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Life Safety

DIGEST

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Steel columns with SFRM Fireproofing protection.
Photo of Grace Monokote MK-10HB. *Grace Photo.*

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Editor's Message

Drive through any major or regional city and you'll see High-Rise Buildings. These structures never cease to amaze all who pass them. We all find ourselves looking up to see the top. We take elevators to get to the top and view all that can be seen from the skydecks.

High-Rise Buildings are well regulated, planned and constructed. Common to many building types, fire-resistance-rated and smoke-resistant construction SYSTEMS make a differences in building safety. They create corridors, elevator lobbies, stairwells, and elevator hoistways that keep people safe in buildings. The assemblies can be used for sound control as well.

Learn about requirements for Spray Fire Resistive Materials, Luminescent Markings, Fire Rated Glazing, Engineering Judgments for Firestopping and much more in this issue of *Life Safety Digest*.

We do appreciate your time reading what the authors have shared. 🔥

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How We Found Our Way... A Historical Perspective of Emergency Egress

By Steve Cooper

We all can probably recall, from one of our various travels, getting up in the middle of the night and stumbling our way in the dark across a hotel room in a strange maze; only to stub your toe and bang your knee on some unknown piece of furniture. It wasn't where you remembered it to be when you went to bed. First you call the furniture a few choice names. Then you think about a way you could have avoided the accident.

Well, codes for building egress had a similar start. There is a series of more treacherous events along with progressive improvements over four decades that explain "how we found our way" from darkness to light and ever safer along that path through photoluminescent egress pathway markings.

What happened to get us to "see the light?"

The International Fire Code (IFC) changed requirements in the "High-Rise Building section of the code The IFC defines a High-Rise Building as:

[B] HIGH-RISE BUILDING. *A building with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.*

Below are a few examples of how we got to this point in the fire code development:

- 1984 – Haunted House fire at Great Adventure Amusement Park kills 8, prompting code officials to respond by requiring directional path marking in special amusement buildings.
- 1988 – The State of California, as the result of the Las Vegas MGM Grand fire in 1980 which caused the death of 85 people, adopted a building code requiring floor-level exit signs in hotels.

Ref: State of California Building Code, 1988, Chapter 10

- 1988 – An explosion on the Piper Alpha oil production platform in the North Sea killed 157 men. The International Maritime Organization (IMO) made it mandatory that all oil drilling platforms in the North Sea have photoluminescent emergency path markings.

Ref: International Maritime Organization, ISO 16069/TC145 Safe Way Guidance System (SWGS)

- 1990 – A Scandinavian Star cruise ship fire kills 158. The International Maritime Organization (IMO) passes a requirement in 1993 that pathway marking is mandated on all cruise ships and ferries by 1997.

Ref: International Maritime Organization, ISO 16069/TC145 Safe Way Guidance System (SWGS)

- 1993 – Bombing of the New York City World Trade Center kills 6 and injures more than 1,000. The bomb knocked out normal and emergency lighting, greatly complicating egress. The time required for total building evacuation was over 6 hours. Photoluminescent egress path marking was installed in the tower based on a recommendation by the Port Authority of New York and New Jersey. In 2005, photoluminescent path marking was required by New York City law (NYC Local Law 26). Photoluminescent egress path marking was to be installed as a retroactive requirement and also in new construction for commercial high-rise buildings, by July 1, 2006. Much of this was due to research provided by the National Institute of Standards and Technology who worked in conjunction with the National Research Council of Canada's Dr. Guylene Proulx.

Ref: Federal Investigation of the Evacuation of the World Trade Center on Sept. 11, 2001 www.fire.nist.gov/bfrlpubs/fire07/art018.html New York City Local Law 26, November 2005

- 1997 – With the emergence of markedly brighter pigments, the Federal Aviation Administration (FAA) tested and allowed photoluminescent pathway markings to be installed on commercial aircraft.
- 1999 – Following a deadly train accident, the American Public Transit Association (APTA) released guidelines for the installation of pathway markings on commuter trains by 2006.
- 1999 – The National Research Council of Canada releases a study comparing photoluminescent pathway markings and traditional emergency lighting in the stairwells of a commercial High-Rise Building. The study finds that photoluminescent egress markings speeds evacuation and is comparable to standard electrical limiting.

Ref: Dr. Guylene Proulx, Ph.D was a senior researcher for this report. She was with the National Research Council Canada when she authored the research report titled "**Evaluation of the Effectiveness of Different Photoluminescent Stairwell Installations for the Evacuation of Office Building Occupants.**"

- 2000 – NFPA 101 addresses and includes photoluminescent exit signs in the 2000 version.

Ref: NFPA, Life Safety Code 101, 2000 Chapter 10

- 2001 – The 9/11 attack results in the collapse of the World Trade Center Towers. One of the most commonly mentioned items that assisted 15,000 survivors to escape that day was the photoluminescent path marking installed after the 1993 bombing. In 2005, photoluminescent path marking was required by law (NYC Local Law 26) to be installed as a retrofit requirement and in new construction for commercial high-rise buildings, by July 1, 2006.

