.2. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire wall.
   2.3. Each building shall be provided with not less than a Class B roof covering.
3. Walls shall be permitted to terminate at the underside of noncombustible roof sheathing, deck, or slabs where both buildings are provided with not less than a Class B roof covering. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire wall.
4. In buildings of Type III, IV and V construction, walls shall be permitted to terminate at the underside of combustible roof sheathing or decks provided:
   4.1. There are no openings in the roof within 4 feet (1220 mm) of the fire wall,
   4.2. The roof is covered with a minimum Class B roof covering, and
   4.3. The roof sheathing or deck is constructed of fire-retardant-treated wood for a distance of 4 feet (1220 mm) on both sides of the wall or the roof is protected with 5/8 inch (15.9 mm) Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of 2-inch (51 mm) nominal ledgers attached to the sides of the roof framing members for a minimum distance of 4 feet (1220 mm) on both sides of the fire wall.
5. In buildings designed in accordance with Section 509.2, fire walls located above the 3 hour fire rated horizontal separation required by Section 509.2 item 1 shall be permitted to extend from the top of this horizontal separation.
6. Floor ceiling assemblies that attach to or penetrate a fire wall in accordance with one of the following conditions:
   6.1. Where the fire resistive rating of all floor ceiling assemblies and all supporting elements is protected to a level that is equal to or greater than the fire resistive rating of the wall; or
   6.2. Where the design demonstrates that the material will shear free from the wall under fire conditions and will not compromise the continuity of the fire wall or the fire resistive time period prescribed by this code.

**Reason:** The provision for continuity of fire walls has had a wide variety of interpretations depending upon the jurisdiction. Some jurisdictions have taken the requirement to indicate that there can be no penetration of a fire wall by floor ceiling assemblies for any from of building, when, in fact, the code only says that continuity has to be maintained in the event of the collapse of the building on one side of the wall. The variation of interpretation has made some buildings more difficult to design by creating practical difficulties in achieving seismic compliance in buildings that would otherwise be constructed utilizing simplified seismic design procedures.

The above proposal clearly establishes that there are methods of maintaining fire wall continuity where bearing would be allowed as long as the continuity of the fire wall is not compromised. This is done in two ways:

1. There is certainly no reason where the continuity issue will come into play if the entire structure is going to stand for the time period prescribed for the fire wall itself.
2. It clearly will provide that the wall penetrations are an option as long as the designer can demonstrate that the building could collapse on one side of the wall without interfering in the continuity of the fire wall for the time prescribed. This insures much greater latitude for the designer, especially when designing in seismically active areas of the country.

Additionally, it is clear that far more wide spread devastation occurs during earthquake events and that fire is a secondary action that comes about during seismic events. The use of these options within the code will allow for more buildings to be constructed in a conventional manner, using simplified design procedures and avoiding irregularly shaped issues as well as issues of discontinuity.

**Cost Impact:** The code change proposal will not increase the cost of construction. In many jurisdictions the change in language will provide for cost savings while providing seismically safer buildings

**Committee Action:** **Disapproved**

**Committee Reason:** The committee indicated that the addition of prescriptive floor ceiling assembly penetrations through fire walls was unnecessary and that Section 705.2 was adequate to address these issues on a performance level.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Patrick Vandergriff, Vandergriff Code Consulting Service, representing Fairfield Development requests Approval as Submitted.**

**Commenter's Reason:** When this item came before committee there were no questions from the members in regard to the proposal. As reasoning for the committee recommendation, after all floor conversation had ceased, one member of the committee said it is impossible to attach to or penetrate a fire wall and avoid damage to the integrity of the fire wall in the event of the collapse of the building on one side thereof. If he had read the language he would have realized that this allowance is provided only if the design professional can show that such an event can occur without damaging the firewall integrity for the time specified. Such a provision is already allowed in numerous jurisdictions in the western United States where a high degree of seismic activity is an issue.

Had such a question been asked the committee member would have been made aware that design and corresponding testing in support of this concept was well underway for well over a year prior to the submission of the code change proposal. The intent of the testing is to provide a basis for which acceptance criteria can be established, once such a code change is in place.

Final Action: AS AM AMPC____ D

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# FS36-07/08
## 706.5

*Proposed Change as Submitted:*

**Proponent:** Lee J. Kranz, City of Bellevue, representing The Washington Association of Building Officials (WABO), Technical Code Development Committee

**Revise as follows:**

**706.5 (Supp) Continuity.** Fire barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, such as the space above a suspended ceiling. The supporting construction for a fire barrier shall be protected to afford the required fire-resistance rating of the fire barrier supported~~. , except for 1-hour fire barriers 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.
3. Supporting construction for fire resistance rated nonbearing shaft walls are not required to be protected to afford the required fire resistance rating of the shaft wall being supported.
4. Supporting construction for 1-hour fire barriers required by Table 508.2 in buildings of Type IIB, IIIB, and VB construction is not required to be fire-resistance rated.

**Reason:** Shafts in any form are a potential conduit for smoke and fire to migrate throughout a building. The requirement to provide rated shaft walls (fire barrier walls) in multistory buildings has significant value in terms of compartmentalizing smoke and fire to its area of origin. Rated stair shaft walls also allow for additional time to safely egress from a burning building. Openings into shafts must be protected to maintain the required fire resistance rating.

Shaft walls do not require structural stability, as is required for fire walls. Due to the common practice of platform framing of these walls, the requirement in section 706.5 to support rated shaft walls with equivalent rated construction does not contribute in a significant way to preventing structural collapse of the shaft.

Shafts extending through four or more floors must be of not less than 2 hour fire-resistance rated construction. Other shafts must be of not less than 1 hour fire-resistance rated construction. For those projects where the fire-resistance rating of the shaft exceeds the fire-resistance rating of the building based on the type of construction the current requirement to protect all structural elements that support rated shaft walls creates significant design challenges with potentially huge economic impacts. For example, in a 5 story, type II-B office building, floors and bearing walls are typically nonrated but would require 2 hour rated floors and walls to support a shaft extending through 4 or more floors. The concept of the shaft rating dictating the type of construction requirement is contrary good logic.

The exception for fire-resistance rated incidental use area separations is currently located in the body of the scoping text of Section 706.5. This text has been relocated to become exception #3 of Section 706.5.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee preferred action on FS35-07/08 as it relates to removing the exception form the text of Section 706.5. Further, the committee thought the new exception for supporting construction of nonbearing shaft walls was too broad based on the emphasis of the code on restricting smoke migration from floor to floor.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment:*

**Lee J. Kranz, City of Bellevue, Washington, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Submitted.**

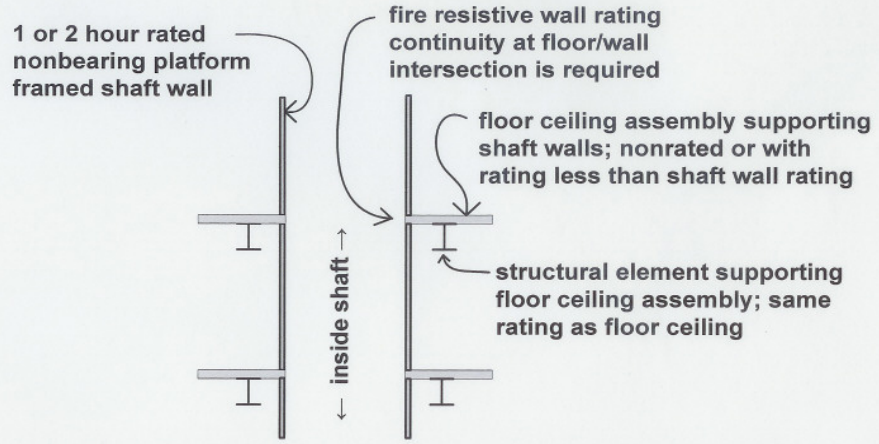
**Commenter's Reason**: It is common practice to platform frame shaft walls (framing goes from the floor to the underside of the deck on each successive floor level). Based on the current language in Sections 707.5 and 706.5, this creates a situation which requires the fire resistance of the floor providing the support for these walls to be at least equivalent to the fire resistance rating of the shaft walls. There is disagreement and ambiguity as to the extent of the protection required for supporting elements when the fire resistive value of the floor assemblies, based on the type of construction, is less than the shaft wall fire resistance rating.

Shafts extending through three or more floors must be of not less than 2 hour fire-resistance rated construction. Other shafts must be of not less than 1 hour fire-resistance rated construction. For those projects where the fire-resistance rating of the shaft exceeds the fire-resistance rating of the floor assembly the current requirement to protect all structural elements that support rated shaft walls creates significant design challenges with potentially huge economic impacts. For example, in a 5 story, type II-B office building, floors and bearing walls are typically nonrated but would require 2 hour rated floors and walls to support a shaft extending through three or more floors. The concept of the shaft rating dictating the type of construction requirement is not logical. ***Please refer to the attached illustrations for examples of fire rated shafts located in a building of a lower type of construction rating than the shaft rating.***

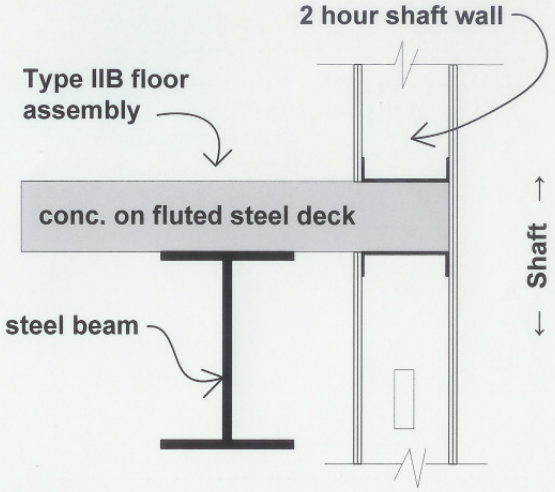
Shafts in any form are a potential conduit for smoke and fire to migrate throughout a building**.** The purpose of a fire resistance rated shaft is to prevent smoke and fire from migrating through multiple stories of a building. In at least one legacy code, there was no requirement for the fire resistance of supporting elements to be equivalent to the rating of the shaft walls. In a building of non-rated construction, a fire can spread to adjacent floors via collapse of the structure anywhere in the building—adjacent to the shaft, or far away from the shaft. There is no reason to require special protection for the structure supporting the shaft walls if the structure around the shaft can fall down. This proposal will allow platform framed nonbearing rated shaft walls to be supported by floors, bearing walls, beams and columns which have a fire resistance rating less than that of the shaft.

The requirement to provide rated shaft walls (fire barrier walls) in multistory buildings has significant value in terms of compartmentalizing smoke and fire to its area of origin. Rated stair shaft walls prevent fire and smoke on the floor of origin from migrating into the shaft. This will provide additional time for occupants to safely egress from a burning building. Openings into shafts must be protected to maintain the required fire resistance rating. It is very important to consider that shaft walls are not required to be provided with structural stability, as is required for fire walls.

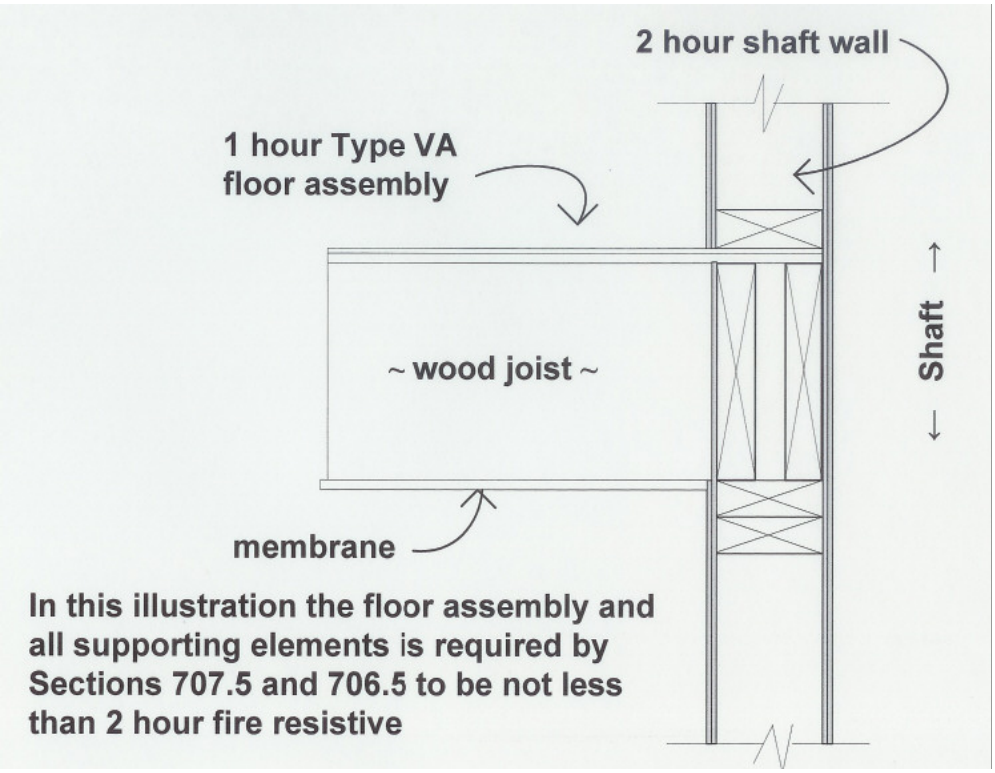
Per FS 35, the exception for fire-resistance rated incidental use area separations was moved from the body of the scoping text of Section 706.5 and has been relocated to become exception #3 of Section 706.5.




Current code (707.5 & 706.5) requires floor assemblies and supporting structural elements in the vicinity of the shaft to have fire resistive rating equivalent to the rating of the shaft walls. This rating is required for all supporting elements extending down to the foundation.




In this illustration, the nonrated floor assembly and all supporting elements is required by Sections 707.5 and 706.5 to be 2 hour fire resistive.




Final Action: AS AM AMPC____ D

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# FS37-07/08

## 706.5, 706.5.1 (New)

*Proposed Change as Submitted:*

**Proponent:** Tony Crimi, AC Consulting Solutions Inc., representing International Firestop Council

**Revise as follows:**

**706.5 (Supp) Continuity.** Fire barriers shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed spaces, such as the space above a suspended ceiling. ~~The supporting construction for a fire barrier shall be protected to afford the required fire-resistance rating of the fire barrier supported, except for 1-hour fire barriers 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 a fire barrier shall be protected to afford the required fire-resistance rating of the fire barrier supported, except for 1-hour fire barriers 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.

**706.9 Joints.** Joints made in or between fire barriers, and joints made at the intersection of fire barriers with underside of the floor or roof sheathing, slab or deck above shall comply with Section 713.

**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 in order to provide the continuity of fire barriers.

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.

With the revisions introduced into the 2006 IBC to the application of fire barriers, the requirement to provide continuity at the top of fire barrier walls has been made more confusing. The 2003 IBC contained the same language in 706.9 regarding "joints made in or between fire barriers". However, by limiting the definition of fire barriers to walls, the previous requirement to protect joints at the intersection of vertical fire barriers and horizontal construction has been subverted. The revised definition of a Fire Barrier in 702.1 does make it clear that fire barriers are required to maintain continuity, but section 706 requires clarification.

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:** **Approved as Submitted**

**Committee Reason:** The committee agreed that this was an appropriate reorganization of Section 706.5 to separate the supporting construction requirements from the continuity requirements as well as to clarify the 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 in order to provide the continuity of fire barriers.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment:*

**Lori Lee Graham, City of Portland, OR, representing self requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**706.5.1 Supporting construction:** The supporting construction for a fire barrier shall be protected to afford the required fire-resistance rating of the fire barrier supported ~~except for 1=hour fire barriers 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.
3. Supporting construction for 1-hour fire barriers required by Table 508.2 in buildings of Type IIB, IIIB, and VB construction is not required to be fire-resistance rated unless required by other sections of this code.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The intent of Public Comment is editorial. The proposed Section 706.5.1 as approved by the committee has 3 exceptions – 2 after the paragraph – 1 in the paragraph. This public comment will simply make them all as listed exceptions.

Final Action: AS AM AMPC____ D

# FS42-07/08
## 707.2

*Proposed Change as Submitted:*

**Proponent:** Lawrence Suggars, South Salt Lake City, UT, representing Utah Chapter of ICC

**Revise as follows:**

**707.2 (Supp) 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.
14. Elevators in open parking garages that serve only the parking garage are not required to be enclosed.

15. In other than Groups H and I, a shaft enclosure is not required for a floor opening created by an elevator that complies with the following:
    15.1. Is contained within a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
    15.2. Is contained within a maximum two story building, without a basement, that has a minimum of two means of egress provided from each floor.

**Reason:** In Section IBC 707.2 exception 11 (by reference to exception 8 and 9 in Section 1020.1), in other than H and I occupancies when a building is equipped throughout with a sprinkler system in accordance with the provisions of 903.3.1.1 stairways are exempted from the shaft requirements with provisions. The elevator in this similar application, and further limited to a two story building, will present no more of a hazard to the occupants than the open stairways.

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

**Committee Action:** **Disapproved**

**Committee Reason:** Based on a lack of technical justification to allow this additional prescriptive allowance for a 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:*

**Eirene Oliphant, City of Leawood, KS, representing self, requests Approval as Submitted.**

**Lawrence Suggars, South Salt Lake City, UT, representing Utah Chapter of ICC, requests Approval as Submitted.**

**Commenter's Reason: (Oliphant)** Both IBC Sections 1003.7 and 3002.3 make it quite clear that an elevator cannot serve as a means of egress. While Section 1007.4 is referenced for accessible means of egress requirements, not every elevator that is installed meets the requirement of an accessible means of egress. For those elevators, especially those connecting only two floors, how is the elevator any different than an open stair which is permitted in a fully sprinklered building in Exception 11 of the very section the proponent is attempting to modify?

**Commenter's Reason: (Suggars)** I will stand on the original reasoning plus the following; in buildings of this nature generally the big problem is smoke related problems. With the current protections offered smoke is not even addressed. The elevator lobby in 707.14.1 is the first time that smoke is even addressed and than if the street level is sprinkled per NFPA 13 it is not required. Shaft protection for the elevator is redundant in this application. To stay consistent with previous code changes this change is needed.

Final Action: AS AM AMPC____ D

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# FS45-07/08
## 707.13.1, Chapter 35 (New)

*Proposed Change as Submitted:*

**Proponent:** Tony Crimi, AC Consulting Solutions Inc, representing International Fire Stop Council

**1. Revise as follows:**

**707.13 Refuse and laundry chutes.** Refuse and laundry chutes, access and termination rooms and incinerator rooms hall meet the requirements of Sections 707.13.1 through 707.13.6.

**Exception:** Chutes serving and contained within a single dwelling unit.

**707.13.1 Refuse and laundry chute enclosures.** A shaft enclosure containing a refuse or laundry chute shall not be used for any other purpose and shall be enclosed in accordance with Section 707.4. Openings into the shaft, including those from access rooms and termination rooms, shall be protected in accordance with this section and Section 715. Openings into chutes shall not be located in corridors. Doors shall be self- or automatic closing upon the actuation of a smoke detector in accordance with Section 715.4.7.3, except that heat-activated closing devices shall be permitted between the shaft and the termination room.

**Exception:** The shaft enclosure provisions of this section shall not be required where a refuse or laundry chute is protected with a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose, in accordance with ASTM E 2336. Such system shall be installed in accordance with the listing and the manufacturer's installation instructions. Penetration shall be protected with a through-penetration firestop system tested and listed in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. The surface of the refuse or laundry chute shall be protected from the point at which it originates, including all access openings, to the termination room.

**2. Add standard to Chapter 35 as follows:**

**ASTM**

E 2336-04 Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems

**Reason:** To introduce an alternative method for protection of refuse or laundry chute enclosures using the ASTM E2336 test Standard for fire resistive grease duct enclosures.

There are alternative methods available for providing fire resistance for refuse and laundry chute enclosures beyond the existing shaft enclosure provisions. ASTM E 2336 is entitled *Standard Test Methods For Fire Resistive Grease Duct Enclosure Systems,* and is currently referenced in the IMC. The Standard is based on the methodology that has been widely used throughout the United States for the evaluation of Grease Duct enclosures for over 10 years.

There are parallels between the level of hazard and performance required for refuse and laundry chutes as compared to Grease ducts and grease duct enclosures. The ASTM E2336 standard evaluates these enclosure materials and the duct enclosure systems using the following test methods: noncombustibility, full scale fire resistance, durability, internal fire, and fire-engulfment with a through-penetration fire stop.

The test method prescribes an ASTM E119 fire exposure for both a fire engulfment and a fire resistance wall test. The fire resistance test illustrates the ability of the enclosure material to resist the effects of fire when applied in a vertical application (i.e. as a wall assembly tested in accordance with ASTM E119).

A durability test is included for the materials, which is intended to simulate the effects of long-term exposure of typical in-service conditions on the thermal transmission qualities of the enclosure materials when subjected to a modified version of Test Method C 518.

In addition, an internal fire test uses two standardized fire exposures occurring inside the protected duct itself. Both tests illustrate the enclosure material's ability to resist thermal transmission of heat to the unexposed side in a horizontal application. The first standardized fire exposure is intended to simulate long term exposure of the enclosure material to a standardized service condition. The test simulates an internal fire within the duct by maintaining a minimum 500°F (260°C) average interior temperature for at least 4 h. The second standardized fire exposure is intended to simulate a sudden rise in the exposure conditions within the duct or chute. Within 15 min after the end of the 4-h period, increase the average interior temperature in the duct is increased to 2000°F (1093°C). This exposure is then maintained for 30 minutes.

A fire-engulfment test uses a standardized fire exposure, the time temperature curve of Test Methods E 119, to simulate a fire occurring on the outside of the grease duct, and demonstrates the ability of the grease duct enclosure system to remain intact without a through opening. The fire-engulfment test also tests the fastening methods used to secure the enclosure material to the grease duct and the supporting system. The fire-engulfment test also provides a means to test a through-penetration fire stop to determine its compatibility with the duct enclosure system. The fire-engulfment and vertical fire resistance tests are followed by the application of a standardized hose stream test.

Enclosure systems which meet the ASTM E2336 criteria demonstrate the ability to resist the passage of flames and hot gases during a standardized fire resistance test and a standardized internal fire test, as well as an ability to resist transmission of heat through the duct and the enclosure material(s). The ability of a fire stop to meet the requirements of Test Method E 814 when used with the duct/chute enclosure system is also evaluated. This portion of the evaluation can be used to protect the areas in which the refuse or laundry chutes penetrate access rooms and termination rooms.

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

**Analysis:** Review of proposed new standard ASTM E2336-04 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

**Committee Action:** **Disapproved**

**Committee Reason:** This is not an appropriate exception for several reasons. First, the standard referenced is for grease ducts, not refuse and laundry chutes. Second, this standard does not address typical laundry chute access openings at floor levels; the chute may act differently under fire conditions than a grease duct. Third, the grease duct usually is associated with a kitchen hood that is provided with a suppression system.

**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 Approved as Modified by this public comment.**

**Modify proposal as follows:**

**707.13 Refuse and laundry chutes**. Refuse and laundry chutes, access and termination rooms and incinerator rooms shall meet the requirements of Sections 707.13.1 through 707.13.6.

**Exception:** Chutes serving and contained within a single dwelling unit.

**707.13.1 Refuse and laundry chute enclosures.** A shaft enclosure containing a refuse or laundry chute shall not be used for any other purpose and shall be enclosed in accordance with Section 707.4. Openings into the shaft, including those from access rooms and termination rooms, shall be protected in accordance with this section and Section 715. Openings into chutes shall not be located in corridors. Doors shall be self- or automatic closing upon the actuation of a smoke detector in accordance with Section 715.4.7.3, except that heat-activated closing devices shall be permitted between the shaft and the termination room.

**Exception:** ~~The shaft enclosure provisions of this section shall not be required where a refuse or laundry chute is~~ Refuse or laundry chutes protected with a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose, and tested in accordance with ASTM E2336. Such system shall be installed in accordance with the listing and the manufacturer's installation instructions. Penetration shall be protected with a through-penetration firestop system tested and listed in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. The ~~surface of the~~ refuse or laundry chute shall be protected from the point at which it originates, including all access openings, to the access or termination room, and shall not be used for any other purpose.

**707.13.2 Refuse and laundry chute openings.** Openings into a shaft or enclosure containing a refuse or laundry chute, including those from access rooms and termination rooms, shall be evaluated as part of any listed or labeled enclosure system, or protected in accordance with this section and Section 715. Openings into chutes shall not be located in corridors. Doors shall be self- or automatic closing upon the actuation of a smoke detector in accordance with Section 715.4.7.3, except that heat-activated closing devices shall be permitted between the shaft and the termination room.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** There are alternative methods available for providing fire resistance for refuse and laundry chute enclosures beyond the existing shaft enclosure provisions. This proposal aims to provide greater design flexibility by introducing an alternative method for protection of refuse or laundry chute enclosures using the ASTM E2336 test Standard for fire resistive grease duct enclosures. ASTM E 2336 is entitled *Standard Test Methods For Fire Resistive Grease Duct Enclosure Systems,* and is currently referenced in the IMC. The Standard is based on the methodology that has been widely used throughout the United States for the evaluation of Grease Duct enclosures for over 10 years.

There are parallels between the level of hazard and performance required for refuse and laundry chutes as compared to Grease ducts and grease duct enclosures. The ASTM E2336 standard evaluates these enclosure materials and the duct enclosure systems using the following test methods: noncombustibility, full scale fire resistance, durability, internal fire, and fire-engulfment with a through-penetration fire stop.

The test method prescribes an ASTM E119 fire exposure for both a fire engulfment and a fire resistance wall test. The fire resistance test illustrates the ability of the enclosure material to resist the effects of fire when applied in a vertical application (i.e. as a wall assembly tested in accordance with ASTM E119).

A durability test is included for the materials, which is intended to simulate the effects of long-term exposure of typical in-service conditions on the thermal transmission qualities of the enclosure materials when subjected to a modified version of Test Method C 518.

In addition, an internal fire test uses two standardized fire exposures occurring inside the protected duct itself. Both tests illustrate the enclosure material's ability to resist thermal transmission of heat to the unexposed side in a horizontal application. The first standardized fire exposure is intended to simulate long term exposure of the enclosure material to a standardized service condition. The test simulates an internal fire within the duct by maintaining a minimum 500°F (260°C) average interior temperature for at least 4 h. The second standardized fire exposure is intended to simulate a sudden rise in the exposure conditions within the duct or chute. Within 15 min after the end of the 4-h period, increase the average interior temperature in the duct is increased to 2000°F (1093°C). This exposure is then maintained for 30 minutes.

A fire-engulfment test uses a standardized fire exposure, the time temperature curve of Test Methods E 119, to simulate a fire occurring on the outside of the grease duct, and demonstrates the ability of the grease duct enclosure system to remain intact without a through opening. The fire-engulfment test also tests the fastening methods used to secure the enclosure material to the grease duct and the supporting system. The fire-engulfment test also provides a means to test a through-penetration fire stop to determine its compatibility with the duct enclosure system. The fire-engulfment and vertical fire resistance tests are followed by the application of a standardized hose stream test.

Enclosure systems which meet the ASTM E2336 criteria demonstrate the ability to resist the passage of flames and hot gases during a standardized fire resistance test and a standardized internal fire test, as well as an ability to resist transmission of heat through the duct and the enclosure material(s). The ability of a fire stop to meet the requirements of Test Method E 814 when used with the duct/chute enclosure system is also evaluated. This portion of the evaluation can be used to protect the areas in which the refuse or laundry chutes penetrate access rooms and termination rooms.

Final Action: AS AM AMPC____ D

# FS47-07/08
**707.14.1**

*Proposed Change as Submitted:*

**Proponent:** Frank Hertzog, Smoke Safety Council

**Revise as follows:**

**707.14.1 (Supp) 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 any occupancy where the elevator opens into a fire rated corridor, 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:** This amendment correlates Section 707.14.1, Exception 4 with the initial charging language in Section 707.14.1 which states that the enclosed elevator lobby prescribed "(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." and with Table 1017.1. Table 1017.1 prescribes where these fire rated corridors are required in buildings without sprinklers as well as in occupancies where buildings are equipped with sprinklers. This table reflects the fact that fire risk varies by occupancy and that certain occupancies, even with sprinklers systems installed, are required to have fire rated corridors because they present greater risk of loss from fire and smoke than the other occupancies that are not required to have fire rated corridors if sprinkler systems are installed.

These occupancies (I-1, I-3, R, H-1, H-2, H-3, H-4, H-5) require the added protection from both fire and smoke when they exceed the floor height stated in the Section 707.14.1 charging language ("…where an elevator shaft enclosure connects more than three stories"). For example, Section 707.14.1 with Exception 4, as it presently reads, would allow the construction of a six story H (hazardous) occupancy without the requirement to provide any separation of the elevator shaft from the corridors into which the elevator opens. In this example, as substantial smoke can be generated even in sprinklered fires, this would allow smoke migration via the elevator shaft to hinder efforts of occupants to evacuate as well as fire fighter efforts to locate occupants and discover the seat of the fire. Since as much as 65% of smoke migration can occur via the elevator shaft, this presents a recognized hazard.

This change correlates the language throughout Section 707.14.1 and Table 1017.1 with the intent to provide the fire and smoke protection that this section prescribes for buildings with elevator shafts. As the building code prescribes the minimum level of fire and life safety protection, this change clarifies the minimum protection required for the occupancies with greater fire risk that require fire rated corridors per Table 1017.1.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee agreed that stack effect was the basis of the original exception and therefore locations where an elevator opens into a corridor should not be introduced as additional criteria within the exception.

**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 Council, requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**707.14.1 (Supp) 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 any occupancy where the elevator opens into a fire-resistance rated corridor, 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:** A minor editorial correction is made at Exception 4, by striking the word and between "I-2" and "I-3", and replacing it with a comma, for clarity.

This amendment correlates Section 707.14.1, Exception 4 with the initial charging language in Section 707.14.1 which states that the enclosed elevator lobby prescribed "(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." and with Table 1017.1. Table 1017.1 prescribes where these fire-resistance rated corridors are required in buildings without sprinklers as well as in occupancies where buildings are equipped with sprinklers. This table reflects the fact that fire risk varies by occupancy and that certain occupancies, even with sprinklers systems installed, are required to have fire rated corridors because they present greater risk of loss from fire and smoke than the other occupancies that are not required to have fire rated corridors if sprinkler systems are installed.

Only the following occupancies would be affected by this change: I-1, R, H-1, H-2, H-3, H-4, H-5. These three general occupancy types require the added protection from both fire and smoke when they exceed the floor height stated in the Section 707.14.1 charging language ("…where an elevator shaft enclosure connects more than three stories"). For example, Section 707.14.1 with Exception 4, as it presently reads, would allow the construction of a six story H (hazardous) occupancy without the requirement to provide any separation of the elevator shaft from the corridors into which the elevator opens.

I-1 (example: assisted living facilities) need special consideration as occupants are not free to evacuate on their own. I-1 occupancies typically rely on horizontal evacuation and defend in place strategies in dealing with fires that make the occupants especially susceptible to fire and smoke.

As substantial smoke can be generated even in sprinklered fires, this would allow smoke migration via the elevator shaft to hinder efforts of occupants to evacuate as well as fire fighter efforts to locate occupants and discover the seat of the fire. Since as much as 65% of smoke migration can occur via the elevator shaft, this presents a recognized hazard.

Final Action: AS AM AMPC____ D

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# FS52-07/08
## 707.14.1

*Proposed Change as Submitted:*

**Proponent:** Bob Eugene, Underwriters Laboratories Inc.

**Revise as follows:**

**707.14.1 (Supp) 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~~ meet the requirements for a smoke and draft control door assembly tested in accordance with UL 1784 without an artificial bottom seal. The air leakage rate of the door assembly shall not exceed 3.0 cubic feet per minute per square foot (0.01524 $m^3/(s\ m^2)$) of door opening at 0.10 inch (24.9 Pa) of water for both the ambient temperature test and the elevated temperature exposure test. Installation of smoke doors shall be in accordance with NFPA 105.
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 requirements for smoke and draft control doors are covered in Sections 707.14.1, 710.5.2 and 715.4.3.1 of the International Building Code (IBC). These three sections use somewhat different language. As such, the intent of this proposal is to harmonize the language of Section 707.14.1 with the language of Section 715.4.3.1 recently Approved under FS106-06/07, to the extent appropriate. A separate proposal was submitted for Section 710.5.2.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee felt that some of the requirements, such as the air leakage rate, were better off changed in the standard as part of the standard development process rather than placed in the code. It would be difficult for a code official to verify this information.

**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 Submitted.**

**Commenter's Reason:** The requirements for smoke and draft control doors are covered in Sections 707.14.1, 710.5.2 and 715.4.3.1 of the *International Building Code* (IBC). These three sections use somewhat different language. As such, the original intent of this proposal was to harmonize the language of Section 707.14.1 with the language of Section 715.4.3.1 recently Approved under FS106-06/07, to the extent appropriate. A separate proposal ultimately identified as FS77-07/08 was submitted to harmonize the language of Section 710.5.2 with Section 715.4.3.1. FS77-07/08 was Approved as Submitted by the Committee in Palm Springs.

In its current form, Section 707.14.1 states the air leakage of these doors shall be tested in accordance with UL 1784. UL 1784 requires the leakage be determined at differential pressures of 0.10, 0.20 and 0.30 in. WC and at temperatures of ambient and 400°F. However, it does not define the level of performance required. The inclusion of NFPA 105 entitled "Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives" brings in necessary field installation requirements but does not define the differential pressure and temperature conditions required during testing. It requires smoke door assemblies to have a leakage rating not greater than 3 $ft^3/min/ft^2$ of door opening when tested in accordance with UL 1784 at differential pressures of 0.10, 0.20 **or** 0.30 in. WC and temperatures **up to** 400°F. As such then, this proposal was intended to consolidate the requirements from NFPA 105, UL 1784 and Section 715.4.3.1 of the IBC to completely define the testing procedure and level of performance required. In doing so, it mimicked the requirements of Section 715.4.3.1.

The published ROH states the Committee 1) suggested the leakage performance criteria is best left to the standards development process, and 2) it would be difficult for a code official to verify the information required in this proposal.

The Committee is correct that ideally the test method and level of performance required should be in the left to the standards development process. However, past precedents set in Section 715.4.3.1 and now Section 710.5.1 suggests the leakage performance required shall be 3.0 $ft^3/min/ft^2$ of door opening when tested in accordance with UL 1784 at a differential pressure of 0.10 in. WC and at temperatures of ambient and 400°F. As such, is it necessary to wait for the standards development process to define the requirements? Doing nothing at this point leaves a void in the 2012 IBC and results in an enforcement issue for code users.

There are numerous examples in the current code where the Standard serves as the test method and the code dictates the level of performance required. For example, Chapter 8 of the IBC defines the level of performance required for interior finishes tested in accordance with ASTM E 84 or UL 723.

Leakage rated doors have been listed to UL 1784 for many years. The UL Fire Resistance Directory identifies 23 manufacturers of leakage rated doors, most of which produce multiple products. Each manufacturer's listing includes the leakage performance determine and the differential pressures and temperatures at which the performance was determined. As such, information is available by which to enforce this proposed language.

In summary, approving this proposal as submitted would define the level of performance required and bring harmony between Sections 707.14.1, 710.5.2 and 715.4.3.1 of the code

Final Action: AS AM AMPC____ D

# FS53-07/08
**707.14.1**

*Proposed Change as Submitted:*

**Proponent:** Gregory Lake, Sacramento Metropolitan Fire District, representing California Fire Chief's Association (Cal Chiefs)

**Revise as follows:**

**707.14.1 (Supp) 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~~ Enclosed elevator lobbies are not required where the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   4.1. I-2 buildings,
   4.2. Group I-3 buildings,
   4.3. Buildings having occupied floors located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, and
   4.4. Buildings in Seismic Design Category D, E, or F.
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:** This proposed code change accomplishes two things. First, it reformats this very complicated Exception to make it easier to understand and apply. Second, it provides an additional criterion for when the Exception does not apply for buildings determined to be in seismic design category D, E, or F.

As we have begun to review the code to become more familiar with it so that we can begin to enforce it with our recent adoption to become effective on January 1, 2008, we have struggled with how to interpret and properly apply Exception 4 which actually starts out as a double negative. We believe the reformatting we have proposed clarifies that the Exception is not intended to apply to Group I-2 and Group I-3 buildings, as well as high rise buildings that comply with Section 403. So we do not believe that the proposed reformatting makes any technical changes.

But we also realize that this Section also in essence allows for the omission of elevator lobbies when they would otherwise be required if the buildings are protected throughout with an NFPA 13 or an NFPA 13R automatic sprinkler system. We have serious concerns about the application of that Exception especially in our part of the country where we are subject to rather severe earthquakes. We know that we can expect a loss of water supplies not only to buildings but to fire hydrants as well for extended periods of time, thus rendering the automatic sprinkler system inoperable and denying us adequate water supplies to fight the multiple fires that will occur after a significant seismic event. Since migration through elevator shafts has been well documented, we believe that a sprinkler exception should not be applied to those cases where the building has been determined to be in a seismic design category D, E, or F. These seismic design categories are also similar to those specified in Section 903.3.5.2 Secondary Water Supply. That Section requires an onsite water supply for high rise buildings that are in seismic design categories C, D, E, or F. We have chosen to delete the reference to seismic design category C because it has an impact on some other parts of the country where earthquakes may not be as severe or as frequent as they are in California and other regions of the west coast.

By implementing this code change we will be able to continue to enforce the requirement for elevator lobbies which has been in our legacy code, the ICBO Uniform Building Code (UBC), for many years. Our experience has found that the elevator lobby enclosures do help to minimize the spread of smoke from floor to floor via elevator shafts, thus helping the fire department to do their job much more effectively and to minimize smoke exposure to occupants on floors remote from the fire floor and to minimize property damage and subsequent clean up and removal of residual smoke from the building. We believe this is important to fire and life safety feature which provides basic smoke protection and should not be traded off for an automatic sprinkler system, especially in locations where a significant seismic event could render the sprinkler system totally inoperable. Therefore, we respectfully request the Committee approve this code change proposal.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee had a concern with the term "buildings" in Items 4.1 and 4.2; they thought "occupancies" was a better fit. Further, there was no technical justification for not allowing buildings in certain seismic design categories from benefiting from this exception.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Mike Ashley, Alliance for Fire and Smoke Containment and Control (AFSCC) requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**707.14.1 (Supp) 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. Enclosed elevator lobbies are not required where the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. This exception shall not apply to the following:
   4.1. Group I-2 ~~buildings~~ occupancies,
   4.2. Group I-3 ~~buildings~~ occupancies, and
   4.3. Buildings having occupied floors located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access~~, and~~.
   ~~4.4. Buildings in Seismic Design Category D, E, or F.~~
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:** Based on the revisions proposed by this Public Comment, this code change proposal no longer contains any technical changes to Exception 4 to Section 707.14.1 (Supp) Elevator Lobby. We have deleted Item 4.4 of the Exception which the Committee objected to as not being technically justified regarding buildings in Seismic Design Categories D, E, or F. We've also made an editorial revision to the references to the term "buildings" and changed them to "occupancies" in both Items 4.1 and 4.2 of Exception 4 to also respond to the Committee comments on their recommendation for disapproval of this code change. The result is an editorial reformatting of Exception 4 to help clarify its application and interpretation. We believe that this reformatting is superior to the current Exception which is very confusing and subject to varying interpretations as to how it is intended to apply to enclosed elevator lobby requirements. We believe that once this Exception is clarified, then it may be easier to further modify it to address technical issues related to how this Exception should apply in various buildings where automatic sprinkler systems are provided in order to eliminate the requirement for an enclosed elevator lobby.

Final Action: AS AM AMPC____ D

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# FS54-07/08
## 707.14.1

*Proposed Change as Submitted:*

**Proponent:** David Frable, US General Services Administration

**Revise as follows:**

**707.14.1 (Supp) 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. Group B occupancies with an occupied floor not more than 420 feet in height above the lowest level of fire department vehicle access that 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 are not required to be provided with enclosed elevator lobbies.
~~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 with an occupied floor not more than 420 feet in height above the lowest level of fire department vehicle access that 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.

During the 2006/2007 ICC Code Development Hearings in Orlando, the Fire Safety Code Committee approved a similar code change proposal (FS54-06/07) that acknowledged that Group B occupancies of any height that are protected by an operational automatic fire sprinkler system provided an acceptable level of safety for building occupants and therefore did not warrant the need for enclosed elevator lobbies for the following reasons:

1. The proposal ties the exception to a specific occupancy which has a good fire record.
2. The NIST analysis is new technical data that shows a justification for this proposal.
3. 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.

However, at the Final Action Hearings of the ICC in May 2007, the ICC membership voted to overturn the Fire Safety Code Committee's recommendation and disapproved the subject code change. At the Hearings, no new technical information was provided to discount any of the Fire Safety Committee's aforementioned rationale for approval as submitted other than several opponents were concerned that it would apply to high-rise office buildings of any height; even those super high-rise office buildings greater than 420 feet in height, where the potential for stack effect in certain areas of the country may be greater and result in the vertical smoke migration through the elevator hoistways.

Therefore, to address this concern, we have limited exception 5 to only apply to Group B occupancies with an occupied floor not more than 420 feet in height above the lowest level of fire department vehicle access.

In addition, the 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[1]. 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.[3] 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 is reasonable to state that Group B occupancies that are not more than 420 feet in height, and 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 not more than 420 feet in height, 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: Disapproved

**Committee Reason:** The committee felt that occupancy classification was not the issue, rather it was the migration of smoke through elevator shafts; therefore elevator lobbies should be required for Group B under the conditions specified in the proposal. Further, no technical justification was provided to allow for this exception.

## Assembly Action: None

# *Individual Consideration Agenda*

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

*Public Comment:*

## Dave Frable, U.S. General Services Administration, requests Approval as Submitted.

**Commenter's Reason:** To say the least, the U.S. General Services Administration is disappointed with the reason statement provided by the 07/08 Fire Safety Code Committee for disapproval of this specific code change at the Code Development Hearings in Palm Springs, CA. The ICC Committees are the foundation upon which the process of development of the *ICC International Codes* is built and their importance cannot be overemphasized. In addition, it is essential that all ICC Code Committees prepare in advance, prior to their participation during the Code Development Hearings.

At the Code Development Hearings in Rochester, NY the Committee's reason statement for "Approval as Submitted" code change FS54-06/07 stated the following"

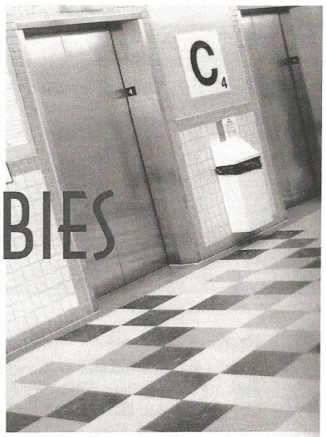
> **"Committee Reason:** This proposal ties the exception to a specific occupancy which has a good fire record. The NIST analysis is new technical data that shows a justification for this proposal. The NIST study did address smoke flow in both winter and summer for this low hazard occupancy. When combined 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."

Unfortunately, based on the reason statement provided by the Fire Safety Code Committee for this specific code change, it appears the 07/08 Fire Safety Code Committee did not meet their responsibilities as Committee members to prepare in advance prior to participating in the Code Development Hearings. It also appears the reason statements of the 07/08 and 06/07 Fire Safety Code Committee's contradict each other and to say no technical justification was provided to allow an exception for enclosed elevator lobbies in Group B buildings less than 420 feet in height when combined with the excellent fire safety record for high-rise Group B buildings is very weak.

To further justify this code change I am again providing the attached article titled "Is There A Need to Enclose Elevator Lobbies In Tall Buildings?", written by Richard Bukowski in the August 2005 *Building Safety Journal* that I referenced in my previous reason statements that substantiates my conclusion that that smoke spread in 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.

Based on all these reasons, we urge the membership to approve this code change as submitted.

# Is There A Need to ENCLOSE ELEVATOR LOBBIES IN TALL BUILDINGS?




by Richard W. Bukowski, P.E., FSFPE

Several proposals have been submitted in recent years to model building code organizations to require enclosure of elevator lobbies in order to restrict the movement of smoke to other parts of buildings via hoistways. A significant development in this area occurred recently when the National Institute of Standards and Technology (NIST)—which was already involved with a consortium of industry representatives, codes and standards developers, and other interested parties in a study of the protection of elevators for occupant evacuation and fire service access[1]—was asked by the U.S. General Services Administration (GSA) to research the conditions under which enclosed elevator lobbies were called for. This article will provide an overview of the progress made to date on this line of research.

## Background

Vertical shafts in tall buildings are subject to something called "stack effect," which describes an induction of airflow resulting from differences in temperature between the inside and outside of the shaft. When the outside temperature is colder, the induced flow is upward (normal stack effect); when the outside temperature is warmer, the flow is downward (reverse stack effect). While firestopping is effective in limiting the upward spread of flames through vertical openings and shafts, smoke is far harder to stop because even small leakages can allow it to pass. This has led to the use of smoke management systems which employ pressure differences to block smoke flow even through small cracks[2].

There are several examples of fires in which smoke spread in shafts has been implicated in deaths on upper floors, with perhaps the most infamous being the November 21, 1980, conflagration at the MGM Grand in Las Vegas. Although the flames were confined to the casino area on the first floor of the structure, 61 of the 85 casualties occurred on upper (above the 20th) floors due to smoke spread up elevator hoistways and seismic joints between the building core and wings.[3]

It is not surprising that such tragedies are frequently cited as substantiation for proposals to enclose elevator lobbies. However, the potential for smoke flow in hoistways is a function not only of leakage of the elevator doors but also of the strength of the stack flow, fire temperature (buoyancy flows) and the height of the shaft. Each of these factors was taken into account in NIST's analysis of the potential flows under varying conditions in order to identify those situations where significant shaft flows might be expected.

## Shaft Flow Analysis

NIST contracted with John H. Klote, Inc.—which is a well known for its expertise in the fields of both smoke management and elevators—for the analysis. Klote's report contains the details of the scenarios examined and the results obtained for each[4] and was summarized in a paper presented at the 2004 ASME Workshop on Use of Elevators in Fires and Other Emergencies.[5]

### Scenarios Studied

A number of primary variables were identified for study, including building size and configuration (five types), extent of fire (three types), lobby enclosure (two conditions), weather (winter or summer), and two alternate methods of preventing smoke flow in the shaft. This resulted in the 27 scenarios shown in Table 1, which were then evaluated using a combination of numerical models and NIST's Consolidated Model of Fire Growth and Smoke Transport (CFAST)[6] and CONTAM multizone airflow and contamination transport analysis software programs.[7]



Final Action: AS AM AMPC____ D

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# FS55-07/08
## 707.14.1

*Proposed Change as Submitted:*

**Proponent:** Sarah A. Rice, CBO, Schirmer Engineering Corporation

**Revise as follows:**

**707.14.1 (Supp) 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. In other than Group I-2 and I-3, enclosed elevator lobbies are not required where the corridor(s) has a fire resistance rating and the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

~~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 proposed exception is based upon recent work conducted by the ICC Code Technology Committee's, Balanced Fire Protection Features Study Group (CTC BFPF). During the last year the Study Groups investigated many of the fire safety related areas in the building code, including the concept of compartmentation. The SG looked at what added level of protection compartmention (fire rated and nonfire-rated) would provide to occupants in a fire incident. While the SG is still many areas, it was generally agreed that there is data to indicate that compartmenting a floor within a building may add a heighten level of protection by inhibiting the rapid spread of a fire incident.

The intent of the rated lobby is to protect against the uncontrolled spread of smoke via the elevator shaft. As the majority of fires (and thus smoke) start within a room or space, not in a corridor, a fire rated corridors should be recognized as already provide this level of compartmentation as it will keep much of the smoke within the compartment. A rated elevator lobby on floors that already provide a barrier to prevent this is redundant. Add to the compartmentation a sprinkler system and the level of protection is further heightened.

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

**Committee Action:** **Disapproved**

**Committee Reason:** Similar to the committee's reasons for FS54-07/08, the committee felt that occupancy classification was not the issue, rather it was the migration of smoke through elevator shafts; therefore elevator lobbies should be required under the conditions specified in the proposal. Further, no technical justification was provided to allow for this exception. Lastly, it seems critical to have lobby protection with Group R that is not currently exempted from the exception.

**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 Approved as Modified by this public comment.**

**Modify proposal as follows:**

**707.14.1 (Supp) 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. In other than Group I-2 and I-3 occupancies, enclosed elevator lobbies are not required on floors where the corridor(s) has a fire resistance rating and the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
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.
7. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 707.14.2.

**Commenter's Reason:** The proposed exception is based upon recent work conducted by the ICC Code Technology Committee's, Balanced Fire Protection Features Study Group (CTC BFPF). During the last year the Study Groups investigated many of the fire safety related areas in the building code, including the concept of compartmentation. The SG looked at what added level of protection compartmention (fire rated and nonfire-rated) would provide to occupants in a fire incident. While the SG is still many areas, it was generally agreed that there is data to indicate that compartmenting a floor within a building may add a heighten level of protection by inhibiting the rapid spread of a fire incident.

The intent of the rated lobby is to protect against the uncontrolled spread of smoke via the elevator shaft. As the majority of fires (and thus smoke) start within a room or space, not in a corridor, a fire rated corridors should be recognized as already provide this level of compartmentation as it will keep much of the smoke within the compartment. A rated elevator lobby on floors that already provide a barrier to prevent this is redundant.

Add to the compartmentation a sprinkler system and the level of protection is further heightened.

Final Action: AS AM AMPC____ D

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# FS62-07/08
## 707.14.2.1

*Proposed Change as Submitted:*

**Proponent:** Jesse J. Beitel, Hughes Associates, Inc.

**Revise as follows:**

**707.14.2.1 (Supp) Pressurization requirements.** Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.04 inches of water (9.96 Pa) and a maximum positive pressure of 0.06 inches of water (14.94 Pa) above the maximum stack effect pressure with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

**Reason:** The 2006 revision to section 707.14 does not include allowanced for stack effect which are often greater than the pressure differentials allowed by this section. Without consideration of stack effect, the hoistway can be lower pressure than many of the building floors, thus rendering the pressurization system ineffective. Thus, without the proposed change, design of hoistway pressurization systems in most climates for high rise buildings is not feasible.

For example assuming a 150 foot tall building with an inside temperature of 70°F and an outside temperature of 40°F, which would not be considered extreme in most climates. The calculated pressure in the shaft with respect to the building can be calculated using the methods established in Principles of Smoke Management Systems by Klote and Milke. For this example, we can use equation 5.6 from the Principles of Smoke Management Systems book. The calculations (shown below) show a differential pressure of 0.065 inches of water column at the top of the shaft. This would effectively prohibit the design of any hoistway pressurization system for this building. If we add the effect of a pressurization system and other smoke controls systems, it becomes almost impossible to pressurize any high rise building and remain within the limits specified.

Other jurisdictions are aware of these issues and have begun giving allowances for stack effect. For example, Oregon has published "Acceptable Alternatives to Required Elevator Lobbies" which allows differential pressure of 0.06 inches of water column above the maximum stack pressure.

Equation 5.26 from Principles of Smoke Management Systems

$$\Delta P_{SO} = K_s \left( \frac{1}{T_O} - \frac{1}{T_S} \right) h$$

Calculations for our example building:

$$\Delta P_{SO} = 7.64 \left( \frac{1}{(70+460)} - \frac{1}{(40+460)} \right) 75 = 0.065 \; inches \; of \; W.C$$

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

**Committee Action:** **Approved as Modified**

**Modify proposal as follows:**

**707.14.2.1 (Supp) Pressurization requirements.** Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.04 inches of water (9.96 Pa) and a maximum positive pressure of 0.06 inches of water (14.94 Pa) above the maximum anticipated stack effect pressure with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

**Committee Reason:** The committee agreed that without consideration of stack effect, the hoistway can have lower pressure than many of the building floors, which could render the pressurization system ineffective. Without the proposed change, design of hoistway pressurization systems in most climates for high rise buildings would not be feasible. The modification clarifies that the stack effect pressure is to be what is anticipated.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Bill Ziegert, Smoke Guard, Inc. requests Approved as Modified by this public comment.**

**Further modify proposal as follows:**

**707.14.2.1 Pressurization requirements.** Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.04 inches of water (9.96 Pa) and a maximum positive pressure of 0.06 inches of water (14.94 Pa) above the maximum anticipated stack effect pressure or +0.35 inches water gauge (87.18 Pa) whichever is less with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

**Commenter's Reason:** Recent studies on elevator shaft pressurization have concluded that while code compliant stair pressurization systems are relatively easy to design, the large leakage paths of elevator doors combined with the Phase 1 Elevator requirement to park each elevator cab at the recall floor with the hoistway and cab doors open make it very difficult to achieve a minimal positive pressure at the recall floor without over pressurizing the elevator doors on higher floors in the building. In addition, in exceptionally tall buildings (> 30 stories) using the previously approved language of "0.06 inches water gauge over the maximum anticipated stack effect" would result in allowable pressures substantially above the level that elevator hoistway doors will reliably work at (estimated to be +0.30 inches to +0.40 inches of water gauge). Finally, since the maximum allowable stair pressurization limit is +0.35 inches of water gauge, it is prudent to not allow elevator shaft pressurization systems to create higher pressures since this may overwhelm the stair pressurization systems and potentially push smoke into the exit stairs.

Final Action: AS AM AMPC____ D

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# FS63-07/08
## 707.14.2.1

*Proposed Change as Submitted:*

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

**Revise as follows:**

**707.14.2.1 (Supp) Pressurization requirements.** Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.04 inches of water (9.96 Pa) and a maximum positive pressure of 0.06 inches of water (14.94 Pa) 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 elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

**Reason:** Smoke control systems are complex mechanical systems that provide for a tenable environment, in this instance, in the elevator shaft for the duration of a fire event. Smoke control provides for evacuation and relocation in most instances and the use of the elevator by emergency personnel in a fire fulfills these rolls. Smoke control systems play a different roll from smoke and heat vents that serve to exhaust smoke from an area or building. Smoke control prevents entry of smoke to an area such as the elevator shaft in the case of exception 6 application in 707.14.1.

The 2006 IBC Commentary correctly states that smoke is a complex problem. The active mechanical system for elevator shaft pressurization must meet design and performance requirements of the Code. The IBC Commentary for smoke control systems states that "simply determining airflow, exhaust rates, and pressures to maintain tenable conditions is not adequate." The numerous factors to consider for smoke control include stack effect, wind effect, and climate. This proposal includes consideration of these key elements as a part of the determination of pressure differentials in the elevator shaft. Establishing these design requirements within the building code will insure that they are incorporated and that the pressurization system installed near the end of the construction of the building will perform properly in a fire.

Stack effect, states the IBC Commentary, if great enough, may overcome the pressures determined during the design analyses and allow smoke to enter areas outside the zone of origin. If stack effect is not accounted for in an elevator shaft pressurization design, in application it may overcome the pressures of the system and allow smoke to enter the shaft.

Wind effects on a smoke control system are also important to the performance of the system when a fire occurs. In larger buildings a wind study is a normal part of the structural design and the data from those studies can be used in the analysis of the effects on the pressures and airflow within the building with regard to the performance of the smoke control system.

Climate is the third key element in this proposed change with the specific language having a reference to designing to the mean low temperature January day. Temperature can not only effect the stack effects in the building, but the equipment used in the smoke control system must be able to perform under the temperature variations of the area of the country where the building is constructed.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee preferred the language in FS62-07/08 and FS67-07/08.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment:*

**Gregory J. Cahanin, Cahanin Fire & Code Consulting, representing Smoke Safety Council requests Approved as Modified by this public comment.**

Modify proposal as follows:

**707.14.2.1 (Supp) Pressurization requirements.** Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.04 inches of water (9.96 Pa) and a maximum positive pressure of 0.06 inches of water (14.94 Pa) above the maximum stack effect pressure 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~~. The system shall be designed such that the maximum probable normal or reverse stack effect will not adversely interfere with the system's capabilities. In determining the maximum probable stack effect, altitude, elevation, weather history and interior temperatures shall be used. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

**Commenter's Reason:** There are multiple references that address the difficulty of smoke control design- *The IBC Commentary, The IBC Handbook on Smoke Control, NFPA 92A* and the *ASHRAE Smoke Control Handbook*. The 2006 IBC Commentary correctly states that smoke is a complex problem. The active mechanical system for elevator shaft pressurization must meet design and performance requirements of the Code. The IBC Commentary, consistent with the other industry references for smoke control systems states that "simply determining airflow, exhaust rates, and pressures to maintain tenable conditions is not adequate." This comment's new language includes consideration of stack effect, wind effect, and climate as a part of the determination of pressure differentials in the elevator shaft. Establishing these design parameters within the building code will insure that they are incorporated and that the elevator pressurization system installed will perform properly in a fire.

The *ASHRAE Smoke Control Handbook* is specific in stating, "the 99.6% heating dry bulb (DB) temperature and the 0.4 % cooling DB temperature from the *ASHREA Handbook of Fundamentals on Climatic Design Information*, are recommended for use as the winter and summer design outside temperatures." This design manual is well accepted and its parameters on temperatures readily apply to elevator pressurization.

Stack effect is a dominant driving force during times of significant inside-to-outside temperature difference**.** Smoke control systems are complex mechanical systems that provide for a tenable environment, in this instance, in the elevator shaft for the duration of a fire event. Smoke control prevents entry of smoke to an area such as the elevator shaft in the case of exception 6 application in 707.14.1.

"Stack effect," states the IBC Commentary, "if great enough, may overcome the pressures determined during the design analyses and allow smoke to enter areas outside the zone of origin." If stack effect is not accounted for in an elevator shaft pressurization design it may overcome the pressures of the system and allow smoke to enter the shaft negating the code mandated requirements effectiveness.

"Wind effects" on a smoke control system are also important to the performance of the system when a fire occurs. In larger buildings a wind study is a normal part of the structural design and the data from those studies can be used in the analysis of the effects on the pressures and airflow within the building with regard to the performance of the smoke control system. Climate is the third key element in this proposed change with the specific language having a reference to designing to the mean high or low temperature for the jurisdiction where the building is to be built. Temperature can not only effect the stack effects in the building, but the equipment used in the smoke control system must be able to perform under the temperature variations of the area of the country where the building is constructed.

Final Action: AS AM AMPC____ D

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# FS66-07/08
## 707.14.2.1

*Proposed Change as Submitted:*

**Proponent:** Bill Ziegert, Smoke Guard, Inc.

**Revise as follows:**

**707.14.2.1 (Supp) Pressurization requirements.** Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.04 inches of water (9.96 Pa) and a maximum positive pressure of 0.06 inches of water (14.94 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet. Pressurization air shall be designed, installed and maintained so as not to impede elevator operation by impinging on traveling cables, selector tapes, governor ropes, compensating ropes and other components sensitive to excessive movement or deflection.

**Reason:** To insure consistency with the requirements of ASME A17.1 (Elevator Code). The next publication of the Elevator Code will contain this language.

**Cost Impact:** The code change proposal will not increase the cost of construction. None, there should be no cost impact on construction from this proposed change.

**Committee Action:** **Disapproved**

**Committee Reason:** The committee felt that verifying that the pressurization does not impede on cables selector tapes, governor ropes, etc. was unrealistic for the code official to do. Further, the committee felt more data was required to substantiate the added requirements, since the referenced elevator standard was not yet published.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Bill Ziegert, Smoke Guard, Inc., requests Approval as Submitted.**

**Commenter's Reason:** Recent studies on Elevator Shaft Pressurization have determined that very large quantities of air are required to pressurize the shaft sufficiently so that all levels of the hoistway shaft are at least at the minimum positive pressure of +0.04 inches water gauge. Introduction of this pressurization air at improper locations can have the potential to cause the traveling cables for the elevator cabs (which are not under tension) to sway into the paths of other moving cabs and sever the traveling cables causing the elevators to stop functioning and requiring expensive repairs. During the Palm Springs hearings it was suggested that this requirement should be part of the Elevator Code (which it will be in future editions), however the elevator suppliers have no input into the sizing and locations of the pressurization system fans; this is done either by the Architect or the Mechanical Engineers. This change has the effect of putting the building design trades on notice that the Elevator Code and mechanical design requirements must be integrated into the shaft pressurization design. Of further note is that a long time Elevator code representative viewed an early attempt to pressurize elevator shafts in Michigan and observed exactly this problem causing a catastrophic failure of the elevators in a High Rise building during initial commissioning.

Final Action: AS AM AMPC____ D

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# FS67-07/08
## 707.14.1, 707.14.2, 707.14.2.1, 909.21 (New)

*Proposed Change as Submitted:*

**Proponent:** Maureen Traxler, City of Seattle, WA, representing Department of Planning & Development; John H. Klote, John H. Klote, Inc.; Douglas H. Evans, Clark County, NV, representing Department of Development Services; Assistant Chief Kenneth L. Tipler, Fire Marshall, City of Seattle, WA, representing Seattle Fire Department

**1. Revise as follows:**

**707.14.1 (Supp) 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~~ 909.21.

**2. Delete without substitution:**

~~**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 (1.0 Pa) and a maximum positive pressure of 0.06 inches of water column (1.49 Pa) 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.~~

**3. Add new text as follows:**

**909.21 Elevator shaft pressurization.** Where elevator hoistway pressurization is provided in lieu of required enclosed elevator lobbies as allowed by 707.14.1 exception 6, the pressurization system shall maintain a minimum positive pressure of 0.10 inches of water (25 Pa) and a maximum positive pressure of 0.35 inches of water (87 Pa) in the elevator hoistway relative to the building measured with all elevator doors closed under maximum anticipated conditions of stack effect and wind effect.

**Reason:** This proposal has two objectives—it relocates the provisions for elevator hoistway pressurization to Section 909, and it changes the required pressure difference to a range of 0.10 to 0.35 instead of the current range of 0.04 to 0.06. The purpose of the proposal is to establish criteria for pressurization systems that will control smoke under actual fire conditions.

Elevator pressurization is a smoke control system in that it is intended to control the movement of smoke. The proposed change moves elevator pressurization to Section 909 so that it is subject to the requirements of Section 909 like other smoke control systems including stairway pressurization. These requirements include rational analysis, equipment, electrical power systems, detection, control, fire-fighter's smoke control panel, special inspection and testing. It provides consistency with the requirements for stairway pressurization. Consistency is important because, in buildings that have both elevator and stair pressurization, the systems will interact with each other, making proper design analysis per Section 909.4 especially important.

Currently IBC Section 707.14.2.1 specifies a minimum pressure difference of 0.04 inches of water and a maximum pressure difference of 0.06 inches of water. There are two problems with these values. First, 0.04 inches of water is not enough to reliably keep smoke out of the hoistway. It could provide some protection from smoke migration, but will not control it during a fully-involved fire. A pressure difference of 0.10 inches of water is sufficient to prevent smoke from infiltrating elevator hoistways under the extreme condition of a fully-involved fire in the space next to the elevator door. This is supported by both engineering analysis and full scale fire tests (see NFPA 92A 2006; Klote and Milke 2002).

While at NIST, Dr. John Klote did a series of full-scale fire tests at the Plaza Hotel Building in Washington, D.C. In these fires, the section of a corridor near the stairs was fully involved in fire. In these tests, a pressure difference of 0.10 inches controlled smoke from very large fires that were only a few feet away from the stairway door. Another test consisted of a room fire that flashed over and remained at fully-developed conditions for some time. A number of other full scale tests have confirmed that pressurization can control smoke from extremely large fires. These tests show that 0.10 inches of water is sufficient to control smoke with a flashed-over fire anywhere on the floor even when it is in the corridor next to the stair door.

The second problem with the current provisions is that the pressure difference range of only 0.02 inches of water is too small. Normal fluctuations in pressure due to changes in wind and barometric pressure are about 0.01 to 0.03 inches of water. While it may be possible to design an elevator shaft pressurization system that would work with a range this small for a very short and simple building, it is not possible to design systems that would work for most buildings. Because of stack effect and floor-to-floor variations in building leakage, hoistway pressurization systems in most buildings will naturally require a much larger pressure difference range.

This proposal and a related one would require the same pressure difference for both stairs and elevators (minimum of 0.10 inches of water and maximum of 0.35 inches of water). Many buildings will have both pressurized stairs and elevators, and having the same design pressure differences will make design much simpler and the systems more reliable.

Some people have concerns about elevator doors jamming during hoistway pressurization. Increased pressure difference can sometimes cause elevator doors to jam closed, but such jammed doors typically require only modest force to open. They are not difficult to open by trained and properly-equipped firefighters. John Klote has conducted extensive research with elevator smoke control systems, and he has encountered only one instance of elevator doors jammed closed. In that case the doors were easily opened by hand. In fire situations, the elevators are required to go into Phase II operation which is sometimes called firefighter's service. The elevators are only used by firefighters who are equipped with various tools and capable of opening a door that has been jammed shut.

The intent of smoke control systems as stated in Section 909.1 is "to provide a tenable environment for the evacuation or relocation of occupants." Hoistway pressurization acts to prevent smoke from flowing through elevator hoistways and going to floors remote from the fire, helping to provide a tenable environment for the evacuation or relocation of occupants on floors remote from the fire. The changes made in this proposal are essential for design of hoistway pressurization systems that will be effective in controlling smoke.

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

### Committee Action: Disapproved

**Committee Reason:** Doors opening at recall should be a part of the pressurization design. Reference to Chapter 9 in exception 6 to Section 707.14.1 could lead to misapplication of the code provisions because the smoke control provisions are not intended to apply to pressurization design. Lastly, Sections 707.14.2.2 through 707.14.2.5 would remain and would need to somehow be coordinated perhaps within Section 909.21.

### 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, WA, representing Department of Planning & Development; John H. Klote, John H. Klote, Inc.; Douglas H. Evans, Clark County, NV, representing Department of Development Services; Assistant Chief Kenneth L. Tipler, Fire Marshall, City of Seattle, WA, representing Seattle Fire Department, requests Approved as Modified by this public comment.

**Replace proposal as follows:**

**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~~ 0.10 inches of water (~~9.96~~ 25 Pa~~)~~ and a maximum positive pressure of ~~0.06~~ 0.25 inches of water (~~14.94~~ 67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

**707.14.2.2 Rational analysis.** A rational analysis complying with Section 909.4 shall be submitted with the construction documents.

(Renumber subsequent sections.)

**707.14.2.6 Marking and identification.** Detection and control systems shall be marked in accordance with Section 909.14.

**707.14.2.7 Control diagrams.** Control diagrams shall be provided in accordance with Section 909.15.

**707.14.2.8 Control panel.** A control panel complying with Section 909.16 shall be provided.

**707.14.2.9 System response time.** Hoistway pressurization systems shall comply with the requirements for smoke control system response time in Section 909.17.

**Commenter's Reason:** The IBC allows hoistway pressurization as an alternative to elevator lobbies. However, the current pressurization provisions do not provide a degree of safety comparable to elevator lobbies. The pressure differences of 0.04 to 0.06 inches allowed by the current code are not adequate to keep smoke from migrating through hoistways. The proposed minimum pressurization value of 0.10 is derived from the long experience of John Klote and the City of Seattle's practical experience with enforcing similar provisions. Research, engineering calculation and field observation, including full-scale fire tests, conducted by Dr. John Klote noted in the reason statement for the original proposal, all support 0.10 as the appropriate value for hoistway pressurization.

The maximum of 0.25 inches is based on Seattle's elevator inspection staff observations that pressure differences greater than 0.25 can cause difficulty in operation of elevator doors. Seattle has had hoistway pressurization provisions since 1977.

The rational design analysis per Section 909.4 is an important part of this proposal. It will require the design engineer to take into account the unique characteristics of the building, including location and number of elevators and hoistways, the size and configuration of the building, and other factors that will influence the behavior of the building during fire conditions.

The Code Development Committee's reasons for disapproving this proposal are all addressed in this comment. Hoistway pressurization requirements remain in Section 707.14, removing all ambiguity about which parts of Section 909 apply. All portions of Section 707.14.2 are retained, and the specific pertinent portions of Section 909 are referenced from that section. By retaining Section 707.14.2.1, it is clear that elevator doors are required to be open at the recall level when the pressurization level is measured.

Final Action: AS AM AMPC____ D

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# FS71-07/08
## 708.1

*Proposed Change as Submitted:*

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

**Revise as follows:**

**708.1 (Supp) General.** The following wall assemblies shall comply with this section.

1. Walls separating dwelling units in the same building as required by Section 419.2.
2. Walls separating sleeping units in the same building as required by Section 419.2.
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. Walls separating enclosed tenant spaces required to have two or more exits or exit access doorways by Section 1015.1.

**Reason:** This code change proposal is a follow up to our previously submitted Code Change Proposal FS64-06/07. We also submitted a Public Comment on FS64-06/07 which was heard during the ICC Final Action Hearings held in Rochester, NY this past May. We fell a few votes short of overturning the Committee's recommendation for disapproval but received good testimony indicating where we might be able to modify the code change proposal to make it more acceptable. The basic issue was that this would apply to any enclosed tenant space regardless of size. Obviously, for a very small tenant space this would be a financial hardship, especially in rather small buildings where the tenants may move in an out on a fairly regular basis. Therefore, we provided a trigger for this requirement to apply the 1-hour fire-resistance rating to separate enclosed tenant spaces based on the requirement for such a space to have two or more exits or exit access doorways in accordance with Section 1015.1. So, for example, a typical office tenant would not require the 1-hour fire-resistive separation until the space exceeded 5,000 sq ft. We believe this is a reasonable compromise because it takes into consideration that the larger space will have more property at risk, as well as more occupants necessitating the need for some fire-resistive protection between the tenant and its adjacent spaces. This we believe is a reasonable compromise while still providing an acceptable level of fire and life safety to multi-tenant buildings.

This would also 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 or the size of the tenant space. 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 our previous 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.

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 tenants have 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.

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

### Committee Action: Disapproved

**Committee Reason:** As with FS70-07/08, the committee felt that the term "tenant spaces" seems to be too inclusive and should be further defined and limited. Also, the committee indicated that there may be enforcement problems in a building where the configurations are likely to change often, such as a typical Group B office building.

### Assembly Action: None

## *Individual Consideration Agenda*

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

*Public Comment:*

### Mike Ashley, Alliance for Fire and Smoke Containment and Control (AFSCC) requests Approval as Submitted.

**Commenter's Reason:** This Public Comment is being submitted to request approval of this code change proposal which was recommended for disapproval by the Committee. Part of the Committee Reason indicated that the term "tenant spaces" seems to be too inclusive and should be further defined and limited as indicated in their concerns with FS70-07/08. However, there is a significant difference between the reference to "tenant spaces" in FS71 versus FS70. In FS71 we've included the modifier "enclosed" so that it only addresses enclosed tenant spaces which was one of the concerns raised during the last code cycle where a similar code change proposal was heard. But that proposal also did not include the additional limits on the size of the tenant space based on the number of means of egress required from the space which is included in this new code change proposal. Using the term "enclosed tenant spaces" eliminates conditions where there may be multiple tenants in an open plan area where the tenants share a common space.

This provision would only apply where a physical separation is provided to separate and enclose a tenant space so that what happens in that tenant space is not readily apparent and visible to occupants of adjacent tenant spaces. In those cases, we believe it is important to provide the 1-hour fire-resistive separation to provide a minimum level of protection for one tenant's actions from affecting another.

The Committee also stated that there may be an enforcement problem where the configurations are likely to change often such as a typical Group B office building. However, we do not understand why that should be a concern for this case since as we noted in the original Reason statement for this code change proposal, all three legacy codes had requirements for tenant separations. In fact, in the SBCCI Standard Building Code, all tenant spaces were required to be separated by a minimum 1-hour fire-resistive construction from each other regardless of occupancy. We are not aware of any significant code enforcement problems occurring in jurisdictions where that code was previously enforced or in other jurisdictions where the tenant separation provisions were enforced in the other legacy codes prior to the International Building Code (IBC).

Furthermore, it should be noted that the term "tenant space" is currently used in Section 402.7 Fire-Resistance-Rated Separation for Covered Mall Buildings. That section specifies that a fire-resistance rated separation is not required between tenant spaces in the mall, nor between a food court and an adjacent tenant space and the mall. Furthermore, Section 402.7.2 Tenant Separations contains requirements that each tenant space be separated from other tenant spaces by a fire partition complying with Section 708 in covered mall buildings but allows that a tenant separation wall is not required between any tenant space and the mall. Certainly, tenant spaces can change quite a bit within malls, as we all know, and we're not aware of any unusual code enforcement problems in those situations. We believe that code officials can clearly understand what an enclosed tenant space is so that they should have no trouble in enforcing this provision if it is approved by the ICC Class A voting members.

The important point to remember is that we should be providing a reasonable level of protection between adjacent tenants in multi-tenant buildings where the tenants are enclosed and separated so that it is not readily obvious if a fire develops in an adjacent tenant space. A 1-hour fire partition will provide a reasonable degree of fire and life safety protection to occupants of adjacent tenant spaces to protect their property, as well as to allow them adequate time to egress from their tenant space to the exterior of the building without having undue exposure from the developing fire condition in the adjacent space. And as noted in our Reason statement, this will also assist the responding fire department in controlling the fire and limiting it to a reasonable area to minimize the extent of damage and assist in search and rescue activities by providing protected areas from which they can make their search, as well as fight the fire. Therefore, we urge the ICC Class A voting members to approve this code change proposal as submitted.

Final Action: AS AM AMPC____ D

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# FS81-07/08, Part I

## 711.9 (New)

*Proposed Change as Submitted:*

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

**PART I – IBC FIRE SAFETY**

**Add new text as follows:**

**711.9 Smoke barrier.** Where horizontal assemblies are required to resist the movement of smoke by other sections of this code in accordance with the definition for smoke barrier, penetrations and joints in such horizontal assemblies shall be protected as required for smoke barriers in accordance with Sections 712.5 and 713.6. Doors located in elevators shaft enclosures that penetrate the horizontal assembly shall be protected by enclosed elevator lobbies complying with Section 707.14.1. Horizontal assemblies shall not be allowed to have unprotected vertical openings. Openings through a horizontal assembly shall be protected as required by Section 707.

**Reason:** This code change proposal is intended to clarify the requirements for horizontal assemblies that are used to support smoke barrier walls such as in Group I-2 occupancies where smoke barriers are required to subdivide floors by Section 407.4. It is clear from the definition for "smoke barrier" that a smoke barrier can be a horizontal assembly. Furthermore, in order to provide for the continuity of the smoke protection for smoke compartments created by vertical smoke barriers to provide for relative safe areas for horizontal movement of patients in a fire emergency, it follows that the floors supporting those smoke barrier walls should also be able to resist the passage or movement of smoke through the assembly to maintain the appropriate level of protection for the occupants. Generally, occupants of Group I-2 occupancies are moved into a smoke barrier that is away from the area where the fire occurred so that they can remain until further moved as necessary or until the fire has been extinguished by the responding fire department. The provisions contained in this code change proposal we believe will provide the equivalent level of smoke protection to that of the smoke barrier for the horizontal assemblies that support the smoke barriers.

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

**PART I – IBC FIRE SAFETY**
**Committee Action:** **Disapproved**

**Committee Reason:** The committee felt that sending the code-user to Sections 707.14.1 and 707 would be confusing because it is not clear what provisions in Section 707 are applicable to horizontal assemblies that are required to resist the movement of smoke.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Mike Ashley, Alliance for Fire and Smoke Containment and Control (AFSCC) requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**711.9 Smoke barrier.** Where horizontal assemblies are required to resist the movement of smoke by other sections of this code in accordance with the definition for smoke barrier, penetrations and joints in such horizontal assemblies shall be protected as required for smoke barriers in accordance with Sections 712.5 and 713.6. Regardless of the number of stories connected by elevator shaft enclosures, doors located in elevator shaft enclosures that penetrate the horizontal assembly shall be protected by enclosed elevator lobbies complying with Section 707.14.1. Openings through horizontal assemblies shall be protected by shaft enclosures complying with Section 707. Horizontal assemblies shall not be allowed to have unprotected vertical openings. ~~Openings through a horizontal assembly shall be protected as required by Section 707.~~

**Commenter's Reason:** We are requesting approval of this code change proposal as modified by this Public Comment. It provides appropriate code requirements for horizontal assemblies used to support smoke barriers required in Group I-2 occupancies. Currently, the code does not contain specific requirements for these horizontal assemblies which act as smoke barriers based on the definition for "smoke barriers" in Section 702.1. This will provide clear guidance to designers of Group I-2 occupancies, as well as to code enforcement officials responsible for assuring such occupancies comply with the code for the protection the occupants from smoke.

We believe the revisions proposed in this Public Comment respond to the Fire Safety Committee's reasons for recommending disapproval of Part I of this code change proposal which was critical to its proper application. We have revised the reference to Section 707 by specifying that we are requiring shaft enclosures to protect the openings in horizontal assemblies in accordance with the provisions for shaft enclosures in Section 707. We have also reformatted the last two sentences so that the last sentence will contain the restriction on the prohibition of unprotected vertical openings through horizontal assemblies. We believe it is more appropriate for it to follow the requirements that openings in horizontal assemblies be protected by shaft enclosures in accordance with Section 707 so that any of the Exceptions or alternate provisions in Section 707 that allow for unprotected vertical openings under limited conditions would not apply to horizontal assemblies supporting smoke barriers.

Also, we have responded to the Committee's concern about a direct reference to Section 707.14.1 for the protection of doors located in elevator shaft enclosures that penetrate the horizontal assembly used to support smoke barriers. We are requiring that an enclosed elevator lobby be provided in compliance with Section 707.14.1. The purpose of Section 707.14.1 is to basically limit the spread of smoke from floor to floor in buildings having elevators serving more than three stories. So we have further clarified the reference to enclosed elevator lobbies by indicating that the limitation on the number of stories served is not applicable to this situation. This is because it doesn't matter how many floors are connected by an elevator shaft when the floors serve as horizontal assemblies supporting smoke barriers and are, themselves, smoke barriers since the purpose is to prevent smoke migration from floor to floor.

In conclusion, we believe that the modifications in this Public Comment adequately respond to the Committee's concerns about the provisions contained in proposed new Section 711.9 Smoke Barrier. We further believe that these provisions are essential for the proper enforcement of the code in protecting occupants in place who are generally bed-ridden in Group I-2 occupancies. Therefore, we respectfully request that the ICC Class A voting members approve this Public Comment for approved as modified for Code Change Proposal FS81-07/08.

Final Action: AS AM AMPC____ D

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# FS81-07/08, Part II
## 711.9 (New)

*Proposed Change as Submitted:*

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

**PART II – IBC GENERAL**

**Add new text as follows:**

**407.4.3 Horizontal assemblies.** Horizontal assemblies supporting smoke barriers required by this section shall be designed to resist the movement of smoke and shall comply with Section 711.9.

**Reason:** This code change proposal is intended to clarify the requirements for horizontal assemblies that are used to support smoke barrier walls such as in Group I-2 occupancies where smoke barriers are required to subdivide floors by Section 407.4. It is clear from the definition for "smoke barrier" that a smoke barrier can be a horizontal assembly. Furthermore, in order to provide for the continuity of the smoke protection for smoke compartments created by vertical smoke barriers to provide for relative safe areas for horizontal movement of patients in a fire emergency, it follows that the floors supporting those smoke barrier walls should also be able to resist the passage or movement of smoke through the assembly to maintain the appropriate level of protection for the occupants. Generally, occupants of Group I-2 occupancies are moved into a smoke barrier that is away from the area where the fire occurred so that they can remain until further moved as necessary or until the fire has been extinguished by the responding fire department. The provisions contained in this code change proposal we believe will provide the equivalent level of smoke protection to that of the smoke barrier for the horizontal assemblies that support the smoke barriers.

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

**PART II – IBC GENERAL**
**Committee Action:** **Disapproved**

**Committee Reason:** The proposed revisions would not work without the proposed requirements in Part I of the proposal. Part I was heard by the Fire Safety Committee later during the hearings.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Mike Ashley, Alliance for Fire and Smoke Containment and Control (AFSCC) requests Approval as Submitted.**

**Commenter's Reason:** We are requesting approval of this code change proposal as modified by this Public Comment. It provides appropriate code requirements for horizontal assemblies used to support smoke barriers required in Group I-2 occupancies. Currently, the code does not contain specific requirements for these horizontal assemblies which act as smoke barriers based on the definition for "smoke barriers" in Section 702.1. This will provide clear guidance to designers of Group I-2 occupancies, as well as to code enforcement officials responsible for assuring such occupancies comply with the code for the protection the occupants from smoke.

We believe the revisions proposed in this Public Comment respond to the Fire Safety Committee's reasons for recommending disapproval of Part I of this code change proposal which was critical to its proper application. We have revised the reference to Section 707 by specifying that we are requiring shaft enclosures to protect the openings in horizontal assemblies in accordance with the provisions for shaft enclosures in Section 707. We have also reformatted the last two sentences so that the last sentence will contain the restriction on the prohibition of unprotected vertical openings through horizontal assemblies. We believe it is more appropriate for it to follow the requirements that openings in horizontal assemblies be protected by shaft enclosures in accordance with Section 707 so that any of the Exceptions or alternate provisions in Section 707 that allow for unprotected vertical openings under limited conditions would not apply to horizontal assemblies supporting smoke barriers.

Also, we have responded to the Committee's concern about a direct reference to Section 707.14.1 for the protection of doors located in elevator shaft enclosures that penetrate the horizontal assembly used to support smoke barriers. We are requiring that an enclosed elevator lobby be provided in compliance with Section 707.14.1. The purpose of Section 707.14.1 is to basically limit the spread of smoke from floor to floor in buildings having elevators serving more than three stories. So we have further clarified the reference to enclosed elevator lobbies by indicating that the limitation on the number of stories served is not applicable to this situation. This is because it doesn't matter how many floors are connected by an elevator shaft when the floors serve as horizontal assemblies supporting smoke barriers and are, themselves, smoke barriers since the purpose is to prevent smoke migration from floor to floor.

In conclusion, we believe that the modifications in this Public Comment adequately respond to the Committee's concerns about the provisions contained in proposed new Section 711.9 Smoke Barrier. We further believe that these provisions are essential for the proper enforcement of the code in protecting occupants in place who are generally bed-ridden in Group I-2 occupancies. Therefore, we respectfully request that the ICC Class A voting members approve this Public Comment for approved as modified for Code Change Proposal FS81-07/08.

Final Action: AS AM AMPC____ D

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# FS83-07/08
## 712.2 (New), 712.2.1, 712.2.2 (New)

*Proposed Change as Submitted:*

**Proponent:** Bill McHugh, Firestop Contractors International Association

**1. Revise as follows:**

**712.2 Installation.** Penetration firestops shall be installed as tested in an approved fire-resistance-rated assembly and the approved manufacturer's instructions, and shall protect the assembly from fire and smoke.

**712.2.1 Installation details, sleeves.** Where sleeves are used, they shall be securely fastened to the assembly penetrated. The space between the item contained in the sleeve and the sleeve itself and any space between the sleeve and the assembly penetrated shall be protected in accordance with this section. Insulation and coverings on or in the penetrating item shall not penetrate the assembly unless the specific material used has been tested as part of the assembly in accordance with this section.

**712.2.2 Installation details, field installation.** Field installations of penetration firestops shall be installed by contractors certified by an approved agency for such installations.

**Reason:** Firestopping is a vital part of effective compartmentation. Firestopping is a very technical industry, requiring technical knowledge of the firm to analyze conditions on construction documents and in the field, select the firestop system that matches the construction documents and / or field conditions and install to zero-tolerance parameters of the firestop design as tested. There are firestop installation processes that outline requirements for firestop systems installation and are administered by approved agencies such as FM Approvals and Underwriters Laboratories. Any contractor can be approved or qualified to the programs administered by these agencies.

Firestopping by a contractor firm who has been approved or qualified means that the firm provides audit tested fire and life safety through:

-Designated Responsible Individual – who has passed an industry exam based on the Firestop Contractors International Association's Firestop Industry Manual of Practice, FM Standard FM 4991, Standard for the Approval of Firestop Contractors, and / or the UL Qualified Firestop Contractor Program requirements.

-Quality Audits – The process to install firestopping is very technical, and needs attention to detail. The specialty firestop contractor firm, or trade contractor firm has their quality manual audited and approved or qualified by an auditor from either FM Approvals or Underwriters Laboratories to be recognized by the approved agency.

Firestopping is a vital part of effective compartmentation. When installation is not performed correctly, it can cause delays of certificate of occupancy, reducing building owners' revenue generating time. Firestopping installation is a process that is knowledge sensitive, and uses small sized materials, that can be delivered or drop shipped directly to the project site. It is lightweight and not sensitive to huge freight costs.

There is already a pool of contractor firms who have been approved or qualified. Visit http://www.fcia.org to view these firms, who service the country as well as international locations.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee felt that the provisions for installation details and field installation were too broad and could conflict with prescriptive provisions currently in the code for annular space protection for other construction, such as masonry. Further, the code official should not be approving manufacturer's installation instructions. Lastly, it seems unreasonable that a code official should have to verify that a contractor is certified.

**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, Approved as Modified by this public comment.**

**Modify proposal as follows:**

**712.2 Installation.** Penetration firestops shall be installed as tested in an approved fire-resistance-rated assembly and ~~the approved~~ in accordance with the manufacturer's instructions, and shall protect the assembly from fire and smoke.

**712.2.1 Installation details, sleeves.** Where sleeves are used, they shall be securely fastened to the assembly penetrated. The space between the item contained in the sleeve and the sleeve itself and any space between the sleeve and the assembly penetrated shall be protected in accordance with this section. Insulation and coverings on or in the penetrating item shall not penetrate the assembly unless the specific material used has been tested as part of the assembly in accordance with this section.

**712.2.2 Installation details, field installation.** ~~Field installations of~~ Penetration firestops shall be installed by contractors certified by an approved agency for such installations.

**Commenter's Reason:** Firestopping is a vital part of effective compartmentation that is fire resistance rated and or smoke resistant. Firestopping is a highly technical industry, requiring specialized knowledge at the firestop contracting firm to analyze conditions on construction documents and / or in the field, select the appropriate firestop system(s) from UL, FM, Intertek / Omega Point Laboratories and other directories, then match the systems to penetrating items. Proper Design, Installation, Inspection and Maintenance of Firestop Systems is critical to fire and life safety. This public comment addresses installation of these firestop systems to zero-tolerance parameters of the classified and listed firestop design. If the system is not installed to the parameters in the design, the 'system' may or may not work when called upon by fire.

There is an approval or qualification process administered by approved agencies such as FM Approvals and Underwriters Laboratories for contractors who install materials that become firestop systems. Any contractor (trade or specialty firestop contractor) installing firestop systems can be approved or qualified to the programs administered by these agencies. Any firm is eligible, with costs ranging from $3000 to $7000 for the initial audit and about $2500-$3000 annually for ongoing audits by UL & FM. The cost is less than many contractors would spend on advertising in the "Blue Book".

Firestopping by a contractor firm who has been approved or qualified means that the firm has the processes in place in the company culture to handle the zero tolerance installation program needed for firestop systems for fire and life safety. The audits by FM & UL test the company's ability to install fire and life safety through penetration firestop systems to these requirements, through extensive review of the company procedures. Here's a summary of what it takes for a contractor to become FM 4991 Approved and / or UL Qualified:

-Designated Responsible Individual (DRI) – Each firm employs a DRI who has passed an industry exam based on the Firestop Contractors International Association's Firestop Industry Manual of Practice, FM Standard FM 4991, Standard for the Approval of Firestop Contractors, and / or the UL Qualified Firestop Contractor Program requirements, as well as selection of firestop systems from directories matched to field conditions.

-Quality Audits – FM & UL then audit the firestop processes of the company:

--Initial Audit - The process to install firestopping is very technical, and needs attention to detail. The specialty firestop contractor firm or trade contractor firm has their company quality manual audited and approved or qualified by an auditor from either FM Approvals or Underwriters Laboratories to be recognized by the approved agency as a 'certified contractor'. This is a very robust, truly independent inspection of the contractor's firestop systems selection, submittal, and installation and inspection processes by FM & UL Auditors. Auditors also visit a project site to verify that the procedures are actually in place throughout the company.

--Annual Audit – FM and or UL visit the firm to review the company's procedures annually to verify continued compliance to the FM 4991 Standard or UL Qualified Firestop Contractor Program. These visits are key to continued success of the firm's quality management system.

Firestopping is a vital part of effective compartmentation. When installation is not performed correctly, it can cause delays of certificate of occupancy, reducing building owners' revenue streams and create a fire and life safety risk. FM Approved and UL Qualified Firestop Contractors can help protect this risk through a company culture that has embraced the quality management system culture, just as building departments have through ICC and other rating organizations.

Firestopping installation is a process that is knowledge sensitive, and requires a firm that has the quality management systems culture ingrained in it's operations and, more importantly, it's people. Plus, the production of the quality assurance manual at the company helps them gather important insight into company operations through self assessment followed up by a full audit by a credible, independent organization, FM & UL.

There are many contractor firms who have been approved or qualified, that cover most of the US, Dubai, with many more in process throughout the world. Since firestopping is lightweight, and knowledge travels, so too can FM Approved and UL Qualified Firestop Contractor Firms travel to serve local needs competitively. For more information, visit http://www.fcia.org to view Specialty Firestop Contractor Firms who have become Approved or Qualified, and see the approval and qualification documents.

Final Action: AS AM AMPC____ D

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# FS91-07/08

## 712.3.2

*Proposed Change as Submitted:*

**Proponent:** Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing In-O-Vate Technologies

**Revise as follows:**

**712.3.2 (Supp) 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 $m^2$) in 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 inch (3.1 mm). Such boxes on opposite sides of the wall or partition shall be separated by one of the following:
   1.1. By a horizontal distance of not less than 24 inches (610 mm);
   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 outlet boxes with listed putty pads; or
   1.5. By other listed materials and methods.
2. Membrane penetrations by listed electrical boxes of any material, provided such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm) unless listed otherwise. Such boxes on opposite sides of the wall or partition shall be separated 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 electrical boxes of any size or type, which have been listed as part of a wall opening protective material system for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.
4. Membrane penetrations by boxes other than electrical boxes provided such penetrating items and the annular space between the wall membrane and the box, are protected by an approved membrane penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water, and shall have an F ~~and T~~ rating of not less than the required fire-resistance rating of the wall penetrated and be installed in accordance with their listing.
5. The annular space created by the penetration of an automatic sprinkler, provided it is covered by a metal escutcheon plate.

**Reason:** During the last cycle, this section was modified. In the modification, a T rating requirement was added for the first time for penetrations of wall assemblies. The justification for the change was flawed by stating that this is already required. T ratings have only been required for floor/ceiling assembly penetrations, not wall penetrations. Section 712.3.1.2 currently only requires a F rating for a through penetration firestop system.

There is no justification for adding a T rating when an assembly only penetrates a membrane. If the penetration is completely through the wall assembly a T rating is not required. A complete through penetration presents a higher hazard than a membrane penetration. Hence, it is inappropriate to require a T rating for a membrane.

The F rating guarantees the integrity of the wall assembly to prevent the passage of flame. Furthermore, a hose stream test is applied at the end of the test to determine the wall's capabilities.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee indicated that the T-rating should be required for membrane penetrations under exception #4 to Section 712.3.2 because there is no size limitation or box type limitation on the penetrating items. Therefore, it is best to be conservative and leave the T-rating requirement in the exception.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment 1:*

**Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies requests Approval as Submitted.**

**Commenter's Reason:** The current 2006 IBC has no requirements for a T rating for wall penetrations. This was added in Rochester without justification.

Why should there be a T rating for boxes when there is no similar requirement for any other wall penetration? You can have a duct completely occupy a wall space, which is done all the time. Yet all that is required a fire damper. The damper would fail any test for T rating.

There are many large metallic pipes that penetrate a membrane, yet there is no T rating for such a penetration. So, again, why single out boxes.

The Firestop Council claimed that they would work with the proponent to come up with a reasonable alternative to always requiring a T rating. Yet, as the proponent, I have not heard from them to date.

If there is one fire death on record resulting from a breach of a penetration that had an F rating and no T rating, I will withdraw this change. However, there is no such occurrence on record. This change from Rochester was an attempt to solve a problem that doesn't exist.

*Public Comment 2:*

**Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies requests Approved as Modified by this public comment.**

Modify proposal as follows:

**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 m2) in area, provided the aggregate 100 square feet (9.29m2) of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm). Such boxes on opposite sides of the wall or partition shall be separated by one of the following:

1.1. By a horizontal distance of not less than 24 inches (610 mm);
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 outlet boxes with listed putty pads; or
1.5. By other listed materials and methods.

2. Membrane penetrations by listed electrical boxes of any material, provided such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm) unless listed otherwise. Such boxes on opposite sides of the wall or partition shall be separated 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 electrical boxes of any size or type, which have been listed as part of a wall opening protective material system for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.
4. Membrane penetrations by boxes 4 square feet or greater in area other than electrical boxes provided such penetrating items and the annular space between the wall membrane and the box, are protected by an approved membrane penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water, and shall have an F and T rating of not less than the required fire-resistance rating of the wall penetrated and be installed in accordance with their listing.
5. Membrane penetrations by boxes less than 4 square feet in area 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 rating of not less than the required fire-resistance rating of the wall penetrated and be installed in accordance with their listing.
6 ~~5~~. The annular space created by the penetration of an automatic sprinkler, provided it is covered by a metal escutcheon plate.

**Commenter's Reason:** At the first hearing, the Firestop Council claimed that a T rating was not justified for all size box penetrations, but they provide no size recommendation. Their concern was boxes that take up an entire wall penetration. Without any recommendation, I propose adding a 4 square foot limitation.

This limitation is arbitrary similar to the arbitrary requirement for a T rating for a box and no other membrane penetration. The Firestop Council claimed that they would work with the proponent to come up with a reasonable alternative to always requiring a T rating. Yet, as the proponent, I have not heard from them to date.

This modification is an alternative to accepting this change as approved as submitted.

Final Action: AS AM AMPC____ D

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# FS92-07/08
## 712.4.1.1

*Proposed Change as Submitted:*

**Proponent:** Tony Crimi, AC Consulting Solutions Inc., representing International Firestop Council

**Revise as follows:**

**712.4.1.1 (Supp) 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 which are capable of preventing the passage of flame, hot gases, and heat through and around the penetrating items in conformance with ASTM E119 temperature rise criteria, and are through a single fire-resistance-rated floor assembly where the annular space is protected with materials that prevent the passage of flame, heat, 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.
4. Penetrations contained and located within the cavity of a wall are not required to prevent the passage of heat in conformance with ASTM E119 temperature rise criteria.

**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.

The exceptions in Section 712.4.1 provide a generic allowance for the annular space between the steel, ferrous or copper pipes or steel conduits and fire-resistance rated floors, up to a maximum of 6-inch (152 mm) penetrant size, to be protected with concrete, grout or mortar installed at full thickness of the wall (or the thickness required to maintain the fire-resistance rating). It also provides for the option of using any material tested to prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 time-temperature fire conditions to be installed in the annular space.

One of the problems with the provisions in exceptions 1 & 2 is that they do not currently address the performance requirement for the penetrating item itself as part of the penetration system protecting the fire-resistance rating of the floor assembly. By comparison, 7.12.4.1.1.2 requires penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479 to have an F rating and a T rating of not less than 1 hour or the required rating of the floor penetrated unless the Floor penetrations are contained and located within the cavity of a wall

In previous cycles, attempts were made to introduce the same exception to the "T"-rating requirements that exists in 712.3.1, and 712.4.1 Exception 1 & 2 for walls and horizontal assemblies, into 7.12.4.1.1.2. This has been rejected by both the Committee and the assembly, even though the proposed new exception was not a new concept, but was contained in the National Building Code (1999) and the Standard Building Code (1999), and stipulated that these metallic penetrants not be in direct contact with combustible materials. 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, 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.

Since the steel, ferrous or copper pipes or steel conduits are identical in both provisions, it is obvious that the materials used to protect the annular space between the penetrants and the fire-resistance rated concrete or masonry floors cannot provide a T-rating for any substantial heat conductive metal objects that have been run as a continuous item through the floors. Grout or mortar cannot turn a heat conductive object into a non-conductive object, and the testing requirements used from ASTM E119 in this requirement do not include limiting the transfer of heat. Since proposals to waive the "T"-rating requirements for floor penetrations tested in accordance with ASTM E 814 or UL 1479 and consisting of either a pipe, tube, conduit or electrical conductor that are not in direct contact with combustible materials were not acceptable to either the Committee or the assembly, there is no rational for permitting such an exception in 7.12.4.1.1. Waiver of the shaft provisions of Section 707 makes sense if the penetration conforms to the F and T ratings described in 712.4.1.1.2, because it provides an equivalent performance level. However, not requiring these conductive penetrants to be insulated when installed or tested as described in Exceptions 1 & 2 of 7.12.4.1.1 permits unlimited lengths of these penetrants to be installed, even if in direct contact with combustible materials, without shaft or temperature rise protection.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee agreed that the additional language to exception #1 to Section 712.4.1.1 dealing with through penetrations created confusion by lengthening a sentence that is already too long and confusing.

**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 Approved as Modified by this public comment.**

**Modify proposal 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 ~~which are capable of preventing the passage of flame, hot gases, and heat through and around the penetrating items in conformance with ASTM E119 temperature rise criteria, and~~ through a single fire-resistance- rated floor assembly where the annular space is protected with materials that prevent the passage of flame~~, heat,~~ 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 mm2) in any 100 square feet (9.3 m2) 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 mm2)~~.~~ and the annular space is protected with concrete, grout or mortar installed the full thickness of the floor or the thickness required to 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.
3. Penetrations by listed electrical boxes of any material, provided such boxes have been tested for use infire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.
4. ~~Penetrations contained and located within the cavity of a wall are not required to prevent the passage of heat in conformance with ASTM E119 temperature rise criteria.~~

**Commenter's Reason:** The purpose of the code change is to provide greater consistency between the two exceptions 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. The exceptions in Section 712.4.1 provide a generic allowance for the annular space between the steel, ferrous or copper pipes or steel conduits and fire-resistance rated floors, up to a maximum of 6-inch (152 mm) penetrant size, to be protected with concrete, grout or mortar installed at full thickness of the wall (or the thickness required to maintain the fire-resistance rating). While Exception 1 provides for the option of using any material tested to prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 time-temperature fire conditions to be installed in the annular space, Exception 2 provides the same allowance without the same conditions.

In an effort to provide the Fire Safety Committee with sufficient information to quantify the amount of flames, heat and hot gases coming from these types of penetrations, 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, 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$^{o}$F in under 17 minutes, will reach temperatures in excess of 1160$^{o}$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$^{o}$F.

Since proposals to waive the "T"-rating requirements for floor penetrations tested in accordance with ASTM E 814 or UL 1479 and consisting of either a pipe, tube, conduit or electrical conductor that are not in direct contact with combustible materials were not acceptable to the Committee (or the Assembly in previous cycles), there is no rationale for permitting such an exception in 7.12.4.1.1. At a minimum, Exception 2 needs to include the same performance level as Exception 1 regarding preventing ignition of cotton waste. Not requiring these conductive penetrants to proved at least some minimal performance level when installed or tested as described in Exceptions 1 & 2 of 7.12.4.1.1 permits unlimited lengths of these penetrants to be installed, even if in direct contact with combustible materials, without shaft or temperature rise protection.

Final Action: AS AM AMPC____ D

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# FS95-07/08
## 712.4.1.1.2

*Proposed Change as Submitted:*

**Proponent:** John Valiulis, PE, Hilti, Inc.

**Revise 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.

**Exception:** Floor penetrations contained and located within the cavity of a wall above the floor or below the floor do not require a T- rating.

**Reason:** To clarify what types of installation conditions can prevent a floor through-penetration from getting unsafely hot in the event of a fire.

The normal requirement for firestopping of a penetration through a floor is for the firestop system to provide a T-rating that is equivalent to the F-rating, so as to prevent the penetrant from exceeding a temperature rise of 325 F on the unexposed (non-fire) side. This is normally accomplished by providing some amount of thermal insulation on the penetrating item.

It has long been generally recognized that if the penetrating item is concealed within a wall, then the conditions that can lead to an unsafe temperature rise in the penetrating item should not exist. This occurs due to two possible conditions:

1. The penetrating item is shielded from the fire below the floor by being contained within the cavity of a wall. This will prevent direct heat transfer from the fire to the penetrating item, thus allowing the temperature above the floor from rising as it would if the penetrating item was exposed to the fire.
2. The penetrating item is protected from accidentally igniting combustible contents in the space above the floor by being contained above the floor within the cavity of a wall.

Either will achieve the desired effect, either by keeping the penetrant from getting as hot as quickly, or by shielding an overheated penetrant from combustibles in the room above. The clarification to the exception is thus proposed to indicate that either option would accomplish the desired goal, albeit in a different way.

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

**Committee Action:** **Approved as Submitted**

**Committee Reason:** The committee recognized that if the penetrating item is concealed within a wall, then the conditions that can lead to an unsafe temperature rise in the penetrating item should not exist; therefore removing the requirement for a T-rating at these locations is reasonable.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment 1:*

**Vickie Lovell, InterCode Inc., representing 3M Company requests Approved 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.

Exception: ~~Floor penetrations contained and located within the cavity of a wall above the floor or below the floor do not require a T-rating.~~ Where a single fire resistance rated floor assembly is penetrated, and the penetration is enclosed within the cavity of a wall above or below the floor assembly at the point where the floor assembly is penetrated, a T rating is not required.

**Commenter's Reason:** By recommending approval on FS 95, the Fire Safety Committee made an interpretation of the application of an exception to a 1 hour T rating on penetrations through floors found in Section 712.4.1.1.2. Their interpretation merits a closer look, and an examination of the history of the T rating exception.

Before the development of the standard for through penetration firestops, building a fire resistive shaft was the only way to protect fire and smoke spread from floor to floor by way of utility penetrations for plumbing, electrical, communications, etc.

By the early 1990's, all three legacy codes adopted new code requirements that reflected the new technology of firestopping as a viable alternative to the construction of a shaft enclosure for the protection of penetrations, requiring both F and T ratings on penetrations through floors in accordance with ASTM E 814.

The first draft of the IBC mirrored the intent of the final editions of the legacy codes:

The 1997 Uniform Building Code stated in 710.2.1 that penetrations of fire-resistive horizontal assemblies shall be enclosed in a fire resistive shaft enclosure OR shall comply with the requirements for through penetration protection.

The 1996 National Building Code stated in 713.4 that all penetrations of a floor/ceiling or the ceiling of a roof ceiling assembly shall be protected by a shaft enclosure OR shall be permitted to be unenclosed by Section 714.1, which contained all the requirements for penetration protection. Section 714.2 the NBC also made the clarification the penetration protection was an alternative to a shaft enclosure.

The 1996 Standard Building Code stated in Section 715.6.1 that all penetrations of a floor, floor/ceiling, or the ceiling of a roof/ceiling assembly shall be protected by a shaft enclosure OR shall comply with Sections 715.6.1 through 705.6.4, which contained all the requirements for penetration protection.

The 2006 IBC carried the concept forward when in Section 712.4, where it says that penetrations through horizontal assemblies shall be protected by a shaft enclosure as described in Section 707, "Shaft Enclosures". As did the legacy codes, Section 707.2 Exception 3 of the 2006 IBC allows the same prescriptive alternatives to shaft construction for the protection of penetrations, and outlines those firestopping provisions in Section 714.

Therefore, the readers of those codes understood that in order to protection the integrity of the rating of the floor, the penetrations had to be protected with the same degree of fire protection as would have been provided by a shaft enclosure , which typically extend through two or more stories. Strict compliance with the construction of a shaft enclosure containing penetrations through multiple floors would not have allowed the condition that is described by FS 95, that is, exposed penetrations through multiple floors without either a T rating or the protection of shaft.

It is correct that the previous model codes allowed, under very specific conditions, certain types of pipes or conduit that penetrate a single floor to be less protected that pipes that penetrate multiple floors. P

Penetrations of multiple fire resistance rated floors were/are required to be protected with through penetration firestop systems that provide an F rating equal to the rating of the floor and a T rating of at least 1 hour. An exception in 712.4.1.1.2 allows penetrations that are "contained and located within the cavity of a wall" to be exempt from the T rating.

How then is the T rating exception that appeared in all the later legacy codes, and also appears in the IBC in Section 712.4.1.1.2 to be understood and applied?

Using the background understanding that the only alternative to this requirement would be to enclose the floor penetrations in a shaft, then the question as to whether the wall is on the top of the floor or below the floor is mute. The "wall" that is referred to in this exception is intended to completely enclose the penetration(s). The T rating exception was only intended to apply to through penetrations that are located within a wall cavity that is continuous, as in a shaft, and the penetration is protected by the enclosure that is both above and below the floor. If the penetration exits a shaft wall that is required to be fire resistance rated, it should be protected as a membrane penetration in accordance with 712.3

Therefore, we have provided a modification to clarify how this exception should be applied.

Where the penetration through fire resistance rated floor assemblies is connecting more than two stories, and the penetration is enclosed within the cavity of a wall both above and below the floor assembly, a T rating at the point where the floor assembly is penetrated may not be required.

If the penetration only penetrates a single floor, the T rating exception should be permitted to apply since there are other allowances in Section 712 for penetrations that only connect two stories, or where they are allowed to penetrate more than one floor with a very strict area limitations per floor. Where a pipe, tube, conduit or vent penetrates multiple fire resistance rated floor assemblies, the T rating requirements must apply.

This is the only interpretation that is consistent with the original intent of the codes dating back to the early 1990s when the exception was first introduced into the codes.

We therefore request that this modification be approved. If it fails to achieve the necessary 2/3s of the voting membership, then we request that this change by disapproved by the membership and the correct interpretation of the T rating exception be included in the 2009 IBC Commentary.

*Public Comment 2:*

## Brian Becker, Fire Trak Corp., requests Disapproval.

**Commenter's Reason:** This code change proposal creates unsafe conditions and diminishes the level of fire protection provided in the current codes.

The T-rating assures that for a given amount of time during a fire, a penetrant extending into an unexposed (non-fire) side will not rise more than 325$^{o}$ F above room temperature. Per the exception of section 712.4.1.1.2, floor penetrations do not require a T-rating if they are contained within the cavity of a wall. However, there is nothing in this code section which stipulates that the wall must be fire rated nor that openings, through-penetrations or joints are protected. Although the result is often a non-rated wall (with unprotected openings and joints) providing a limited degree of fire and heat protection, the existing code provides this protection at every floor level. The wall surrounding penetrants above a floor provides protection from fire and heat that enters into a wall cavity situated below the floor.

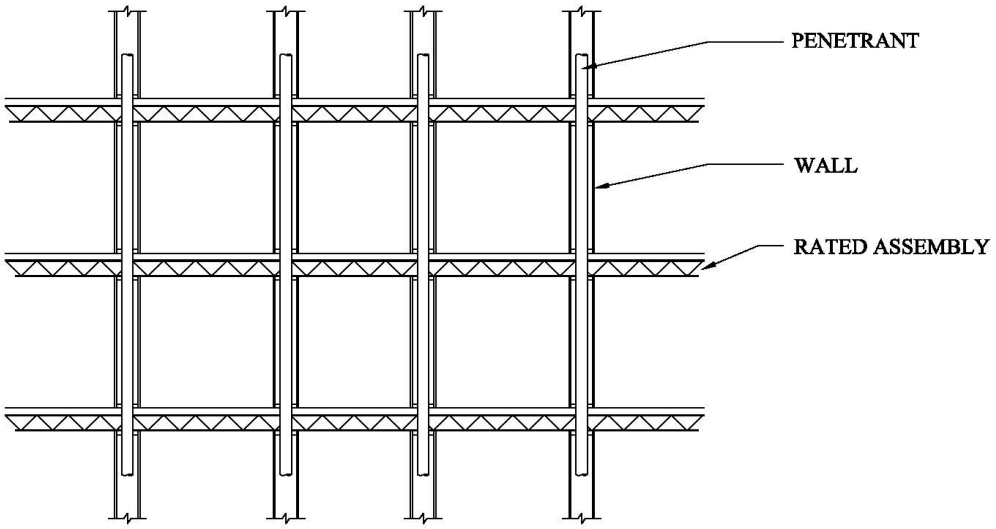
The proposed code change would diminish this protection by only requiring a wall on every other floor. Heat which enters the wall cavity on a lower floor during a fire will easily propagate and ignite combustibles on the floor above, since the upper protective wall is now missing. Without a wall above, there is no longer a barrier to prevent combustible materials (i.e., cardboard, paper, plastics) from being placed against or adjacent to hot penetrants. In addition, exposed penetrants are permitted to be of any material (i.e., copper, iron, steel, PVC, ABS, etc.) and of any size (i.e., 8", 24", 36").

In multi-story structures, this code change would lead to protective walls only being installed on alternate floors (refer to figure). An inspector would have to keep track of when there was a wall above or below a given floor – a laborious task when there are several floor levels and/or multiple penetrants.

Since this code proposal reduces the level of safety provided in the existing codes, please vote for disapproval.

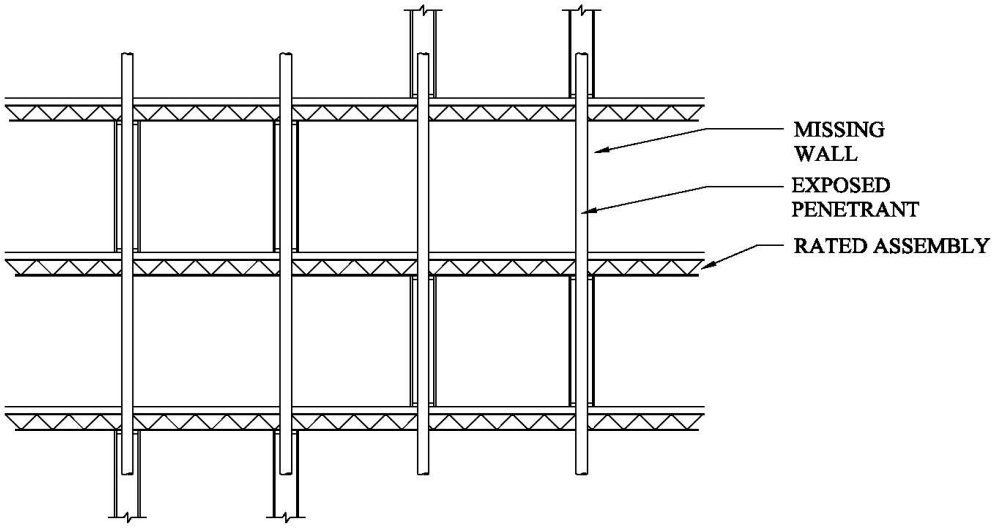
## LEVEL OF FIRE SAFETY PROVIDED IN CURRENT CODE

PENETRANTS ARE REQUIRED TO BE LOCATED IN WALLS
ON EVERY FLOOR OR COMPLY WITH T-RATING




## DIMINISHED LEVEL OF FIRE SAFETY PROVIDED BY PROPOSAL

PENETRANTS WOULD ONLY BE REQUIRED IN WALLS ON ALTERNATE FLOORS.
T-RATINGS WOULD NOT BE REQUIRED FOR THE EXPOSED PENETRANTS.




Final Action: AS AM AMPC____ D

# FS99-07/08
## 712.5

*Proposed Change as Submitted:*

**Proponent:** John Williams, Washington State Department of Health, Construction Review Services, representing Washington Association of Building Officials, Technical Code Development Committee

**Revise as follows:**

**712.5 Penetrations in smoke barriers.** Penetrations in smoke barriers shall be tested in accordance with the requirements of UL 1479 for air leakage~~. The air leakage rate of the penetration assembly shall not exceed 5.0 cfm per square foot (0.025$m^3$ / s • $m^2$) of penetration opening at 0.30 inch ( 7.47 Pa) of water for both the ambient temperature and elevated temperature tests.~~

**Reason:** To delete the requirement for an individual penetration of a smoke barrier to comply with 5 cfm/sq ft. The 5 cfm/sq ft value imposes a restriction on an individual opening rather than minimizing the total smoke leakage within a given area. Thus, it does not significantly improve life safety and only serves to raise the cost of construction.

The Standard, UL 1479 includes an optional air leakage test to determine how well a particular opening is sealed against particulate air and smoke. While in principle it is a good idea to be cognizant of air leakage, this code requirement does not make buildings safer because the method used to report air leakage is flawed.

Reporting air leakage by expressing it in terms of cfm/sq ft is not the actual leakage through the opening. This allows the test to be manipulated to comply with the 5 cfm/sq ft value while at the same time not reducing the air leakage through the opening.

Air leakage occurs within unsealed space within a given opening. In the case of grouped electrical or communications cabling, it represents the interstitial space between each cable within the bundle. In other words, the cables typically do not nest tightly enough to prevent leakage from occurring within the bundle itself. Using caulk to provide a seal around the bundle will provide a near hermetic seal around the bundle, but it will not reduce the leakage through the interstitial space within the bundle. Therefore, the leakage within the bundle is a constant. To mathematically show the flaw in expressing leakage in terms of cubic feet per minute per square foot, please see the examples below:

Consider a 4" diameter cable bundle passes through a 0.5 sq ft opening and the actual leakage is 4.9 cfm - expressed in cfm/sq ft, the leakage would be 9.8 cfm/sq ft (4.9/0.5=9.8).

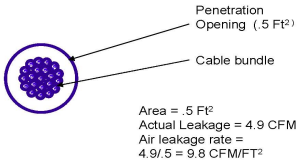
However, if the same 4" diameter cable bundle passes instead through a 2.5 sq ft opening, the interstitial (i.e. unsealed) space within the bundle does not change, so the actual leakage is still 4.9. However, dividing 4.9 by 2.5 will yield a leakage rating of 1.96 cfm/sq ft (4.9/2.5=1.96). The 2 cfm/sq ft value complies with the requirements of Section 712.5 yet the leakage remains the same.

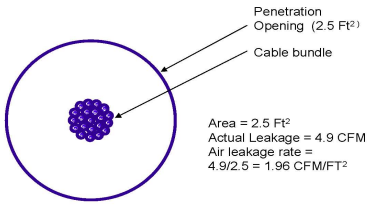
The easy way to make a system pass is to increase the size of the opening. It is not improving life safety because the actual leakage has not been reduced despite the fact that the design listing may state that it provides an L Rating of 5 cfm/sq ft or less. Additionally, most third party laboratories list opening sizes in terms of a "maximum", but they do not specify a minimum opening size. Therefore, a design listing with a published L Rating less than 5 cfm/sq ft may actually provide false comfort since the same grouped penetrant bundle installed through a smaller opening will have a computed L Rating above 5 cfm/sq ft when tested despite the fact that the design listing permits the installation in smaller openings by specifying a maximum opening size without restricting the minimum size.

Finally, limiting an individual opening to 5 cfm/sq ft, but not capping the aggregate may encourage the practice of simply making more small openings that do comply with 5 cfm/sq ft to simply get the same volume of building services into a given area. If a group of air conditioning line sets has an L Rating greater than 5 cfm/sq ft, simply splitting the bundle into two openings may in fact allow each individual bundle to comply with 5 cfm/sq ft, but if you calculate the interstitial space, the actual leakage doesn't change. This has the effect of weakening the wall overall.

Section 712.5 as presently written in the 2006 IBC may actually have a negative impact on life safety by compromising the performance of the assembly by promoting the concept of creating larger openings or a series of smaller openings. The 5 cfm/sq ft value was prematurely added to the codes. It should be struck until such time that reporting methods improve or a better methodology for evaluating leakage through a smoke barrier can be developed.

I am not averse to leaving a reference to the air leakage tests of UL 1479 in the code for now provided that the value is eliminated. It plays up the importance of looking for tested systems, while not mandating a specific value that is arbitrary and subject to exploitation of present testing and reporting methods.




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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee felt that criteria for testing of penetrations through smoke barriers in accordance with UL 1479 were needed and should not simply be deleted; this would create a hole in the code.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment:*

**Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council and Bob Eugene, Underwriters Laboratories Inc. request Approved as Modified by this public comment.**

**Modify proposal as follows:**

**712.5 Penetrations in smoke barriers.** Penetrations in smoke barriers shall be tested in accordance with the requirements of UL 1479 for air leakage. The air leakage rate of the penetration assemblies measured at 0.30 inch (7.47 Pa) of water in both the ambient temperature and elevated temperature tests, shall not exceed:

1. 5.0 cfm per square foot (0.025$m^3$ / s-$m^2$ ) of penetration opening for each through-penetration firestop system, or,
2. A total cumulative leakage of 50 cfm for any 100 square feet of wall area, or floor area.

**Commenter's Reason: (Crimi)** There is a need to better define and quantify the performance of Smoke Barriers & Smoke Partitions with respect to their ability to prevent smoke from migrating across them in a fire situation. The existing language in 712.5 of the IBC is a means of providing some minimal level of performance for the through penetrations. The current language has the potential to be manipulated to make the requirement ineffective because the 5 cfm/sq ft value imposes a restriction on an individual opening rather than restricting the total smoke leakage within a given area. To better specify the limits for smoke leakage of through penetrations in Smoke Barriers it is more reasonable to require a total smoke barrier performance level per 100 $ft^2$ (for example) in addition to dealing with individual items. By doing that, it would be possible to be more flexible with the individual penetrations, but more comprehensive on the smoke barrier leakage performance.

**Justification:** This proposed Code change is intended to clarify and improve the Code regarding the requirements for smoke leakage through penetrations in smoke barriers. This proposal would retain the existing 5 cfm/$ft^2$ for individual through penetrations as one option, but would allow a new alternative requirement for the cumulative total leakage of all through-penetrations in a smoke barrier. The 50 cfm suggested here is based on two approaches:

1. A very simplistic approach of a theoretical maximum of 10 through penetrations @ max allowed 5 cfm/$ft^2$ in 100 $ft^2$ of wall or floor area.
2. Section 909.5 permits 1 sq ft of leakage area per 1000 sq feet of wall space. Based on some fundamental assumptions about anticipated pressure differentials during fires, the cumulative value of 50 cfm per 100 $ft^2$ proposed also represents approximately 50% of that permitted leakage.

Consequently, if the L-rating of a particular system being used is less than the maximum of 5 cfm/ft$^2$, then more through-penetrations could be installed in the same 100 ft$^2$ of wall area. Alternatively, an individual through-penetration could be greater than 5 cfm/ft$^2$ if the total for the 100 ft$^2$ of wall or floor area does not exceed the 50 cfm cumulative value.

Section 715.4.3.1 of the IBC currently includes requirements for leakage rated smoke and draft control doors in corridors and smoke barriers. In addition to these individual limits, the IBC has effectively already established a cumulative level of smoke leakage through these doors in Chapter 10 by identifying the required number of openings for exits and exit access. In addition, Section 705.8 limits the aggregate width of openings at any floor level in a Fire Wall to 25% of the length of the wall. Similarly, Section 706.7 also limits the maximum aggregate width of openings to 25% for Fire Barriers.

For smoke and draft control doors, the IBC contains limits requires the addition of 3.0 cfm/sq ft for each door within the 100 sq ft area (measured at 0.1 in of water column), since that its the limit for smoke and draft control doors in UL 1784 and NFPA 105. The value for leakage through penetrations is actually identical to the leakage rating of smoke and draft control doors in smoke barriers, since 3 cfm/ft$^2$ measured at 0.1 in of water column is equivalent to 5.2 cfm/ft$^2$ at 0.3 inches of water.

**Commenter's Reason: (Eugene)** The original proponent pointed out some valid issues relating to the current code provisions relating penetration of smoke barriers. However, deleting the quantitative requirements entirely will leave an unenforceable provision in the code. As such, this public comment is intended to present a solution to the issues brought up by the original proponent.

This proposal suggests two either/or requirements to the air leakage requirements. First, it suggests the current limit of 5.0 cfm per square foot of penetration opening be maintained. Second, it suggests an absolute limit of permissible smoke leakage per 100 sq ft of wall or floor area. The 50 cfm leakage was selected as a reasonable compromise based to the performance of systems published in the UL Fire Resistance Directory.

Final Action: AS AM AMPC____ D

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# FS105-07/08
## 713.2

*Proposed Change as Submitted:*

**Proponent:** Bill McHugh, Firestop Contractors International Association

**1. Revise as follows:**

**SECTION 713**
**FIRE RESISTANT JOINT SYSTEMS**

**713.2 Installation.** Fire-resistant joint systems shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases, installed by contractors certified by an approved agency for such installations.

**Reason:** Firestopping the various types of joints from expansion, to tops of fire resistance rated walls, and building perimeters is a vital part of effective compartmentation. Firestopping is a very technical industry, requiring technical knowledge of the firm to analyze conditions on construction documents and in the field, select the firestop system that matches the construction documents and / or field conditions and install to zero-tolerance parameters of the firestop design as tested. There are firestop installation processes that outline requirements for firestop systems installation and are administered by approved agencies such as FM Approvals and Underwriters Laboratories. Any contractor can be approved or qualified to the programs administered by these agencies.

Firestopping by a contractor firm who has been approved or qualified means that the firm provides audit tested fire and life safety through:

-Designated Responsible Individual – who has passed an industry exam based on the Firestop Contractors International Association's Firestop Industry Manual of Practice, FM Standard FM 4991, Standard for the Approval of Firestop Contractors, and / or the UL Qualified Firestop Contractor Program requirements.

-Quality Audits – The process to install firestopping is very technical, and needs attention to detail. The specialty firestop contractor firm, or trade contractor firm has their quality manual audited and approved or qualified by an auditor from either FM Approvals or Underwriters Laboratories to be recognized by the approved agency.

Firestopping is a vital part of effective compartmentation. When installation is not performed correctly, it can cause delays of certificate of occupancy, reducing building owners' revenue generating time. Firestopping installation is a process that is knowledge sensitive, and uses small sized materials, that can be delivered or drop shipped directly to the project site. It is lightweight and not sensitive to huge freight costs.

There is already a pool of contractor firms who have been approved or qualified. Visit http://www.fcia.org to view these firms, who service the whole country as well as international locations.

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

**Committee Action:** **Disapproved**

**Committee Reason:** Consistent with FS83-07/08, the committee felt that it was unreasonable for a code official to verify that a contractor is certified.

**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 Approved as Modified by this public comment.**

**Modify proposal as follows:**

**713.2 Installation.** Fire-resistant joint systems shall be securely installed in or on the joint for it's entire length so as not to dislodge, loosen, or otherwise impair its' ability to accommodate expected building movements and to resist the passage of fire and hot gasses, installed by contractors certified by an approved agency ~~for such installations~~.

**Commenter's Reason:** This public comment addresses installation of these firestop systems to zero-tolerance parameters of the classified and listed firestop design. If the system is not installed to the parameters in the design, the 'system' may or may not work when called upon by fire.

Firestopping is a vital part of effective compartmentation that is fire resistance rated and or smoke resistant. Firestopping is a highly technical industry, requiring specialized knowledge at the firestop contracting firm to analyze conditions on construction documents and / or in the field, select the appropriate firestop system(s) from UL, FM, Intertek / Omega Point Laboratories and other directories, then match the systems to types of joints, Walltop, Expansion or Control, or Building Perimeter Fire Containment Systems. Proper Design, Installation, Inspection and Maintenance of all types of Firestop Systems is critical to fire and life safety.

Whether it is penetration or joint firestopping, the application is highly technical, requiring specialized knowledge at the firestop contracting firm to analyze conditions on construction documents and / or in the field, select the appropriate firestop system(s) from UL, FM, Intertek and other directories that match the joint sizes and types. Then installation of these firestop systems to zero-tolerance parameters of the classified and listed firestop design is critical to fire and life safety. If the system is not installed to the parameters in the design, the system' may or may not work when called upon by fire.

There is an approval or qualification process administered by approved agencies such as FM Approvals and Underwriters Laboratories for contractors who install materials that become firestop systems. Any contractor (trade or specialty firestop contractor) installing firestop systems can be approved or qualified to the programs administered by these agencies. Any firm is eligible, with costs ranging from $3000 to $7000 for the initial audit and about $2500-$3000 annually for ongoing audits by UL & FM. The cost is less than many contractors would spend on advertising in the "Blue Book".

Firestopping by a contractor firm who has been approved or qualified means that the firm has the processes in place in the company culture to handle the zero tolerance installation program needed for firestop systems for fire and life safety. The audits by FM & UL test the company's ability to install fire and life safety through penetration firestop systems to these requirements, through extensive review of the company procedures. Here's a summary of what it takes for a contractor to become FM 4991 Approved and / or UL Qualified:

-Designated Responsible Individual (DRI) – Each firm employs a DRI who has passed an industry exam based on the Firestop Contractors International Association's Firestop Industry Manual of Practice, FM Standard FM 4991, Standard for the Approval of Firestop Contractors, and / or the UL Qualified Firestop Contractor Program requirements, as well as selection of firestop systems from directories matched to field conditions.

-Quality Audits – FM & UL then audit the firestop processes of the company:

--Initial Audit - The process to install firestopping is very technical, and needs attention to detail. The specialty firestop contractor firm or trade contractor firm has their company quality manual audited and approved or qualified by an auditor from either FM Approvals or Underwriters Laboratories to be recognized by the approved agency as a 'certified contractor'. This is a very robust, truly independent inspection of the contractor's firestop systems selection, submittal, and installation and inspection processes by FM & UL Auditors. Auditors also visit a project site to verify that the procedures are actually in place throughout the company.

--Annual Audit – FM and or UL visit the firm to review the company's procedures annually to verify continued compliance to the FM 4991 Standard or UL Qualified Firestop Contractor Program. These visits are key to continued success of the firm's quality management system.

Firestopping is a vital part of effective compartmentation. When installation is not performed correctly, it can cause delays of certificate of occupancy, reducing building owners' revenue streams and create a fire and life safety risk. FM Approved and UL Qualified Firestop Contractors can help protect this risk through a company culture that has embraced the quality management system culture, just as building departments have through ICC and other rating organizations.

Firestopping installation is a process that is knowledge sensitive, and requires a firm that has the quality management systems culture ingrained in it's operations and, more importantly, it's people. Plus, the production of the quality assurance manual at the company helps them gather important insight into company operations through self assessment followed up by a full audit by a credible, independent organization, FM & UL.

There are many contractor firms who have been approved or qualified, that cover most of the US, Dubai, with many more in process throughout the world. Since firestopping is lightweight, and knowledge travels, so too can FM Approved and UL Qualified Firestop Contractor Firms travel to serve local needs competitively. For more information, visit http://www.fcia.org to view Specialty Firestop Contractor Firms who have become Approved or Qualified, and see the approval and qualification documents.

Final Action: AS AM AMPC____ D

# FS110-07/08
**713.4**

*Proposed Change as Submitted:*

**Proponent:** Tony Crimi, AC Consulting Solutions Inc, representing North American Insulation Manufacturers' Association (NAIMA) and International Firestop Council

**Revise as follows:**

**713.4 (Supp) 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~~ and tested in accordance with ASTM E 2307 to prevent the passage of flame for the time period at least equal to the fire-resistance rating of the floor assembly and prevent the passage of heat and hot gases sufficient to ignite cotton waste. Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 704.9.

**Reason #1: (NAIMA)** To require perimeter fire barrier joint protection systems to be tested to confirm with ASTM Standard E2307 for determining Fire Resistance of Perimeter Fire Barrier Systems rather than continue to permit the outdated reference to ASTM E119.

Perimeter fire barrier systems are unique building construction details not specifically addressed by other fire test methods. The ASTM E2307 test method specifies criteria and methods to be used to determine the fire resistance of perimeter fire barrier systems. Reference to the existing provisions for testing in accordance with ASTM E119, under the conditions stipulated in IBC Section 713.4, was originally retained in order to allow Code users and manufacturers sufficient time to transition to the new test method. At this point, there is no reason to continue to do so.

Perimeter fire barrier systems are unique building construction details not specifically addressed by other fire test methods. ASTM Committee E5 completed the development of ASTM E2307 *Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus* in March of 2004. A perimeter fire barrier system is the perimeter joint protection installed in the space between an exterior wall assembly and a floor assembly. Section 713.4 of the IBC currently addresses these exterior wall and floor intersections by requiring materials or systems to be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 time-temperature fire conditions under a specified minimum positive pressure. However, the ASTM E2307 Standard is clear in identifying that the perimeter fire barrier protection respresents a complete system made of numerous material components. Reference to "materials" is not correct or appropriate.

The test method specifies criteria and methods to be used to determine the fire resistance of perimeter fire barrier systems using the intermediate-scale, multistory test apparatus (ISMA). The use of the multi-story test apparatus and this test method are specifically intended to simulate a possible fire exposure on a perimeter fire barrier system. Consequently, this new test method specifies the fire exposure conditions, methods of test, and criteria for evaluation of the ability of a perimeter fire barrier system to maintain the fire resistance where a floor and exterior wall assembly intersect to a create a perimeter joint. The fire exposure used is that specified by the test method for the first 30 min of exposure, and then conforms to the Test Methods E 119 time-temperature curve for the remainder of the test in the test room.

ASTM 2307 measures the performance of the perimeter fire barrier system and its ability to maintain a seal to prevent fire spread during the deflection and deformation of the exterior wall assembly and floor assembly expected during a fire condition, while resisting fire exposure from both an interior compartment and from the flame plume emitted from a window burner below. The end point of the fire resistance test is the period of time elapsing before the first condition of compliance is reached as the perimeter fire barrier system is subjected to the time-temperature fire exposure. Having developed this test method, reference to the existing provisions for testing in accordance with ASTM E119, under the conditions stipulated in IBC Section 713.4, should be deleted as the IBC has allow Code users and manufacturers sufficient time to transition to the new test method.

**Reason #2: (International Fire Stop Council)** To require perimeter fire barrier joint systems to be tested to confirm with ASTM Standard E2307 for determining Fire Resistance of Perimeter Fire Barrier Systems rather than continue to permit the outdated reference to ASTM E119.

Perimeter fire barrier systems are unique building construction details not specifically addressed by other fire test methods. The ASTM E2307 test method specifies criteria and methods to be used to determine the fire resistance of perimeter fire barrier systems. Reference to the existing provisions for testing in accordance with ASTM E119, under the conditions stipulated in IBC Section 713.4, was originally retained in order to allow Code users and manufacturers sufficient time to transition to the new test method. At this point, there is no reason to continue to do so.

ASTM Committee E5 completed the development of ASTM E2307 *Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus* in March of 2004. A perimeter fire barrier system is the perimeter joint protection installed in the space between an exterior wall assembly and a floor assembly. Section 713.4 of the IBC currently addresses these exterior wall and floor intersections by requiring such materials or systems to be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 time-temperature fire conditions under a specified minimum positive pressure.

Perimeter fire barrier systems are unique building construction details not specifically addressed by other fire test methods. The test method specifies criteria and methods to be used to determine the fire resistance of perimeter fire barrier systems using the intermediate-scale, multistory test apparatus (ISMA). The use of the multi-story test apparatus and this test method are specifically intended to simulate a possible fire exposure on a perimeter fire barrier system. Consequently, this new test method specifies the fire exposure conditions, methods of test, and criteria for evaluation of the ability of a perimeter fire barrier system to maintain the fire resistance where a floor and exterior wall assembly intersect to a create a perimeter joint. The fire exposure used is that specified by the test method for the first 30 min

of exposure, and then conforms to the Test Methods E 119 time-temperature curve for the remainder of the test in the test room. ASTM 2307 measures the performance of the perimeter fire barrier system and its ability to maintain a seal to prevent fire spread during the deflection and deformation of the exterior wall assembly and floor assembly expected during a fire condition, while resisting fire exposure from both an interior compartment and from the flame plume emitted from a window burner below. The end point of the fire resistance test is the period of time elapsing before the first condition of compliance is reached as the perimeter fire barrier system is subjected to the time-temperature fire exposure. Having developed this test method, reference to the existing provisions for testing in accordance with ASTM E119, under the conditions stipulated in IBC Section 713.4, should be deleted as the IBC has allow Code users and manufacturers sufficient time to transition to the new test method.

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

**Committee Action:** **Approved as Submitted**

**Committee Reason:** The committee agreed that the single applicable standard to test exterior curtain wall and floor intersections is ASTM E2307. This standard, unlike ASTM E119 and UL 263, addresses the unique construction details associated with exterior curtain wall and floor intersections.

**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 Alcan Composites USA, Inc., requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**713.4 (Supp) 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 protected by ~~sealed with~~ an approved perimeter fire barrier designed to resist ~~system to prevent~~ the interior spread of fire and hot gases between stories. ~~Such systems~~ The perimeter fire barrier shall be ~~securely installed and~~ tested in accordance with ASTM E2307 ~~to prevent the passage of flame~~ for the time period at least equal to the fire-resistance rating of the floor assembly ~~and prevent the passage of heat and hot gases sufficient to ignite cotton waste~~.

**713.4.1 Installation.** The perimeter fire barrier shall be securely installed so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases.

**713.4.2 Curtain wall spandrels.** Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 704.9.

**Add new definition as follows:**

**702.1 Definitions.**

**PERIMETER FIRE BARRIER.** The perimeter joint protection installed between the exterior curtain wall assembly and the floor assembly to resist the passage of fire and hot gases between stories within the building at the voids created at the intersection of the exterior curtain wall assembly and the floor assembly.

**Commenter's Reason:** Now that the Committee has revised this section to eliminate the alternate method of testing which was utilized prior to the development of ASTM E2307 so that the protection of the voids created at the intersection of exterior curtain wall assemblies and floor assemblies is required to be tested in accordance with ASTM E2307, we believe it is appropriate to further revise this section to clarify that fact. Therefore, we have deleted some of the unnecessary terminology since that is already covered within the test method itself or within the definition for "perimeter fire barrier" which we are also including as a part of this Public Comment.

The definition for "perimeter fire barrier" is similar to that contained in ASTM E2307 and is the term contained in the title of the standard which is "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus." So we have incorporated the term "perimeter fire barrier" within this Public Comment to make it very clear what protection the section prescribes based on tests conducted in accordance with ASTM E2307. Some of the other terminology we have substituted parallels that in Section 713.1 General for fire-resistant joint systems so that they are consistent since this is also a subsection of Section 713 Fire-Resistant Joint Systems.

We have also reformatted Section 713.4 and subdivided it into two additional subsections. Subsection 713.4.1 specifically deals with the installation of the perimeter fire barrier and utilizes terminology based on Section 713.2 Installation for fire-resistant joint systems for consistency. Subsection 713.4.2 is simply the last sentence of Section 713.4. We believe that this will provide for better clarity, interpretation, and enforcement of these provisions for exterior curtain wall/floor intersection protection utilizing perimeter fire barriers.

In summary, no technical changes have been made to this section. It has simply been editorially revised to be consistent with the referenced test method ASTM E2307 and the similar requirements in Section 713 for fire-resistant joint systems of which this Section 713.4 is a subsection.

Final Action: AS AM AMPC____ D

# FS111-07/08
## 713.4.1 (New)

*Proposed Change as Submitted:*

**Proponent:** Tony Crimi, AC Consulting Solutions Inc, representing North American Insulation Manufacturers' Association (NAIMA)

**Add new text as follows:**

**713.4.1 Exterior curtain wall and non fire-resistance rated floor assembly intersections.** Voids created at the intersection of exterior curtain wall assemblies and non fire-resistance-rated floor or floor/ceiling assemblies shall be sealed with an approved material or system to prevent the interior spread of fire and the free passage of heat and hot gases.

**Reason:** To require some minimal level of protection of the void spaces located at the perimeter of a building between non-fire-resistance rated floor assemblies and exterior walls or curtain walls. This proposal would treat perimeter openings similar to the way in which Ducts and Penetration through non fire resistance rated horizontal assemblies are currently handled in the IBC.

Section 713.4 addresses the perimeter fire barrier joint for cases were the floor assemblies have a fire resistance rating. However, there is still a need to prevent the free passage of flame, heat and hot gases at the voids created around the perimeter of a floor assembly, even if the floor is not fire resistance rated. Reference to the existing provisions for testing in accordance with ASTM E2307 or ASTM E E119 in IBC Section 713.4, is not applicable to unrated floor assemblies.

The provisions of IBC Section 713.4 only apply to cases where fire resistance-rated floor or floor/ceiling assemblies are required. However, the risk of spread of flames, smoke, heat, and hot gases through the voids created at the intersection of the exterior curtain wall assemblies and unrated floor assemblies still exist. This proposed change is consistence with sections 716.6.3 dealing with Ducts through non fire resistance rated floor assemblies, and 712.4.2 the treatment of penetrations through non fire resistance rated floor assemblies. Both of these sections require the annular space around the penetrating duct to be protected with an approved noncombustible material that resists the free passage of flame and the products of combustion.

There are numerous examples of severe fires spreading through unprotected perimeter gaps created at the zone of interface between an exterior curtain walls and floor or floor/ceiling assemblies. Most notable among these are the First Interstate Bank Tower fire in Los Angeles in 1988 in which lack of any protection around the perimeter of the floor assemblies led to rapid spread of fire and smoke.

This code change proposal will add performance language which will provide minimum protection for these conditions by requiring some type of noncombustible material to be installed to prevent the interior spread of fire and the free passage of heat and hot gases.

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

**Committee Action:** **Approved as Modified**

**Modify proposal as follows:**

**713.4.1 Exterior curtain wall and non fire-resistance rated floor assembly intersections.** Voids created at the intersection of exterior curtain wall assemblies and non fire-resistance-rated floor or floor/ceiling assemblies shall be sealed with an approved material or system to resist ~~prevent~~ the interior spread of fire and the free passage of heat and hot gases.

**Committee Reason:** The committee agreed that this type of protection is commonly provided and a typical construction practice; therefore adding the requirement to the code is appropriate and will be useful for the code official for enforcement purposes. The modification to replace the word "prevent" with "resist" seemed to be more appropriate based on the intent of the requirements.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Rick Thornberry, The Code Consortium, Inc., representing Alcan Composites USA, Inc. requests Approval as Modified by this public comment.**

**Further modify proposal as follows:**

**713.4.1 Exterior curtain wall ~~&~~/non fire-resistance rated floor assembly intersection~~s~~.** Voids created at the intersection of exterior curtain wall assemblies and non fire-resistance-rated floor or floor/ceiling assemblies shall be sealed with an approved material or system to ~~resist~~ retard the interior spread of fire ~~and the free passage of heat~~ and hot gases between stories.

**Commenter's Reason:** The purpose of this Public Comment is to further clarify this new section for the protection of the voids created at the intersection of exterior curtain wall assemblies and non-fire-resistance rated floor assemblies. The revisions to the title of the subsection are proposed to be consistent with the title of Section 713.4 and are strictly editorial. Editorial revisions have also been made to the text of the subsection to be consistent with the text in Section 717.2.1 Fireblocking Materials. And the text has been further modified to indicate that the purpose of the protection of the void at the intersection is to retard the interior spread of fire between stories. We believe these revisions are appropriate since this type of protection for nonrated types of construction is similar in concept to fireblocking in combustible construction.

Final Action: AS AM AMPC____ D

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# FS115-07/08, Part I

## 704.8.1, 714.1, 714.1.1, 714.1.2, 714.4, 714.2, 714.2.1, 714.3, 714.6

*Proposed Change as Submitted:*

**Proponent:** Philip Brazil, PE, Reid Middleton, Inc., representing himself

**PART I – IBC FIRE SAFETY**

**Revise as follows:**

**704.8.1 (Supp) 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 first story above grade either:
   1.1. Where the wall faces a street and has a fire separation distance of more than 15 feet (4572 mm); or
   1.2. Where the wall faces 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*.
2. Buildings whose exterior bearing walls, exterior nonbearing walls and exterior primary structural frame are not required to be fire-resistance rated shall be permitted to have unlimited unprotected openings.

**714.1 (Supp) 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 ratings required for the fire-resistance-rated assemblies supported by the structural members.

**Exception**: Fire barriers, fire partitions, smoke barriers and horizontal assemblies as provided in Sections 706.5, 708.4, 709.4 and 711.4, respectively.

**714.1.1 (Supp) Primary structural frame.** The primary structural frame shall ~~be~~ include all of the following structural members:

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 and spandels;
3. Members of the floor construction and roof construction having direct connections to the columns; and
4. Bracing members designed to carry gravity loads.

~~**714.2**~~ **714.1.2 (Supp) Secondary members.** The following structural members ~~of floor or roof construction that are not connected to the columns~~ shall be considered secondary members and not part of the primary structural frame:

1. Structural members not having direct connections to the columns;
2. Members of the floor construction not having direct connections to the columns; and
3. Bracing members not designed to carry gravity loads.

~~714.4~~ **714.2 (Supp) Column protection.** Where columns are required to be fire-resistance rated, the entire column, ~~including its connections to beams or girders,~~ shall be provided individual encasement protection by protecting it on all sides for the full column length, including connections to other structural members, with materials having the required fire-resistance rating. Where the column extends through a ceiling, the ~~fire resistance rating of the column~~ encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

~~714.2~~ **714.3 (Supp) ~~Individual encasement protection~~ Protection of the primary structural frame other than columns.** ~~Girders, trusses, beams, lintels or other structural~~ Members of the primary structural frame other than columns 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~~ provided individual encasement protection by protecting them on all sides for ~~the~~ their full length, including connections to other structural members, with materials having the required fire resistance rating.

> **Exception:** Individual encasement protection on all sides shall be permitted on all exposed sides provided the extent of protection is in accordance with the required fire-resistance rating, as determined in Section 703.

~~714.2.1~~ **714.4 (Supp) ~~Alternative~~ Protection of secondary members.** ~~The structural~~ Secondary 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~~ shall be protected by individual encasement protection, 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~~ **714.4.1 (Supp) ~~Membrane protection~~ Light-frame construction.** King studs and boundary elements that are integral elements in load-bearing walls of light-frame~~d~~ construction shall be permitted to have required fire-resistance ratings provided by the membrane protection provided for the load-bearing wall.

(Renumber Sections 714.2.3-714.2.5 as Sections 714.5-714.7, and Sections 714.3-714.5 as Sections 714.8-714.10)

~~714.6~~ **714.11 Bottom flange protection.** Fire protection is not required at the bottom flange of lintels, shelf angles and plates, spanning not more than 6 feet (1829 mm) whether part of the primary structural frame or not, and from the bottom flange of lintels, shelf angles and plates not part of the primary structural frame, regardless of span.

(Renumber subsequent sections)

**Reason:** The purpose for this proposal is to make the provisions approved by Proposal FS98-06/07-AS more technically sound and to improve coordination with other provisions of the IBC. Reference to "columns, girders and trusses" in the item under "Building Element" for primary structural frame" in 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.

In Section 714.1, "and assemblies" is deleted because the subject of Section 714.1 is structural members, not assemblies, which implies floor, roof or wall assemblies. The other revisions are editorial. Note that "structural member" is not currently defined in the IBC.

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 primary structural frame. The current language implies that, in addition to columns and bracing members designed to carry gravity loads, only girders, beams, trusses and spandrels having direct connections to the columns are part of the primary structural frame. The intent, however, is that, in addition to columns, all structural members having direct connections to the columns, including structural members of the floor construction and roof construction and bracing members that are designed to carry gravity loads, are part of the primary structural frame. The listing of girders, beams, trusses and spandrels in Section 714.1.1 should be viewed as examples of such structural members.

Section 714.1.1 is also revised to specify all members of the primary structural frame as structural members. This revision makes it clear that bracing members are structural members and reduces questions over the scope of Section 714.1, which specifies structural members but not bracing members. Structural members of the floor construction and roof construction having direct connections to the columns are also identified as members of the primary structural frame. This revision correlates Section 714.1.1 with Section 714.1.2 on secondary members, which specifies members of the floor construction and roof construction not connected to columns.

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. The current language also creates a gap between what structural members are considered part of the primary structural frame and what are considered secondary members. This gap consists of a third group of structural members that are neither part of the primary structural frame nor secondary members. Section 714.1.2 is revised to close this gap by clearly specifying what structural members are secondary members, including structural members not having direct connections to the columns as structural members and bracing members not designed to carry gravity loads.

Also in Section 714.1.2, members of the floor or roof construction "not connected" to the columns is changed to "not having direct connections" to the columns to make it clear that structural members indirectly connected via supporting beams or girders that are directly connected to the columns are not intended to be members of the primary structural frame. Note that horizontal bracing members typically are part of the floor or roof construction. The format of Section 714.1.2 is revised to specify individual items in the same manner as Section 714.1.1.

In conjunction with the proposed changes to Section 714.1.2, secondary members are added to the listings of floor construction and roof construction in Table 601 along with references to Sections 714.1.1 and 714.1.2 in the same manner as the listing for primary structural frame. With the approval of FS98-06/07, secondary members become a distinct type of building element and should be specified in Table 601 along with primary structural frame.

The order of the technical provisions in Section 714 is revised. The primary structural frame consists of the columns with the most restrictive technical provisions (Section 714.4), other members of the primary structural frame with technical provisions that are less restrictive than columns (Section 714.3), and secondary members with technical provisions that are less restrictive than the primary structural frame (Section 714.2.1). These sections are rearranged beginning with the most restrictive: columns in Section 714.2, primary structural frame members other than columns in Section 714.3 and secondary members in Section 714.4.

References to individual encasement protection are clarified. Renumbered Sections 714.2 and 714.3 (current Sections 714.4 and 714.2) reference individual encasement protection but neither section contains technical provisions for it. Also, the title of renumbered Section 714.3 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. If individual encasement protection is the intent, it is not achieved by reliance on the title of the section, which is nonmandatory. Renumbered Sections 714.2 and 714.3 are revised by specifying individual encasement protection as individual protection on all sides of the structural member for its full length, including connections to other structural members, with materials having the required fire-resistance rating.

An exception is added to renumbered Section 714.3 (current Section 714.2) on primary structural frame members other than columns. Beams and girders typically support floor or roof construction, which prevents the protection of their surfaces that bear against floor or roof members (i.e., steel decks). The exception permits the protection on all sides to be only on exposed sides provided the assembly being relied on for the required fire resistance rating limits protection to the exposed sides.

"Structural frame" in Item (a) of Table 601, Section 704.8.1 (Exception 2) and Section 714.6 (Section 714.11 in proposal) is changed to "primary structural frame" for better consistency with the changes approved by FS98-06/07. With these changes a clear distinction will be established between "primary structural frame" in the nonstructural provisions of the IBC and "structural frame" in the structural provisions. The use of "structural frame" is found in Sections 2104.2.1, 2109.4.3, 2109.7.4, 2110.1.1, 3402.1 (technically infeasible) and H109.1.

Additional references to the footnotes in Table 601 at the fire-resistance ratings for roof construction in Table 601 are made to restore the original references, which were inadvertently deleted in the 2007 IBC Supplement. Note that Footnotes (c) and (d) in the 2006 IBC are Footnotes (b) and (c) in the 2007 IBC Supplement.

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

## PART I – IBC FIRE SAFETY
## Committee Action: Approved as Modified

**Modify the proposal as follows:**

**714.1 (Supp) 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. The fire-resistance ratings shall not be less than the ratings required for the fire-resistance-rated assemblies supported by the structural members.

(Portions of the proposal not shown remain unchanged)

**Committee Reason:** The committee felt that the reorganization of Section 714 orders the requirements to create a more user-friendly code, for both the designer and the code official. The modification put back the words "and assemblies" to cover items other than structural members.

## Assembly Action: None

## *Individual Consideration Agenda*

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

*Public Comment 1:*

### Paul K. Heilstedt, PE, FAIA, Chair, representing ICC Code Technology Committee (CTC), requests Approval as Modified by this public comment for Part I.

**Modify proposal as follows:**

**714.1.1 (Supp) Primary structural frame.** The primary structural frame shall include all of the following structural members:

1. The columns;
2. Structural members having direct connections to the columns, including girders, beams, trusses and spandrels;
3. Members of the floor construction and roof construction having direct connections to the columns; and
4. ~~Bracing members designed to carry gravity loads.~~ Bracing members that are essential to the vertical stability of the primary structural frame under gravity loading shall be considered part of the primary structural frame whether or not the bracing member carries gravity loads.

**714.1.2 (Supp) Secondary members.** The following structural members shall be considered secondary members and not part of the primary structural frame:

1. Structural members not having direct connections to the columns;
2. Members of the floor construction not having direct connections to the columns; and
3. ~~Bracing members not designed to carry gravity loads.~~ Bracing members other than those that are part of the primary structural frame in accordance with Section 714.1.1

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The purpose of this public comment is to coordinate the code committee's action on code changes FS 113 and FS 115. Code change FS 113 included technical revisions to the primary structural frame provisions of Section 714.1.1 while FS 115 is primarily an editorial re-formatting of Section 714.

Specifically, approved code change FS 113 revised the requirements for bracing considered part of the structural frame of the building. The approved language from FS 113 has been incorporated in Item 4 to Section 714.1.1. In order to coordinate this change, Item 3 to Section 714.1.2 needs to be revised to clarify that bracing which is not part of the structural frame is not limited to bracing which is not designed to carry gravity loads.

Code issues are assigned to the CTC by the ICC Board as "areas of study". Information on the CTC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the following website: http://www.iccsafe.org/cs/cc/ctc/index.html. Since its inception in April/2005, the CTC has held fifteen meetings - all open to the public. This public comment is a result of the CTC's investigation of the area of study entitled "NIST World Trade Center Recommendations". The CTC web page for this area of study is: http://www.iccsafe.org/cs/cc/ctc/WTC.html

*Public Comment 2:*

**Maureen Traxler, City of Seattle, Department of Planning and Development, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this public comment for Part I.**

**Modify proposal as follows:**

**Section 202 ~~714.1.1~~ (Supp) Primary structural frame.** The primary structural frame shall include all of the following structural members:

1. The columns;
2. Structural members having direct connections to the columns, including girders, beams, trusses and spandrels;
3. Members of the floor construction and roof construction having direct connections to the columns; and
4. Bracing members designed to carry gravity loads.

**Section 202 ~~714.1.2~~ (Supp) Secondary members.** The following structural members shall be considered secondary members and not part of the primary structural frame:

1. Structural members not having direct connections to the columns;
2. Members of the floor construction not having direct connections to the columns; and
3. Bracing members not designed to carry gravity loads.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** Sections 714.1.1 and 714.1.2 function as definitions of "primary structural frame" and "secondary members". We are proposing to clearly identify them as definitions to make it obvious to code users that the terms are defined. The terms are used in both Chapters 6 and 7, and, therefore, should be located in Chapter 2. If the definition is located in Chapter 2 it is obvious that the definition applies to both chapters.

Final Action: AS AM AMPC____ D

# FS115-07/08, Part II
## Table 601

*Proposed Change as Submitted:*

**Proponent:** Philip Brazil, PE, Reid Middleton, Inc., representing himself

**PART II – IBC GENERAL**

**Revise table as follows:**

**TABLE 601 (Supp)**
**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 [g]<br>See Section 714.1.1<br>~~Including columns, girders, trusses~~ | 3[a] | 2[a] | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Bearing walls<br>Exterior [f, g]<br>Interior | 3<br>3[a] | 2<br>2[a] | 1<br>1 | 0<br>0 | 2<br>1 | 2<br>0 | 2<br>1/HT | 1<br>1 | 0<br>0 |
| Nonbearing walls and partitions<br>Exterior | See Table 602 | | | | | | | | |
| Nonbearing walls and partitions<br>Interior [e] | 0 | 0 | 0 | 0 | 0 | 0 | See Section 602.4.6 | 0 | 0 |
| Floor construction <u>and secondary members</u><br><u>See Sections 714.1.1 and 714.1.2</u><br>~~Including supporting beams and joists~~ | 2 | 2 | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Roof construction <u>and secondary members</u><br><u>See Sections 714.1.1 and 714.1.2</u><br>~~Including supporting beams and joists~~ | 1-½[b] | 1[b, c] | 1 [b, c] | 0[b, c] | 1[b, c] | 0[b, c] | HT | 1[b, c] | 0 |

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of <u>primary</u> structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.
c. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.
d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.
e. Not less than the fire-resistance rating required by other sections of this code.
f. Not less than the fire-resistance rating based on fire separation distance (see Table 602).
g. Not less than the fire-resistance rating as referenced in Section 714.5

**Reason:** The purpose for this proposal is to make the provisions approved by Proposal FS98-06/07-AS more technically sound and to improve coordination with other provisions of the IBC. Reference to "columns, girders and trusses" in the item under "Building Element" for primary structural frame" in 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.

In Section 714.1, "and assemblies" is deleted because the subject of Section 714.1 is structural members, not assemblies, which implies floor, roof or wall assemblies. The other revisions are editorial. Note that "structural member" is not currently defined in the IBC.

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 primary structural frame. The current language implies that, in addition to columns and bracing members designed to carry gravity loads, only girders, beams, trusses and spandrels having direct connections to the columns are part of the primary structural frame. The intent, however, is that, in addition to columns, all structural members having direct connections to the columns, including structural members of the floor construction and roof construction and bracing members that are designed to carry gravity loads, are part of the primary structural frame. The listing of girders, beams, trusses and spandrels in Section 714.1.1 should be viewed as examples of such structural members.

Section 714.1.1 is also revised to specify all members of the primary structural frame as structural members. This revision makes it clear that bracing members are structural members and reduces questions over the scope of Section 714.1, which specifies structural members but not bracing members. Structural members of the floor construction and roof construction having direct connections to the columns are also identified as members of the primary structural frame. This revision correlates Section 714.1.1 with Section 714.1.2 on secondary members, which specifies members of the floor construction and roof construction not connected to columns.

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. The current language also creates a gap between what structural members are considered part of the primary structural frame and what are considered secondary members. This gap consists of a third group of structural members that are neither part of the primary structural frame nor secondary members. Section 714.1.2 is revised to close this gap by clearly specifying what structural members are secondary members, including structural members not having direct connections to the columns as structural members and bracing members not designed to carry gravity loads.

Also in Section 714.1.2, members of the floor or roof construction "not connected" to the columns is changed to "not having direct connections" to the columns to make it clear that structural members indirectly connected via supporting beams or girders that are directly connected to the columns are not intended to be members of the primary structural frame. Note that horizontal bracing members typically are part of the floor or roof construction. The format of Section 714.1.2 is revised to specify individual items in the same manner as Section 714.1.1.

In conjunction with the proposed changes to Section 714.1.2, secondary members are added to the listings of floor construction and roof construction in Table 601 along with references to Sections 714.1.1 and 714.1.2 in the same manner as the listing for primary structural frame. With the approval of FS98-06/07, secondary members become a distinct type of building element and should be specified in Table 601 along with primary structural frame.

The order of the technical provisions in Section 714 is revised. The primary structural frame consists of the columns with the most restrictive technical provisions (Section 714.4), other members of the primary structural frame with technical provisions that are less restrictive than columns (Section 714.3), and secondary members with technical provisions that are less restrictive than the primary structural frame (Section 714.2.1). These sections are rearranged beginning with the most restrictive: columns in Section 714.2, primary structural frame members other than columns in Section 714.3 and secondary members in Section 714.4.

References to individual encasement protection are clarified. Renumbered Sections 714.2 and 714.3 (current Sections 714.4 and 714.2) reference individual encasement protection but neither section contains technical provisions for it. Also, the title of renumbered Section 714.3 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. If individual encasement protection is the intent, it is not achieved by reliance on the title of the section, which is nonmandatory. Renumbered Sections 714.2 and 714.3 are revised by specifying individual encasement protection as individual protection on all sides of the structural member for its full length, including connections to other structural members, with materials having the required fire-resistance rating.

An exception is added to renumbered Section 714.3 (current Section 714.2) on primary structural frame members other than columns. Beams and girders typically support floor or roof construction, which prevents the protection of their surfaces that bear against floor or roof members (i.e., steel decks). The exception permits the protection on all sides to be only on exposed sides provided the assembly being relied on for the required fire resistance rating limits protection to the exposed sides.

"Structural frame" in Item (a) of Table 601, Section 704.8.1 (Exception 2) and Section 714.6 (Section 714.11 in proposal) is changed to "primary structural frame" for better consistency with the changes approved by FS98-06/07. With these changes a clear distinction will be established between "primary structural frame" in the nonstructural provisions of the IBC and "structural frame" in the structural provisions. The use of "structural frame" is found in Sections 2104.2.1, 2109.4.3, 2109.7.4, 2110.1.1, 3402.1 (technically infeasible) and H109.1.

Additional references to the footnotes in Table 601 at the fire-resistance ratings for roof construction in Table 601 are made to restore the original references, which were inadvertently deleted in the 2007 IBC Supplement. Note that Footnotes (c) and (d) in the 2006 IBC are Footnotes (b) and (c) in the 2007 IBC Supplement.

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

## PART II – IBC GENERAL

**Committee Action:** **Disapproved**

**Committee Reason:** Part II of the proposal was heavily dependant upon the action on Part I, which at the time of the IBC General Committee hearings had not been discussed yet.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment:*

**Maureen Traxler, City of Seattle Department of Planning and Development, representing Washington Association of Building Officials Technical Code Development Committee, requests Approval as Modified by this public comment.**

**Modify proposal as follows:**

**TABLE 601 (Supp)**
**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 [g] See Section ~~714.1.1~~ 202 | 3[a] | 2[a] | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Bearing walls | | | | | | | | | |
| Exterior [f, g] | 3 | 2 | 1 | 0 | 2 | 2 | 2 | 1 | 0 |
| Interior | 3[a] | 2[a] | 1 | 0 | 1 | 0 | 1/HT | 1 | 0 |
| Nonbearing walls and partitions Exterior | See Table 602 | | | | | | | | |
| Nonbearing walls and partitions Interior [e] | 0 | 0 | 0 | 0 | 0 | 0 | See Section 602.4.6 | 0 | 0 |
| Floor construction and secondary members See Section~~s 714.1.1 and 714.1.2~~ 202 | 2 | 2 | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Roof construction and secondary members See Section~~s 714.1.1 and 714.1.2~~ 202 | 1-½[b] | 1[b, c] | 1 [b, c] | 0[b, c] | 1[b, c] | 0[b, c] | HT | 1[b, c] | 0 |

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
b. through g. (No change)

**Commenter's Reason:** Sections 714.1.1 and 714.1.2 function as definitions of "primary structural frame" and "secondary members". We are proposing to clearly identify them as definitions to make it obvious to code users that the terms are defined. The terms are used in both Chapters 6 and 7, and, therefore, should be located in Chapter 2. If the definition is located in Chapter 2 it is obvious that the definition applies to both chapters.

Final Action: AS AM AMPC____ D

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# FS118-07/08
## 714

*Proposed Change as Submitted:*

**Proponent:** Sarah A. Rice, Schirmer Engineering

**Revise as follows:**

**(Entire section relocated from Section 714 and renumbered to Section 704)**

**SECTION ~~714~~ 704**
**FIRE-RESISTANCE RATING OF STRUCTURAL MEMBERS**

**(Entire section relocated from Section 704 and renumbered to Section 705)**

**SECTION ~~704~~ 705**
**EXTERIOR WALLS**

**(Entire section relocated from Section 705 and renumbered to Section 706)**

**SECTION ~~705~~ 706**
**FIRE WALLS**

**(Entire section relocated from Section 706 and renumbered to Section 707)**

**SECTION ~~706~~ 707**
**FIRE BARRIERS**

**(Entire section relocated from Section 707 and renumbered to Section 708)**

**SECTION ~~707~~ 708**
**SHAFT ENCLOSURES**

**(Entire section relocated from Section 708 and renumbered to Section 709)**

**SECTION ~~708~~ 709**
**FIRE PARTITIONS**

**(Entire section relocated from Section 709 and renumbered to Section 710)**

**SECTION ~~709~~ 710**
**SMOKE BARRIERS**

**(Entire section relocated from Section 710 and renumbered to Section 711)**
**SECTION ~~710~~ 711**
**SMOKE PARTITIONS**

**(Entire section relocated from Section 711 and renumbered to Section 712)**

**SECTION ~~711~~ 712**
**HORIZONTAL ASSEMBLIES**

**(Entire section relocated from Section 712 and renumbered to Section 713)**

**SECTION ~~712~~ 713**
**PENETRATIONS**

**(Entire section relocated from Section 713 and renumbered to Section 714)**

**SECTION ~~713~~ 714**
**FIRE-RESISTANT JOINT SYSTEMS**

**Reason:** The material contained in Section 714 Fire-resistance Rating of Structural Members is a fundamental provision applicable to all types of fire rated assemblies. It would seem to be something that the user should find right away when reading Chapter 7. As there are no references to Section 714 in any of the specific sections covering specific types of assemblies, it's relocation to the beginning of Chapter 7 seems reasonable.

The order of Chapter 7 would then be:

701 General
702 Definitions
703 Fire Resistance Ratings and Fire Tests
704 Fire Resistance Rating of Structural Members
705 Exterior Walls
706 Fire Walls
707 Fire Barriers
708 Shaft Enclosures
709 Fire Partitions
710 Smoke Barriers
711 Smoke Partitions

Etc.

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

**Committee Action:** **Approved as Submitted**

**Committee Reason:** The committee agreed that the requirements contained in Section 714 Fire-resistance Rating of Structural Members are applicable to all types of fire rated assemblies; therefore it's relocation to the beginning of Chapter 7 seems appropriate.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment 1:*

**Mark A. Belke, Greenheck Corporation requests Disapproval.**

**Commenter's Reason:** Greenheck is requesting that the ICC membership delay the approval of FS118 until the CTC study group can complete their work for the next code cycle by overturning the committee recommendation of "Approved as Submitted." These changes to Chapter 7 will require manufacturer's literature revisions and significant training throughout the engineering community. The CTC study group already has begun to rework and modify Chapter 7.

*Public Comment 2:*

**Tony Crimi, A.C. Consulting Solutions Inc, representing North American Insulation Manufacturers Association (NAIMA) requests Disapproval.**

**Commenter's Reason:** The Code change proposal will be very costly to Code users such as Architect, Engineers, and Manufacturers, while providing little reciprocal value. While it is not uncommon for Code changes to produce changes that result in reprinting literature or revising Educational materials, specifications, drawings, etc., they are usually associated with technical improvements to the code. This proposal is premature.

As a stand-alone item, this Code change proposal represents a costly exercise (and at the minimum a significant inconvenience) without providing any real benefit to Code users. While the reorganization proposed may ultimately be useful, the proposal is premature and, certainly, unnecessary in the context of the work currently underway in the Code Technology Committee Study Group on Vertical openings. As part of its' review, the Working Group was charged with investigating such formatting issues at the May 2008 CTC meeting. The Study Group will be considering these formatting issues, in conjunction with other technical changes they have identified. The goal is to capture all the necessary changes in a single code change proposal for the next code change cycle, with the goal of a new Chapter 7, which will incorporate both technical and formatting improvements. To make these editorial revisions to the whole of Chapter 7, knowing that further reformatting issues will likely arise when the Working Group completes its' work in the next cycle, is unreasonable.

*Public Comment 3:*

**Vickie Lovell, InterCode Inc., representing 3M Company, Fire Trak, Inc., requests Disapproval.**

**Commenter's Reason:** The proponent of FS 118 stated that this change does not increase the cost of construction. We strongly disagree that this code change does not increase the cost of construction. The cost of time and money spent reprinting must be passed on to customers, which indirectly but inevitably increases material costs. Although the proposal may have some merit from a purely philosophical approach to formatting of Chapter 7, there is no other technical change that would warrant such an expense other than a re-numbering of the entire chapter.

The Vertical Openings Study Group of the Code Technology Committee has been charged with reviewing Chapter 7 primarily to identify inconsistencies in the requirements for protection of openings through floors. During the process of that investigation, the group also has the latitude to identify and fix other problems with Chapter 7 such as technical inconsistencies, do-loops, dead-ends, and changes to formatting as needed.

The deadline for the Vertical Openings Study group proposal is the March 2009 deadline for code changes to the 2010 IBC. The Study group can make the recommendation that the intent of FS 118 be included in the reformatting of Chapter 7. We request that the ICC membership delays approving the format change in FS 118 until the CTC Study Group finishes its work for the next code cycle, and intent of the code change and other improvements to Chapter 7 can be realized at that time. Industry, the design community, educators, spec writers, and others can reprint all their material at that time with justification.

*Public Comment 4:*

**James Shriver, Thermafiber Inc., requests Disapproval.**

**Commenter's Reason:** The proposal will increase the cost of construction. It will have a major bearing on the cost of reprinting literature, displays, presentations, etc. that currently reference these sections of the code. These costs will obviously be reflected in increased cost to the end user. The CTC study group on Vertical Openings is currently evaluating Chapter 7 for these types of improvements. Until such time as the CTC study group concludes their findings it is requested that the ICC membership overturn the committee recommendation for approval as submitted and prevent duplication of time and expenditures that could occur following the decision of the CTC Study Group.

*Public Comment 5:*

**John Valiulis, Hilti, Inc., requests Disapproval.**

**Commenter's Reason:** Code change FS118 will cause all code articles to be re-numbered throughout sections 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, and 714. This will impact an endless number of publications that include code article references. This includes handbooks and reference guides of all sorts, manufacturers' technical literature (e.g. product technical guides), construction specifications, and published web resources – both technical and business/product related. The construction products industry and construction sector routinely absorb the cost of republishing pertinent documents when substantive code changes are made that change selected code articles. However, code changes more commonly result in articles within one individual section being renumbered, not all code provisions related to fire-resistive construction being renumbered all at once. The scale of changes due to this one code change has not been matched since the initial creation of the IBC in 2000. Industries impacted by the need to scrap existing technical literature and re-publish new literature would include those manufacturing or selling products related to fire-resistive wall, floor, or roof materials, fire-rated doors and glazing, penetration firestopping, fire-resistive joint systems, and fire and/or smoke rated dampers and ducts. All of this material cost and manpower cost would need to be borne due to the fact that one or a few people decided that they would rather see a group of requirements (section 714 of the 2006 IBC) about 12 pages earlier in the 2009 code books. This borders on the absurd. Changes to the building code do and should consider the cost/benefit ratio. If there was some tangible benefit due to this code change, then some amount of cost could reasonably be incurred. However, the benefit of this code change is virtually nil. It will not make a single building safer, nor lower the cost to build a single building. It would not even necessarily improve the usability of the code, as the requirements of section 714 are completely unchanged, they are simply

lifted and dropped into a different place within the same chapter. If someone could not find the requirements when they were called “Section 714”, there is no reason to believe that they will find the requirements any easier if they are renumbered to become section 704. As such, there is no benefit that compensates for the cost. The ICC membership is therefore asked to overturn the decision of the committee and to vote to disapprove this code change.

The ICC Code Technology Committee has a study group in place called “Vertical Openings” that is examining all of Chapter 7 and is planning on making recommendations for changes to Chapter 7 of the Building Code for the 2010-20111 Supplement. Since the study group’s proposed changes seem likely to result in the re-numbering of numerous sections, it would seem that that would be the opportune time to move existing section 714 of the Building Code to a different place within Chapter 7, if that move still seems like a good idea at that time.

Final Action: AS AM AMPC____ D

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# FS123-07/08
## 715.4.3.2

*Proposed Change as Submitted:*

**Proponent:** William O’Keeffe, SAFTIFIRST

**Revise as follows:**

**715.4.3.2 (Supp) Glazing in door assemblies.** In a 20-minute fire door assembly, the glazing material in the door itself shall have a minimum fire protection rating of 20 minutes and shall be exempt from the hose stream test. Glazing material in any other part of the door assembly, including transom lites and sidelites, shall be tested in accordance with NFPA 25~~7~~ 2 or ~~UL 9~~ UL10, ~~including~~ and shall be exempt from the hose stream test~~, in accordance with Section 715.5~~.

**Reason:** The application of the hose stream test to the sidelight and transom components of a 20-minute door assembly is a new requirement that was added to the 2000 IBC as the result of a code change proposal submitted on behalf specific industry interests. The last full editions of the legacy codes did not include a requirement for special treatment of sidelights and transoms. Sidelights and transoms were treated as part of the door assembly and were exempt from the hose stream requirement. The SBC supplement to the 1997 edition was the first code to introduce the provision for the hose stream test for sidelights and transoms. See excerpts of legacy codes below.

When the IBC code change passed that included a hose stream test for the sidelight and transom components of a 20-minute door assembly, there was no technical or fire case history to show that products tested without hose stream pose a fire safety threat. As a matter of fact, the technical evidence and actual fire case data showed, and continue to show, that these products provide the level of fire protection needed for the opening, and do not fail under real fire conditions.

20-minute glazing products tested without hose stream to NFPA 252 have been listed in the U.S. for use in 20-minute sidelight and transom assemblies since 1991. These products have been available in Europe, and millions of square feet have been supplied worldwide, since 1983.

There are no reported incidents of failure due to thermal shock from fire sprinklers in the U.S. or anywhere in the world to indicate a fire safety problem.

Actual fire case experience in Europe has shown these products perform adequately when sprinklers activate.

Clinical fire test data show these products resist thermal stress when exposed to sprinklers activated at temperatures as rated.

All U.S. fire-rated glazing distributors offer 20-minute fire and safety glazing products tested without hose stream Prices of 20-minute fire and safety glazing products have dropped to 50-500% below that of fire and safety rated glazing products tested to hose stream.

The introduction of NFPA 257 as a test standard for part of a door assembly is inconsistent with the testing of fire rated doors as required in NFPA 252. NFPA 252 is the test standard for doors and the definition of doors clearly includes sidelights and transoms. The IBC section 715.4.3.2 now includes a conflict between the Building Code and NFPA 252.

The use of the hose stream test has never been validated as an appropriate test for evaluating the fire risk of glazing. It was originally used for cast iron columns to evaluate the risk of collapse during fire fighting operations.

It is not true that this issue has been debated in NFPA 101 and NFPA 80 and has always been defeated. This is simply not true. NFPA 80 clearly states that the sidelights and transoms are considered part of the door assembly. See Excerpt NFPA 80-1999, section 1-4 below.

The NFPA Standards Council addressed the same fire safety performance issues in 1997 and rejected a comment to NFPA 101 that proposed to remove the hose stream exception applied to glazing in 20-minute doors altogether. See attached Decision of the Standards Council, 1/27/97.

The Standards Council found no safety justification to limit use of these products based on the absence of any field failures reported or other evidence of a thermal shock problem.

The Standard Council’s written decision gives this IBC Fire Safety Committee guidance in resolving this matter: “Prior to restricting the use of products or methods from a standard there should generally be adequate substantiation for doing so.”

The 2000 IBC change to require separate testing of the sidelights and transoms from the testing specified in NFPA 252 for doors in the 2000 IBC was clearly to support a market position. Sidelights and transoms were used for years without the hose stream test without any documented unfavorable experience. There is no documentation to demonstrate any problem with the way the legacy codes dealt with this issue up to 1997. And there is no documentation to substation the need for separate testing of the sidelights and transoms since.

We are causing the expenditure of money for glazing in sidelights when there is no documentation that hose stream-tested products in non-structural fire protective locations provide extra safety. Particularly hard-hit by the current market-driven code requirements are public entities, like schools and hospitals.

**DECISION OF THE NFPA STANDARDS COUNCIL, 1/27/97:**

**Decision of the Standards Council on the**
**Complaint of W. Koffel, Koffel Associates**
**On Comment 101-164 for the 1997 Edition of**
**NFPA 101, *Life Safety Code*®**

On January 15, 1997, the Standards Council considered the complaint of W. Koffel, Koffel Associates, on behalf of O'Keefe's Inc. The complaint sought the rejection of Comment 101-164 on the proposed 1997 edition of NFPA 101, *Life Safety Code*®.

Public Comment 101-164 would, in pertinent part, sharply limit an exception (which for convenience, will be referred to as "the hose stream" exception) contained in the prior edition of NFPA 101. Specifically, it would change the requirements applicable to the testing of 20-minute doors protecting openings in one hour corridor walls or smoke barriers and ½ hour fire barriers by permitting the hose stream test to be omitted only for door assemblies that do not incorporate vision panels. In the prior edition (NFPA 101-1994) all 20 minute doors were exempted form the hose stream test regardless of the presence of vision panels.

The limitation of the hose stream exception was first proposed in Public Proposal 101-128. This Proposal was rejected by the Technical Committee on Fire Protection Features and the Life Safety Technical Correlating Committee. The issue was raised again in Comment 101-164 and, this time, was Accepted in Principle by the Technical Committee and Technical Correlating Committee. A motion to reject Comment 101-164 was moved on the floor of the 1996 Fall Association Meeting. On a tie vote, the floor motion failed.

Attending a hearing on the complaints and speaking in favor of rejecting Comment 101-164 were: W. Koffel, Koffel Associates Inc. representing O'Keeffe's Inc, and K. Steel, O'Keefe's Inc. J. Beitel, Hughs Associates, Representing the Wired Glass Industry, was in attendance speaking in support of Comment 101-+164 as accepted in the Report on Comments.

There were numerous arguments make in the written submissions and at the hearing. Without attempting to summarize fully, some the most salient fell into the following categories. Those in favor of rejecting Comment 101-164 argued that the Comment fails to address the concerns raised by the submitter, that the testing submitted as the substantiation is not a valid reason for such a change, that the change would have a significant impact on existing assemblies without any adverse experience being documented, and that the change focuses on one specific performance characteristic which favors the wired glass industry. They also argued that the reversal of the Committee position between the Proposal and Comment stage and the tie vote of the membership at the Association Technical Meeting failed to provide a convincing evidence of consensus.

Those in favor of retaining Comment 101-164 argued that the limitation of the hose stream exception would improve safety, would eliminate inconsistency in the Code, and would close what they considered a loophole in the current requirements of NFPA 101. They also argued that test work done by one laboratory showed that one unspecified type of listed 20-minute rated glass failed early under certain circumstances when exposed to a small water spray. They also claimed that inclusion of a hose stream test would be consistent with practice in Canada and Europe.

After the hearing, the Council reviewed and considered all of the information available to it regarding the complaint and voted to uphold the complaint and reject Comment 101-164. The effect of this decision is to return to the Report on Proposals wording, which effectively retains the hose stream exception as it existed in the previous edition of NFPA 101.

Comment 101-164 has come through the standards development process with a recommendation to accept, and the Council would generally adopt that recommendation unless there were substantial reasons presented for not doing so. In this case, the Council has concluded that there are substantial reasons for rejecting the Comment. The effect of this Comment would be to severely restrict the use in door assemblies of alternative types of fire rated glazings to wired glass. Because of the hose stream exception, such alternative glazings have been in use in door assemblies. The proponent of Comment 101-164, however, could point to no documented history of problems with these door assemblies. Moreover, the other arguments offered by the proponents were not persuasive. In particular, the test results offered by the proponents in favor of their position were, for reason brought out at the hearing, far from conclusive.

Prior to restricting the use of products or methods from a standard there should generally be adequate substantiation for doing so. The Council, after reviewing the entire record, does not believe that the proponents of Comment 101-164 have provided such substantiation. The Council, moreover, is influenced in its decision by the fact that, although a recommendation in favor of the Comment was technically achieved under NFPA rules, there is reason to question whether a clear consensus on the issue has been achieved. The Technical Committee declined to remove the hose stream exception during the Proposal stage, and only came around to that position at the Comment stage. It did so without any clear indication of the reasons for the position change. Moreover, although the floor motion to reject the Comment failed, the membership on the floor were divided evenly on the question. In these circumstances and given the insufficiency of the substantiation in favor of the Comment, the Council believes that there is an inadequate basis to limit the hose stream exception. Of course, if further action to review and address this issue is deemed necessary, such action can be taken during the next revision cycle, or if it is determined to be of an emergency nature, through the processing of a Tentative Interim Amendment.

Council member Belles recused himself from participation in the hearing and was not present during the deliberations and vote on this issue.

*Note: Anyone may appeal to the Board of Directors concerning Council action on any matters in accordance with the Procedures for Appeals to the Board of Directors. Notice of the intent to file an appeal shall be submitted to the Board within 20 days of action by the Council. See section 1-7 and 3-8 of the Regulations Governing Committee Projects.*

**SC 97-4(c)(d)**

D#97-3

**EXCERPTS OF LEGACY CODES:**

**BOCA 1999, section 717.1.1;**

***717.1 Fire door assemblies:*** *Approved fire door assemblies as defined in this code shall be constructed of any material or assembly of component materials which conforms to the test requirements of NFPA 252 listed in Chapter 35 and the fire protection rating herein required in Table 717.1, unless otherwise specifically provided for in this code.*

***Exception****: Floor fire doors shall comply with Section 714.2.6*

***717.1.1 Twenty-minute doors****: Fire doors having a fire protection rating of 20 minutes shall be tested in accordance with ASTM E152 listed in Chapter 35 without the hose stream test.*

**SBC 1997, section 705.1.3**;

***705.1.3 Approved types of fire windows, doors and shutters***

***705.1.3.1*** *Wall openings required to be protected shall be protected by approved listed and labeled fire doors, windows and shutters and their accompanying hardware, including all frames, closing devises, anchorage and sills, in accordance with the requirements of NFPA 80, except as otherwise specified in the code.*

***705.1.3.2.*** *Openings are classified in accordance with the character and location of the wall in which they are situated. Fire protection ratings for products intended to comply with this section shall be as determined and reported by a nationally recognized testing agency in accordance with NFPA 252 or NFPA 257. All such products shall bear an approved label. In each of the following classes, the minimum fire protection ratings are shown.*

***705.1.3.2.1*** *Fire doors are classified as 3-hour, 1-1/2 hour, 1-hour, ¾ hour or 20 minutes.*

***705.1.3.2.2*** *Unless otherwise specified, door assemblies in walls required to have a fire resistance rating of 1-hour or less shall have a fire resistance rating of 20 minutes when tested in accordance with NFPA 252 without the hose stream.*

*Exception: For Group I Unrestrained, corridor doors shall be in accordance with 409.41.4*

**UBC 1977, sections 713.7 &1004.3.4.3.2.1. Doors**

**713.7 Glazed Openings in Fire Doors:** Glazed openings in fire doors shall not be permitted in a fire assembly required to have a three-hour fire-resistive rating.

The area of glazed openings in a fire door required to have one- and one-half-hour or one-hour fire resistive rating shall be limited to 100 square inches (64 500 mm²) with a minimum dimension of 4 inches (102 mm). When both leaves of a pair of doors have observation panels, the total area of the glazed openings shall not exceed 100 square inches (64 500 mm²) for each leaf.

Glazed openings shall be limited to 1,296 square inches (0.84 m²) in wood and plastic-faced composite or hollow metal doors, per light, when fire-resistive assemblies are required to have a three-fourths-hour fire-resistive rating.

***1004.3.4.3.2.1 Doors.*** *All exit-access doorways and doorways from unoccupied areas to a corridor shall be protected by tightfitting smoke- and draft-control assemblies having a fire-protection rating of not less than 20 minutes when tested in accordance with UBC Standard 7-2, Part II. Such doors shall not have louvers, mail slots or similar openings. The door and frame shall bear an approved label or other identification showing the rating thereof, followed by the letter "S", the name of the manufacturer and the identification of the service conducting the inspection of materials and workmanship at the factory during fabrication and assembly. Doors shall be maintained self-closing or shall be automatic closing by actuation of smoke detector in accordance with Section 713.2 Smoke- and draft-control door assemblies shall be provided with a gasket installed so as to provide a seal where the door meets the stop on both sides and across the top.*

*Exception: View ports may be installed if they require a hole not larger than 1 inch (25 mm) in diameter through the door, have at least a ¼ inch thick (6.4mm) glass disc and the holder is of metal that will not melt out when subject to temperatures of 1,700°F (927°C).*

**NFPA 80-1999, section 1-4:**

***Fire Door.**** *The door component of a fire door assembly.*

***Fire Door Assembly****. Any combination of a fire door, a frame, hardware, and other accessories that together provide a specific degree of fire protection to the opening.*

***Fire Door Frame****. A component, forming the perimeter of an opening in a fire door assembly, that is supplied welded or knocked down and anchored to the surrounding structure.*

***Fire Door Frame for Lights****. A frame that, in addition to a door opening, contains an opening(s) for use with glazing materials. Various types include transom light, side light, and transom and side light frames. (See Figures B-66, B-67 and B-68 for elevations.)*

**NFPA 80-2007, section 3.3.52-55:**

***3.3.52* Fire Door.*** *The door component of a fire door assembly.*

***3.3.53 Fire Door Assembly****. Any combination of a fire door, a frame, hardware, and other accessories that together provide a specific degree of fire protection to the opening.*

***3.3.54 Fire Door Frame.*** *A component forming the perimeter of an opening in a fire door assembly that is supplied welded or knocked down and anchored to the surrounding structure.*

***3.3.55* Fire Door Frame for Lights.*** *A frame that, in addition to a door opening, contains an opening(s) for use with glazing materials.*

NFPA 80 does not specify separate testing for the sidelights or transoms from the glazing in the door. It simply refers to NFPA 252 for the testing of the door.

***3.3.59 Fire Protection Rating.*** *For the purposes of this standard, the designation indicating the duration of the fire test exposure to which a fire door assembly or fire window assembly was exposed and for which it successfully met all acceptance criteria as determined in accordance with NFPA 252, Standard Methods of Fire Tests of Door Assemblies, or NFPA 257, Standard on Fire Test for Window and glass Block Assemblies, respectively. (See also Annex D.)*

**Cost Impact:** The code change proposal will not increase the cost of construction. This code change will reduce the cost of glazing in sidelights without reducing fire protection.

**Committee Action:** **Disapproved**

**Committee Reason:** Based on lack of data to substantiate the deletion of the hose stream test, the committee disapproved this proposal.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment:*

**John Woestman, The Kellen Company, representing The Window and Door Manufacturers Association (WDMA), requests Approval as Submitted.**

**Commenter's Reason:** The Window and Door Manufacturers Association (WDMA) recommends that FS123 be Approved as Submitted.

WDMA concurs with the proponent's supporting statements. But more importantly the current code language requires an assembly that is illogical and cannot be tested as described. Proposal FS123 resolves this existing problem with the code.

The current text of 715.4.3.2 requires all elements of a door (and sidelite) or door (and transom lite) assembly to be of 20-minute no-hose-stream construction except the actual glazing installed in the sidelite and/or transom. This means taking a glazing that was tested separately from the assembly, per NFPA-257, including the hose stream test, and installing it in a door assembly that was tested without the hose stream test per NFPA-252.

As written, the glazing, having been tested per NFPA-257 including the hose stream test, affords no additional protection to the opening because no other elements of the assembly are required to be hose-stream tested. For the glazing to provide additional protection it would have to be installed in a glazing system that meets the hose stream, which in turn would require a frame that meets the hose stream. Neither of these are required per 715.4.3.2 nor section 715.5 referenced within it.

As written, the current code produces confusion as to the glazing, glazing system, and frame required to meet the intended level of protection.

Proposal FS123 addresses the inconsistencies in the code and requires that sidelite and transom glazing be evaluated to the same test standard as the rest of the door assembly, which is logical and does not reduce the protection afforded by the door assembly from that required by the current code language.

Final Action: AS AM AMPC____ D

# FS135-07/08
## Table 715.5, 715.5.7, 715.5.7.1, 715.5.7.2 (New)

*Proposed Change as Submitted:*

**Proponent:** William O'Keeffe, SAFTIFIRST

**Revise as follows:**

**TABLE 715.5 (Supp)**
**FIRE WINDOW ASSEMBLY FIRE PROTECTION RATINGS**

| TYPE OF ASSEMBLY | | REQUIRED ASSEMBLY RATING (hours) | MINIMUM FIRE WINDOW ASSEMBLY RATING (hours) |
|---|---|---|---|
| Interior walls: | Fire walls | All | NP[a] |
| | Fire barriers | >1<br>1 | NP[a]<br>¾ |
| | Smoke barriers | 1 | ¾ |
| | Fire partitions | 1<br>½ | ¾<br>1/3[b] |
| Exterior walls | | >1<br>1 | 1 ½<br>¾ |
| Party wall | | All | NP |

NP = Not Permitted.
a. Not permitted except as specified in Section 715.2.
b. For testing requirements, see Section 715.5.7.2

**715.5.7 Interior fire window assemblies.** Fire-protection-rated glazing used in fire window assemblies located in fire partitions and fire barriers shall be limited to use in assemblies with a maximum fire-resistance rating of 1 hour in accordance with this section.

**715.5.7.1 Where 3/4–hour fire protection window assemblies permitted.** Fire-protection-rated glazing requiring 45-minute opening protection in accordance with Table 715.5 shall be limited to fire partitions designed in accordance with Section 708 and fire barriers utilized in the applications set forth in Sections 706.3.6 and 706.3.8 where the fire-resistance rating does not exceed 1 hour.

**715.5.7.2 Where 1/3-hour fire protection window assemblies permitted.** Fire-protection rated glazing in fire window assemblies tested to NFPA 257 in ½-hour fire -resistant rated fire partitions requiring 1/3-hour opening protection in accordance with Table 715.5 shall be exempt from the hose stream test.

**715.5.7.~~2~~ 3 ~~Size~~ Area limitations.** The total area of windows shall not exceed 25 percent of the area of a common wall with any room.

**Reason:** This is a clarification and addition to the code to specifically address the rating requirements for interior windows. The more correct terminology for section 715.5.7.3 should be "area" limits, rather than "size" limits. The new proposed section 715.5.7.2 addresses 20-minute windows tested to NFPA 257 now specified in Table 715.5 for ½-hour fire partitions. Since a ½-hour fire resistance rated fire partition assembly is tested to ASTM E119 without the hose stream test, and fire doors tested for 20-minutes as required in Table 715.4 are not subject to the hose stream test, for consistency in the code, the fire window component of a ½-hour fire partition should be likewise exempt from the hose stream test under NFPA 257.

**Cost Impact:** This will reduce the cost of construction where 20-minute windows are required.

**Committee Action:** **Approved as Submitted**

**Committee Reason:** Based on the fact that ASTM E119 does not require the hose stream test for partitions qualifying for a 30 minute fire rating and Section 715.4.3 allows 20 minute rated fire doors to be tested without the hose stream test, the committee agreed that the hose stream test was not required for a 20 minute rated fire protection window.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Thomas S. Zaremba, Pilkington Fire Protection Glass NA, Inc., requests Disapproval.**

**Commenter's Reason:** If adopted, this proposal would reduce fire safety in 1/2-hour fire-resistance rated fire partitions by eliminating the hose stream test for 1/3 hour fire-protection rated fire window assemblies tested to NFPA 257. Other than adding symmetry to the code, there is no technical justification for the Committee's support of this proposal.

It is true that 1/2-hour fire-resistance rated fire partitions forming the subject of this proposal are tested to ASTM E119 without the hose stream test. It is also true that 20-minute fire doors may be tested without the hose stream test. However, symmetry does not always assure an adequate level of fire safety and it is not true that exemptions from hose-stream testing for wall materials and doors should be extended to fire windows.

Exempting wall materials from the hose stream test recognizes that the types of materials used in fire-resistance rated walls are not likely to degrade sufficiently by the end of a 1/2 hour test to warrant hose stream testing. Similarly, exempting 20-minute doors from the hose stream test recognizes that it is unlikely that fuel loads will be stacked in front of doors, blocking access through doorways. However, the glass used in fire windows cannot be compared to the types of materials used in fire-resistance rated walls. And, unlike fire doors, fire-windows can experience high fuel loads from materials stored next to them.

As currently written, the code requires fire windows used in 1/2-hour fire partitions to be tested to NFPA 257 for 1/3 hours (20 minutes) and to be subjected to the hose stream test. Requiring fire windows in 1/2-hour fire partitions to be tested to the hose stream test eliminates the use of tempered glass in these fire windows and for good reason. As soon as tempered glass experiences a significant temperature delta, it disintegrates. For that reason, even when subjected to a fire test for only a few minutes, tempered glass can fail catastrophically when subjected to the hose stream test.

If adopted, FS135 would make the testing of fire windows more symmetrical to wall materials and doors in 1/2-hour fire partitions. However, glass is not the same as the opaque materials used in walls and the fire loads experienced by fire windows can be far greater than those experienced by doors.

Other than symmetry, there is no technical justification for FS135 and I urge you to vote against the motion to support the Committee's recommendation.

Final Action: AS AM AMPC____ D

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# FS138-07/08

## 716.2.1, 716.3, 716.5.2, 716.5.3, 716.5.3.1 (New) [IMC [B] 607.2.1, [B] 607.3, [B] 607.5.2, [B] 607.5.5, [B] 607.5.5.1 (New)]

*Proposed Change as Submitted:*

**Proponent:** Lee J. Kranz, City of Bellevue, representing himself

**1. Delete without substitution as follows:**

~~**716.2.1 (IMC [B] 607.2.1) Smoke control system.** Where the installation of a fire damper will interfere with the operation of a required smoke control system in accordance with Section 909, approved alternative protection shall be utilized.~~

(Renumber subsequent sections)

**2. Revise as follows:**

**716.3 (IMC [B] 607.3) Damper testing and ratings.** Dampers shall be listed and bear the label of an approved testing agency indicating compliance with the standards in this section. Fire dampers shall comply with the requirements of UL555. Only fire dampers labeled for use in dynamic systems shall be installed in heating, ventilation, smoke control and air-conditioning systems designed to operate with fans on during a fire. Smoke dampers shall comply with the requirements of UL 555S. Combination fire/smoke dampers shall comply with the requirements of both UL 555 and UL 555S. Ceiling radiation dampers shall comply with the requirements of UL 555C.

**716.5.2 (IMC [B] 607.5.2) (Supp) 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~~ 2. Such walls are penetrated by ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, are in areas of other than Group H and are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 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 [B] 607.5.3) (Supp) 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 ASTME119 or UL263 as part of the fire-resistance 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~~ 3. 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.
5. Fire dampers and combination fire/smoke dampers are not required in kitchen and clothes dryer exhaust system when installed in accordance with the *International Mechanical Code*.

**716.5.3.1 (IMC [B] 607.5.5.1) Smoke control system shafts.** A combination smoke/fire damper shall be installed in smoke control system shaft penetrations.

**Reason:** Fire dampers are classified by UL 555 for use in static and dynamic airflow conditions. Fire dampers installed in air distribution systems that remain in operation after smoke or heat from a fire is detected (a dynamic airflow condition) must be labeled for such use. Static fire dampers may not operate properly under dynamic conditions: therefore, fire dampers used in systems designed with dynamic air flow must be tested and labeled for closure under anticipated airflow and pressure conditions. Currently there is no charging language to require a combination fire/smoke damper to be used in shaft openings which serve smoke control systems. This code change provides direction to use a combination fire/smoke damper, which is considered to be a dynamic damper, to provide adequate protection for the shaft in cases where the smoke control system is overcome by high heat fires. Item #3 of Section 716.3.1.1 gives criteria for combination fire/smoke damper actuation which allows the damper to be operated by fire dept. personnel up to a temperature of 350 degrees F. The current direction in Section 716.2.1 to use alternate protection where the installation of a fire damper will interfere with the operation of a required smoke control system does not provide adequate direction. Exception #2 of Section 716.5.2 and exception #1.3 of Section 716.5.3 are no longer necessary.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The committee felt that these proposed limitations on smoke/fire dampers used in conjunction with a smoke control system would conflict with other portions of the code that allow this use.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Lee J. Kranz, City of Bellevue, Washington, representing himself, requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**716.3.1.1 (IMC [B] 607.3.1.1) Fire damper actuating device.** The fire damper actuating device shall meet one of the following requirements:

1. The operating temperature shall be approximately 50°F (10°C) above the normal temperature within the duct system, but not less than 160°F (71°C).
2. The operating temperature shall be not more than 286°F (141°C) where located in a smoke control system complying with Section 909.
3. ~~Where a combination fire/smoke damper is located in a smoke control system complying with Section 909, the operating temperature rating shall be approximately 50°F (10°C) above the maximum smoke control system designed operating temperature, or a maximum temperature of 350°F (177°C). The temperature shall not exceed the UL 555S degradation test temperature rating for a combination fire/smoke damper.~~

**716.5.3.1 (IMC [B] 607.5.5.1) Smoke control system shafts.** A combination smoke/fire damper shall be installed in smoke control system shaft penetrations. Where a combination fire/smoke damper is located in a smoke control system complying with Section 909, the operating temperature rating shall be approximately 50°F (27.8°C) above the maximum smoke control system designed operating temperature, or a maximum temperature of 350°F (177°C). The temperature shall not exceed the UL 555S degradation test temperature rating for a combination fire/smoke damper. Combination fire/smoke dampers installed in smoke control system shaft penetrations shall not be activated by local area smoke detection unless it is secondary to the smoke management system controls.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The proposed language adds scoping to require combination fire/smoke dampers in smoke control shaft penetrations which will allow the smoke control system to function for at least the intended time period and then protect shaft openings if the fire gets to the point where it could spread to other areas of the building.

Various subsections of Sec. 716 allow fire dampers to be excluded in smoke control shaft penetrations where they may interfere with smoke control operation. Currently, an approved alternative form of protection must be utilized, as indicated in Sec. 716.2.1. The approved alternative usually includes the installation of dynamic combination fire/smoke dampers or the use of sub-ducts. Testimony in Palm Springs addressed the need to not have dampers in some smoke control system designs. In those cases the alternative materials, design and methods of construction and equipment process of IBC Section 104.11 may be utilized.

Section 716.3 stipulates that a combination fire/smoke damper shall comply with both UL 555 and 555S, which insures that the damper will remain functional even when subjected to significant air movement. A static damper may fail when subjected to significant air movement and that is one of the reasons why they should not be used in a smoke control shaft penetration.

Combination fire/smoke dampers used in smoke control shafts should be actuated by heat and not smoke. Language prohibiting activation by local area smoke detection was added to resolve this issue. Local area smoke detection may be provided but it must be secondary to smoke control system detection and controls.

The text in IBC Section 716.3.1.1, related to higher operating temperatures for combination fire/smoke dampers used in a smoke control system, has been relocated to Section 716.5.3.1 so it will become part of the scoping language requiring combination fire/smoke dampers in smoke control system shaft penetrations. Higher operating temperatures for combination fire/smoke damper actuation will provide more time before the damper closes, thereby allowing the smoke control system to operate for at least the required 20 minutes specified in Sec. 909.4.6.

Keep in mind the code requires the smoke control system to function for 20 minutes but the shaft is supposed to still be there for one or two hours, depending on the number of stories it serves. If the sprinkler system does not contain the fire then the combination fire/smoke damper will close and reduce the potential for smoke and fire to spread through the building via the smoke control shaft.

Final Action: AS AM AMPC____ D

# FS139-07/08

## 716.3, 716.3.1, 716.3.2, 716.3.2.1 (New),Table 716.3.3.1, 716.3.2.2 (New), 716.3.1.1, 716.3.3.1 (New), 716.3.2.1, 716.3.3.3 (New) [IMC [B] 607.3, [B] 607.3.1, [B] Table 607.3.1, [B] 607.3.1.1, [B] 607.3.2, [B] 607.3.2.1

*Proposed Change as Submitted:*

**Proponent:** Lee J. Kranz, City of Bellevue, representing The Washington Association of Building Officials (WABO), Technical Code Development Committee

**Revise as follows:**

**716.3 (IMC [B] 607.3) Damper testing, ~~and~~ ratings and actuation.** Damper testing, ratings and actuation shall be in accordance with Sections 716.3.1 through 716.3.3.

**716.3.1 (IMC [B] 607.3.1) Damper testing.** Dampers shall be listed and bear the label of an approved testing agency indicating compliance with the standards in this section. Fire dampers shall comply with the requirements of UL 555. Only fire dampers labeled for use in dynamic systems shall be installed in heating, ventilation and air-conditioning systems designed to operate with fans on during a fire. Smoke dampers shall comply with the requirements of UL 555S. Combination fire/smoke dampers shall comply with the requirements of both UL 555 and UL 555S. Ceiling radiation dampers shall comply with the requirements of UL 555C.

~~716.3.1.2~~ **716.3.2 (IMC [B] ~~607.3.1~~ 607.3.2) ~~Fire protection~~ Damper rating.** Damper ratings shall be in accordance with Sections 716.3.2.1 and 716.3.2.2.

**716.3.2.1 (IMC [B] 607.3.2.1) Fire damper ratings.** Fire dampers shall have the minimum fire protection rating specified in Table ~~716.3.1~~ 716.3.2.1 for the type of penetration.

**TABLE ~~716.3.1~~ 716.3.2.1 (IMC [B] Table ~~607.3.1~~ 607.3.2.1)**
**FIRE DAMPER RATING**

(Portions of table not shown do not change)

**716.3.2.2 (IMC [B] 607.3.2.2) Smoke damper ratings.** Smoke damper leakage ratings shall not be less than Class II. Elevated temperature ratings shall not be less than 250°F (121°C).

~~716.3.1.1~~ **716.3.3 (IMC [B] ~~607.3.1.1~~ 607.3.3) ~~Fire~~ Damper ~~actuating device~~ actuation.** Damper actuation shall be in accordance with 716.3.3.1 through 716.3.3.3 as applicable.

**716.3.3.1 (IMC [B] 607.3.3.1) Fire damper actuation device.** The fire damper ~~actuating~~ actuation device shall meet one of the following requirements:

1. The operating temperature shall be approximately 50°F (10°C) above the normal temperature within the duct system, but not less than 160°F (71°C).
2. The operating temperature shall be not more than 286°F (141°C) where located in a smoke control system complying with Section 909.
3. ~~Where a combination fire/smoke damper is located in a smoke control system complying with Section 909, the operating temperature rating shall be approximately 50°F (10°C) above the maximum smoke control system designed operating temperature, or a maximum temperature of 350°F (177°C). The temperature shall not exceed the UL 555S degradation test temperature rating for a combination fire/smoke damper.~~

~~**716.3.2 (IMC [B] 607.3.2) Smoke damper ratings.** Smoke damper leakage ratings shall not be less than Class II. Elevated temperature ratings shall not be less than 250°F (121°C).~~

~~716.3.2.1~~ **716.3.3.2 (IMC [B] ~~607.3.2.1~~ 607.3.3.2) Smoke damper actuation methods.** The smoke damper shall close upon actuation of a listed smoke detector or detectors installed in accordance with Section 907.10 and one of the following methods, as applicable:

1. Where a smoke damper is installed within a duct, a smoke detector shall be installed in the duct within 5 feet (1524 mm) of the damper with no air outlets or inlets between the detector and the damper. The detector shall be listed for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.
2. Where a smoke damper is installed above smoke barrier doors in a smoke barrier, a spot-type detector listed for releasing service shall be installed on either side of the smoke barrier door opening.
3. Where a smoke damper is installed within an unducted opening in a wall, a spot-type detector listed for releasing service shall be installed within 5 feet (1524 mm) horizontally of the damper.
4. Where a smoke damper is installed in a corridor wall or ceiling, the damper shall be permitted to be controlled by a smoke detection system installed in the corridor.
5. Where a total-coverage smoke detector system is provided within areas served by a heating, ventilation and air-conditioning (HVAC) system, smoke dampers shall be permitted to be controlled by the smoke detection system.

**716.3.3.3 (IMC [B] 607.3.3.3) Smoke control system damper actuation.** Where a combination fire/smoke damper is located in a smoke control system complying with Section 909, the operating temperature rating shall be approximately 50°F (27.8°C) above the maximum smoke control system designed operating temperature, or a maximum temperature of 350°F (177°C). The temperature shall not exceed the UL 555S degradation test temperature rating for a combination fire/smoke damper.

**Reason:** This is a reorganization of IBC Section 716.3 related to fire damper, smoke damper and combination fire/smoke damper testing, rating and actuation requirements. The proposed format addresses testing, rating and actuation for all 3 types of dampers into 3 separate subsections which organizes the information to be more user friendly. Item #3 of Section 716.3.1.1 has been relocated to a new Section 716.3.3.3 and has a new title that more accurately reflects its purpose.

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

**Committee Action:** **Disapproved**

**Committee Reason:** Based on the proponent's request for disapproval.

**Assembly Action:** **None**

## *Individual Consideration Agenda*

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

*Public Comment:*

**Lee J. Kranz, City of Bellevue, Washington, representing Washington Association of Building Officials Technical Code Development Committee, requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**716.3.2 (IMC [B] 607.3.2) Damper rating.** Damper ratings shall be in accordance with Sections 716.3.2.1 ~~and 716.3.2.2~~ through 716.3.2.3.

**716.3.2.3 (IMC [B] 607.3.2.3) Combination fire/smoke damper ratings.** Combination fire/smoke dampers shall have the minimum fire protection rating specified for fire dampers in Table 716.3.2.1 for the type of penetration and shall also have a minimum Class II leakage rating and a minimum elevated temperature rating of 250°F (121°C).

**716.3.3.1 (IMC [B] 607.3.3.1) Fire damper actuation device.** The fire damper actuation device shall meet one of the following requirements:

1. The operating temperature shall be approximately 50°F (10°C) above the normal temperature within the duct system, but not less than 160°F (71°C).
2. The operating temperature shall be not more than 350°F (177°C) ~~286°F (141°C)~~ where located in a smoke control system complying with Section 909.

**716.3.3.2 (IMC [B] 607.3.3.2) Smoke damper actuation ~~methods~~.** The smoke damper shall close upon actuation of a listed smoke detector or detectors installed in accordance with Section 907.10 and one of the following methods, as applicable:

1. Where a smoke damper is installed within a duct, a smoke detector shall be installed in the duct within 5 feet (1524 mm) of the damper with no air outlets or inlets between the detector and the damper. The detector shall be listed for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.
2. Where a smoke damper is installed above smoke barrier doors in a smoke barrier, a spot-type detector listed for releasing service shall be installed on either side of the smoke barrier door opening.

3. Where a smoke damper is installed within an unducted opening in a wall, a spot-type detector listed for releasing service shall be installed within 5 feet (1524 mm) horizontally of the damper.
4. Where a smoke damper is installed in a corridor wall or ceiling, the damper shall be permitted to be controlled by a smoke detection system installed in the corridor.
5. Where a total-coverage smoke detector system is provided within areas served by a heating, ventilation and air-conditioning (HVAC) system, smoke dampers shall be permitted to be controlled by the smoke detection system.

~~**716.3.3.3 (IMC [B]607.3.3.3)Smoke control system damper actuation.** Where a combination fire/smoke damper is located in a smoke control system complying with Section 909, the operating temperature rating shall be approximately 50°F (27.8°C) above the maximum smoke control system designed operating temperature, or a maximum temperature of 350°F (177°C). The temperature shall not exceed the UL 555S degradation test temperature rating for a combination fire/smoke damper.~~

**716.3.3.3 (IMC [B]607.3.3.3) Combination fire/smoke damper actuation.**Combination fire/smoke damper actuation shall be in accordance with Sections 716.3.3.1 and 716.3.3.2. Combination fire/smoke dampers installed in smoke control system shaft penetrations shall not be activated by local area smoke detection unless it is secondary to the smoke management system controls.

**716.3.3.4 (IMC [B]607.3.3.4)Ceiling radiation damper actuation.** The operating temperature of a ceiling radiation damper actuation device shall be 50°F (27.8°C) above the normal temperature within the duct system, but not less than 160°F (71°C).

**716.6.2.1 (IMC [B]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 ASTME119 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.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** After meeting with industry representatives we are suggesting approval of this proposal.

This code change accomplishes 5 things:

1. It consolidates all the code requirements for testing, ratings and actuation of dampers into one subsection which makes it more user friendly and accessible.
2. Clarifies that combination fire/smoke dampers must meet the hourly rating requirements of Table 716.3.2.1.
3. Modifies the maximum damper operating temperature for fire dampers used in smoke control systems to 350 degrees F to be consistent with other provisions in IBC Section 716.
4. Clarifies that combination fire/smoke dampers used in smoke control systems shall not be activated by a local area detector as that could render the smoke control system inoperable.
5. Adds ceiling radiation damper actuation criteria.

This change is needed to provide better clarity and usability. The format is organized better because it gives the requirements for each of the 4 types of dampers; fire, smoke, combination fire/smoke and ceiling radiation dampers, in 3 separate subsections; testing, rating and actuation.

For clarity please add the following to the bottom of the reason statement: Stikethroughs and underlines show changes to the current code text.

Final Action: AS AM AMPC____ D

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# FS142-07/08
## 716.5.3 (IMC [B] 607.5.5)

*Proposed Change as Submitted:*

**Proponent:** David Frable, US General Services Administration

**Revise as follows:**

**716.5.3 (IMC [B] 607.5.5) (Supp) 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 ASTME119 or UL263 as part of the fire-resistance 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.
5. Fire dampers and combination fire/smoke dampers are not required in kitchen and clothes dryer exhaust system when installed in accordance with the *International Mechanical Code*.
6. In Group B 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 unless smoke dampers are used as part of an approved smoke control system in accordance with Section 909.

**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 does not warrant the need for the installation of smoke dampers at all penetrations of shaft duct/air transfer opening penetrations, unless smoke dampers are used as part of an approved smoke control system.

The justification for smoke dampers in the original code change (FS164-99) was that smoke can travel through a duct to locations in a building that are remote from the fire. While this statement is correct, smoke travel through ducted ventilation shafts has not been a contributing factor to fire deaths in sprinklered Group B occupancies in recent history. Smoke detectors installed at air handling equipment have been a requirement to accomplish automatic shut off of the air handling equipment to minimize the potential of smoke spread through ventilation ducts. In addition, all high-rise fires where smoke spread has been cited as 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.

Therefore, one can conclude that smoke spread in shaft duct/air transfer opening penetrations has not been 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.

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. 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 IBC 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.

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 installing smoke dampers in shaft duct/air transfer opening penetrations 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 installing smoke dampers in shaft duct/air transfer opening penetrations in Group B occupancies, protected throughout by an operational automatic fire sprinkler system has not been based on sound technical documentation and has significantly increased building construction and maintenance costs without increasing the overall safety to the building occupants. A rough cost estimate for the installation of smoke dampers and associated required equipment range from $1500-$3000 per damper or even more for large dampers. This does not include the ongoing cost of testing the dampers and detectors.

Lastly, it should also be noted that some jurisdictions (e.g., Commonwealth of Virginia) are granting similar modifications to the requirement for smoke dampers in exhaust ducts because it is impractical to comply with the IBC and there is no demonstrated need.

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

## Committee Action: Disapproved

**Committee Reason:** The committee felt that this exception for smoke dampers at shaft enclosures was an unsubstantiated sprinkler system trade-off, regardless of the occupancy classification.

## Assembly Action: None

*Individual Consideration Agenda*

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

*Public Comment 1:*

**Lawrence G. Perry, representing Building Owners and Managers Association (BOMA) International, requests Approval as Submitted.**

**Commenter's Reason:** This proposal provides a reasonable exception limited to Group B occupancies. There is no evidence that smoke spread through shafts in a fully sprinklered office building creates a life-safety hazard to occupants or responders. The addition of smoke dampers, historically not required in many areas of the country, introduces an extensive initial cost, as well as significant ongoing maintenance and testing costs, without providing any benefit. There is no bang for many bucks. BOMA International believes that the U.S. General Services Administration has provided adequate substantiation to justify the approval of this item; when this requirement slipped in to the IBC, it did so without any technical substantiation.

*Public Comment 2:*

**David Frable, U.S. General Services Administration requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**716.5.3 (IMC [B]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 ASTME119 as part of the fire resistance 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 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.

~~6.~~ 3. In Group B 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 when an exhaust fan is installed at the upper terminus of the shaft that is powered on upon operation of any fire alarm system initiating device and installed in accordance with the provisions of Section 909.11, so as to maintain a upward airflow to the outside ~~unless smoke dampers are used as part of an approved smoke control system in accordance with Section 909.~~

4~~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.

5~~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.

6~~5~~. Fire dampers and combination fire/smoke dampers are not required in kitchen and clothes dryer exhaust system when installed in accordance with the *International Mechanical Code*.

**Commenter's Reason:** The intent of this modified code change is to acknowledge that Group B occupancies protected by an operational fire sprinkler system and having an exhaust fan installed at the top of the shaft that is powered upon operation of any fire alarm system initiation device provides an acceptable level of safety for building occupants and therefore does not warrant the need for the installation of smoke dampers at all penetrations of shaft duct/air transfer opening penetrations.

We have limited the scope of the proposal to only sprinklered Group B occupancies based on the concerns of members of the 06/07 Fire Safety Code Committee that the original proposed exception was not limited to a specific occupancy and we have included the requirement for an exhaust fan at the top of the shaft based on comments from members of the 07/08 Fire Safety Code Committee.

ased on these revisions, we strongly believe that it unreasonable to state that Group B occupancies protected throughout with automatic fire sprinkler system and having an exhaust fan installed at the top of the shaft that is powered upon operation of any fire alarm system initiation device is not a rationale alternative to installing smoke dampers in shaft duct/air transfer opening penetrations 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 installing smoke dampers in shaft duct/air transfer opening penetrations in Group B occupancies, protected throughout by an operational automatic fire sprinkler system has not been based on sound technical documentation and has significantly increased building construction and maintenance costs without increasing the overall safety to the building occupants.

Therefore, based on our reason statement, we urge the membership to approve as modified the subject modification.

Final Action: AS AM AMPC____ D

# FS144-07/08
## 716.5.3 (IBC [B] 607.5.5)

*Proposed Change as Submitted:*

**Proponent:** Raymond A. Grill, PE, Arup, representing himself

**Revise as follows:**

**716.5.3 (IMC [B] 607.5.5) (Supp) 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 ASTME119 or UL263 as part of the fire-resistance 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.~~
~~5. Fire dampers and combination fire/smoke dampers are not required in kitchen and clothes dryer exhaust system when installed in accordance with the *International Mechanical Code*.~~

1. Fire and smoke dampers are not required where steel exhaust subducts extend at least 22 inches (559 mm) vertically in exhaust shafts provided there is a continuous airflow upward to the outside.
2. Fire dampers are not required where penetrations are tested in accordance with ASTM E 119 as part of the fire-resistance rated assembly.
3. Fire and smoke dampers are not required where ducts are used as part of an approved smoke-control system in accordance with Section 909.
4. Fire and smoke dampers are not required where 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.
5. Smoke dampers are not required where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.

**Reason:** This proposal has been submitted to simplify the code and to make this section more user friendly. Over the last two cycles, there have been various compromises made that have added exceptions for B and subsequently R occupancies. These changes reinforce why this change should be approved.

FS164-99 was the original code change to the International Building Code that required smoke dampers in addition to fire dampers at duct penetrations of shafts. This change was incorporated during the comment phase of the development of the first edition of the International Building Code.

This requirement did not exist in any of the model building codes (BOCA, UBC & SBC) or in NFPA 101 (Life Safety Code).

The justification for smoke dampers in the original code change is that smoke can travel through a duct to locations in a building that are remote from the fire. While this statement is correct, smoke travel through ducted ventilation shafts has not been a contributing factor to fire deaths in buildings in recent history. Smoke detectors at HVAC equipment have been a requirement to accomplish automatic shut off to minimize the potential of smoke spread through ventilation ducts. For example, the majority of fire deaths in upper stories of the MGM grand fire of 1980 were due to smoke spread through stair shafts and seismic joints that were not protected. Fancoil units in guestrooms drew air from the corridors which also contributed to fatalities. While the HVAC system was cited as a potential source of smoke spread, smoke detectors were not present to provide automatic shutoff of equipment (NFPA Preliminary Report of the MGM Grand Hotel Fire). There was only one fatality in an upper story of the San Juan DuPont fire in 1986 which was not readily explained. Smoke travel through ventilation shafts was not a contributing factor in the First Interstate fire in Los Angeles or the Meridian fire in Philadelphia.

Even in the World Trade Center bombing of 1993, 6 fatalities were attributed to the explosion, but there were no fatalities due to the effects of smoke (Isner, Michael S. and Klem, Thomas J., "World Trade Center Explosion and Fire," National Fire Protection Association).

While these fires were thoroughly investigated, and code changes promulgated to address fire safety issues, smoke dampers in duct penetrations of shafts were never adopted as changes to any of the model codes as a result of these fires.

The original code change (FS164-99) did not present any technical substantiation for the additional requirement for smoke dampers at all penetrations of shafts. The comments submitted by Mr. Frable of the GSA and Mr. Perry of BOMA to the original proposal continue to be valid. In Mr. Frable's comment he stated, "In addition, no technical information or justification was provided on why the steel exhaust sub-duct exception, with continuous air-flow, is inadequate, and requires the addition of a smoke damper. The proponent fails to point out that the exceptions apply only to fire dampers, meaning that even where the exceptions are applied, a smoke damper is required." In Mr. Perry's comment to the original proposal, he states, "This proposal includes either an inadvertent oversight on behalf of the proponent, or an interesting new approach to exponentially expanding the market for smoke dampers. In either case, it should be disapproved." He concludes his comment with, "There was virtually no justification offered to substantiate the addition of smoke dampers to all shaft duct/air transfer opening penetrations, regardless of building size and height. There was none at all offered to essentially eliminate the exceptions which have been used in the model codes for years."

The 2003 addition of the IBC was modified so that smoke dampers are not required in toilet exhaust duct penetrations in fully sprinklered Group B Occupancy buildings only. While fire dampers can be eliminated if a steel subduct complying with the IBC is installed, a smoke damper would be required in all other occupancy types including hotels and apartment buildings.

Performance of Fully Sprinklered Buildings

It is important to note that the IBC requires sprinkler protection for most buildings of any significant size or occupant load (see section 903). Therefore, the performance of sprinklered buildings is relevant. There has never been a multiple life loss fire in a fully sprinkler building of any occupancy type where the occupants have not been intimate with the fire or where an explosive or terrorist event has occurred.

The original submitter of the code change in adding the additional smoke dampers does not question the reliability of sprinklers, he questions whether a 98% success factor is adequate to justify not having smoke dampers at duct penetrations and shafts. There were no fire incidents identified as part of the code change to demonstrate the need. The need for smoke dampers at ventilation shafts as a general requirement had never before been considered to be necessary to provide a reasonable level of life safety even in unsprinkler buildings.

Implications of the Requirement

The requirement for installation of smoke dampers drives additional features and requirements. These include a smoke detector in the duct to activate the damper which would be required to be supervised and connected to a fire alarm panel. HVAC controls and logic would be required to cause the appropriate damper operation upon smoke detector initiation. Ongoing maintenance and testing of the above devices is required on a regular frequency to assure operability.

A rough installed cost estimate for the smoke dampers and associated required equipment ranges from $1500-$3000 per damper or even more for large dampers. This does not include the ongoing cost of testing the dampers and detectors.

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

## Committee Action: Disapproved

**Committee Reason:** The committee believes that the shaft enclosure exceptions within Section 716.5.3 as currently contained in the code are easily understood and disagree with the proponent's reorganization of the requirements.

## Assembly Action: None

# *Individual Consideration Agenda*

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

*Public Comment:*

## Ray Grill, ARUP, representing himself, requests Approved as Modified by this public comment.

**Modify proposal as follows:**

**716.5.3 (IMC [B] 607.5.5) (Supp) 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 and smoke dampers are not required where: ~~steel exhaust subducts extend at least 22 inches (559 mm) vertically in exhaust shafts provided there is a continuous airflow upward to the outside.~~
   - 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 ASTME119 or UL263 as part of the fire-resistance 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. Fire dampers are not required where penetrations are tested in accordance with ASTM E 119 as part of the fire-resistance rated assembly.
3. Fire and smoke dampers are not required where ducts are used as part of an approved smoke-control system in accordance with Section 909 and where the smoke damper will interfere with the operation of the smoke control system.
4. ~~Fire and smoke dampers are not required where 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.~~

~~5~~ 4. Smoke dampers are not required where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1 and not otherwise required as part of an engineered smoke control system.

**Commenter's Reason:** The reason the committee gave for recommending disapproval of this proposal was that, "The committee believes that the shaft enclosure exceptions within Section 716.5.3 as currently contained in the code are easily understood and disagree with the proponent's reorganization of the requirements."

The proposed revision simplifies the requirements.

Over the last few code development cycles, since the requirement was first introduced in the 2000 edition of the IBC, the requirement for smoke dampers has been revised every cycle to add another exception because of the technical challenges of implementing the requirement. Now, there are numerous exceptions for shafts that serve rooms and equipment that would cause unwanted smoke detector activation if dampers and detectors were installed.

There has not been any technical justification for the introduction of smoke dampers in shafts. Of all the significant high rise fires that have occurred, the recommendation that smoke dampers be installed due to transfer of smoke in ducted shafts has never been made.

Final Action: AS AM AMPC____ D

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# FS147-07/08, Part I

## 717.2.5, 717.2.5.1

*Proposed Change as Submitted:*

**Proponent:** Jesse J. Beitel, Hughes Associates, Inc., representing Spray Polyurethane Foam Alliance

**PART I – IBC FIRE SAFETY**

**Delete and substitute as follows:**

~~**717.2.5 Ceiling and floor openings.** Where annular space protection is provided in accordance with Exception 6 of Section 707.2, Exception 1 of Section 712.4.1.2, or Section 712.4.2, fireblocking shall be installed at openings around vents, pipes, ducts, chimneys and fireplaces at ceiling and floor levels, with an approved material to resist the free passage of flame and the products of combustion. Factory-built chimneys and fireplaces shall be fireblocked in accordance with UL 103 and UL 127.~~

**717.2.5 Ceiling and floor openings.** Where required by Exception 6 of Section 707.2, Exception 1 of Section 712.4.1.2 or Section 712.4.2, fireblocking of the annular space around vents, pipes, ducts, chimneys and fireplaces at ceilings and floor levels shall be installed with a material specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and resist the free passage of flame and the products of combustion.

**717.2.5.1 Factory-built chimneys and fireplaces.** Factory-built chimneys and fireplaces shall be fireblocked in accordance with UL 103 and UL 127.

**Reason: (IBC)** During the last Code change cycle there were discussions concerning fireblocking materials and their use. To address these issues, this code proposal is a revision to the existing Section 717.2.5 of the IBC.

The revision clarifies the requirements for the fireblocking materials. The requirements are that any material used as fireblocking in combustible construction must demonstrate via testing, that it can remain in place and resist the free passage of flame and products of combustion. While a specific test is not specified, some manufacturers have used existing standardized tests to demonstrate that their materials can meet these requirements.

The language for the performance requirements is similar to that already in Section 717.2.5 and in Section 717.2.1 for loose-fill insulation used as fireblocking.

The revision also allows that any material (combustible or noncombustible) can be used if it demonstrates that it can meet the performance requirements. Thus, the words "approved material" were not included in this revision.

This revision provides clearer requirements to assist Code Officials in using this Section.

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

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

**Committee Reason:** The committee agreed that these proposed revisions provide good performance language describing how fireblocking needs to perform, which will allow for many products to determine compliance.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Michael Vieria, Willdan, representing Sacramento Valley Association of Building Officials (SVABO), requests Approved as Modified by this public comment.**

**Modify proposal as follows:**

**717.2.5 Ceiling and floor openings.** Where required by Exception 6 of Section 707.2, Exception 1 of Section 712.4.1.2 or Section 712.4.2, fire blocking of the annular space around vents, pipes, ducts, chimneys, and fireplaces, at ceilings and floor levels shall be installed with a material specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and resist the free passage of flame and the products of combustion.

**Exception:** Group R-3 occupancies with not more than two dwelling units.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The IBC code change approved in Palm Springs will eliminate products that have been used effectively for years. Compliance with the testing requirements will add an expense for all structures although the "Cost Impact" published in the Code Change Hearing document stated it would not increase the cost of construction. This public comment will add an exception for one and two-family dwelling units and will be consistent with the IRC committee that disapproved Part II of FS-147.

Final Action: AS AM AMPC____ D

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# FS147-07/08, Part II
## IRC R602.8

*Proposed Change as Submitted:*

**Proponent:** Jesse J. Beitel, Hughes Associates, Inc., representing Spray Polyurethane Foam Alliance

**PART II – IRC BUILDING/ENERGY**

**Revise as follows:**

**R602.8 Fireblocking required.** Fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories, and between a top story and the roof space. Fireblocking shall be provided in wood-frame construction in the following locations.

1. In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs; as follows:
   1.1. Vertically at the ceiling and floor levels.
   1.2. Horizontally at intervals not exceeding 10 feet (3048 mm).
2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.
3. In concealed spaces between stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with Section R311.2.2.
4. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with ~~an approved material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E 136 requirements~~ a material specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and resist the free passage of flame and the products of combustion.
5. For the fireblocking of chimneys and fireplaces, see Section R1003.19.
6. Fireblocking of cornices of a two-family dwelling is required at the line of dwelling unit separation.

**Reason: (IRC)** During the last Code change cycle there were discussions concerning fireblocking materials and their use. To address these issues, this code proposal is a revision to the existing Item 4 of Section R602.8 of the IRC.

The revision clarifies the requirements for the fireblocking materials used in this application. The requirements are that any material used as fireblocking must demonstrate via testing, that it can remain in place and resist the free passage of flame and products of combustion. While a specific test is not specified, some manufacturers have used existing standardized tests to demonstrate that their materials can meet these requirements.

The language for the performance requirements is similar to that required in Section R602.8.1.3 [Supplement] of the IRC for loose-fill insulation used as fireblocking.

The revision also allows any material (combustible or noncombustible) to be used if it demonstrates that it can meet the performance requirements. Thus, the additional language added during the last cycle concerning "…not be required to meet the ASTM E 136 requirements" was not included in this revision.

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

**PART II – IRC B/E**
**Committee Action:** **Disapproved**

**Committee Reason:** This proposal would eliminate fireblocking that is in use now and will require testing. There is no testing criteria specified. This may require proprietary material.

**Assembly Action:** **None**

*Individual Consideration Agenda*

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

*Public Comment:*

**Jesse J. Beitel, Hughes Associates, Inc., representing Spray Polyurethane Foam Alliance, requests Approval as Submitted.**

**Commenter's Reason:** While the Committee disapproved this proposal, the issue at hand is that the proposal as submitted will significantly improve the capability of fireblocking to perform its intended function of resisting free passage of flames and hot gases. Currently, fireblocking could be any material that is just stuffed into the annular space. The capability of that material to stay in place in the event of a fire and to resist passage of flame or hot gases is only in the eye of the beholder – no performance criteria is required. The proposed change provides requirements for evaluating the fireblocking material such that it will meet the intent of the Code. While some proprietary materials can be used, any material can be tested and evaluated for use and if they meet the criteria, then they can be used.

Final Action: AS AM AMPC____ D

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# FS149-07/08

## 202 (New), 719.1, 719.2, 719.2.1, 2604 (New), Chapter 35 (New)

*Proposed Change as Submitted:*

**Proponent:** Marcelo M. Hirschler, GBH International, representing American Fire Safety Council

**1. Add new definition as follows:**

**REFLECTIVE PLASTIC CORE FOIL INSULATION.** An insulation material with a reflective metallic surface on at least one side and a thin plastic core containing voids consisting of open or closed cells distributed throughout the material.

**2. Revise as follows:**

**719.1 General.** Insulating materials, including facings such as vapor retarders and vapor-permeable membranes, similar coverings, and all layers of single and multilayer reflective foil insulations, shall comply with the requirements of this section. Where a flame spread index or a smoke-developed index is specified in this section, such index shall be determined in accordance with ASTM E 84 or UL 723. Any material that is subject to an increase in flame spread index or smoke-developed index beyond the limits herein established through the effects of age, moisture, or other atmospheric conditions shall not be permitted.