Ref: Federal Investigation of the Evacuation of the World Trade Center on Sept. 11, 2001 www.fire.nist.gov/bfrlpubs/fire07/art018.html New York City Local Law 26, November 2005

The same day, Sept. 11, 2001, in the Pentagon, occupants reported extreme difficulty in escaping after Flight 77 slammed into the building knocking out normal and emergency lighting in corridors and stairwells. The Pentagon has since retrofitted the entire facility corridors and stairwells with close to the floor photoluminescent egress path markings and exit signs.

Ref: Photoluminescent Safety Association

- 2003 – The United Nations (UN) Building in New York City voluntarily installs photoluminescent egress path markings in corridors and stairwells.
- 2003 – Power blackout in the Eastern United States (USA). The safeguards put in place after 2003’s power outage in the Eastern USA reduces the odds of blackouts caused by human error. However, they don’t help overtaxed electrical transmission lines during peak demands caused by extreme weather, meaning blackouts of power may still happen.
- 2006 – The State of Connecticut passes legislation requiring egress path marking to be installed in hallways, corridors leading to an exit for new construction in occupancies of more than 300 persons.
- 2007 – National Research Council of Canada release the results of a second egress study on the evacuation of a high-rise building comparing photoluminescent egress path marking to traditional emergency lighting. The study suggests that photoluminescent egress path marking can be an acceptable alternative to emergency lighting.

Ref: Dr. Guylene Proulx, PhD was a senior researcher for this report as well as for the National Research Council Canada research report titled **“Evaluation of the Effectiveness of Different Photoluminescent Stairwell Installations for the Evacuation of Office Building Occupants”**

- 2007 – New Zealand modifies its building code to allow the use of egress path marking as an acceptable equal to emergency lighting to identify the egress path.

- 2007 – The City of Fresno, California passes a local law requiring photoluminescent egress path marking as a retrofit requirement for commercial high-rise building.
- 2009 – In the International Code Council (ICC) Family of Codes, The International Building Code (IBC) and International Fire Code (IFC), Chapter 46, require photoluminescent egress path marking in the stairwells of high-rise buildings in occupancies Assembly (A), Business (B), Education (E), Residential (R1), Institutional (I), and Merchantile (M).

Ref: 2009 International Building Code and 2009 International Fire Code

- 2012 – During the ICC’s 2012 Code Development Cycle, IBC and IFC uphold the requirements of the 2009 codes. The IFC retroactive installation requirements are moved to Chapter 11. Also, the IBC Section 1011.2 states that floor-level exit signs are required in Residential Group R1 occupancies. The exception is that there does not need to be luminous egress path markings “on the level of exit discharge in lobbies that serve as part of the exit path in accordance with IFC Section 1027.1, exception 1.”

Ref: 2012 International Building Code and 2012 International Fire Code

Building egress is a very important part of protecting occupants in an emergency situation. The objective is to keep people safe by providing an obvious and intuitive path to safety, plus a plan based on decades of improvements made from practical examples. Researchers have spent lifetimes studying occupant behavior in buildings during simulated and actual emergency situations.

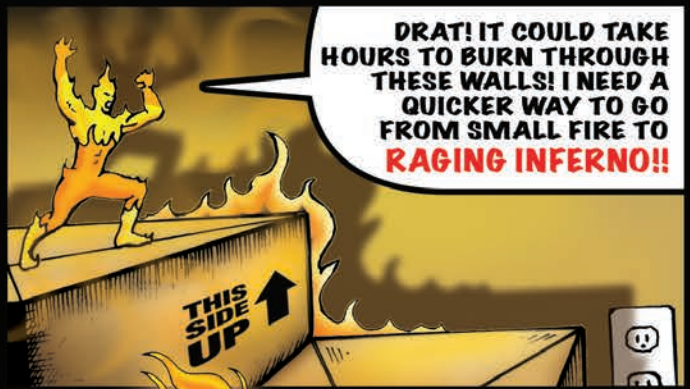
We can and have learned from history and the building code development process. The industry has implemented several regulations to improve egress from buildings in emergency situations through many changes, including photoluminescent egress path and sign marking systems. 🔥

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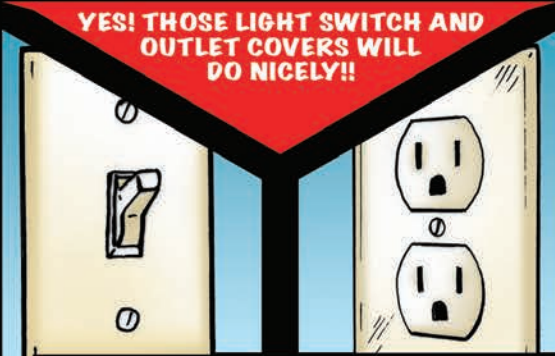
*Want to learn more about the occupancies discussed in this article and Photoluminescent Markings? Check out the Sidebar Article continued on page 29.
–Life Safety Digest Staff*

THE ADVENTURES OF THE APEX™ THE FIRESTOPPER

IN THIS ISSUE, WE FIND A SMALL FIRE HAS STARTED IN A STORAGE ROOM... IT MAY BE SMALL, BUT IT HAS BIG PLANS!



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Significant Changes to Bond Strength Requirements in the 2009 IBC

By John Dalton

In 2009, the International Building Code (IBC) was changed to include higher bond strength requirements for Spray-Applied Fire-Resistive Materials (SFRM), which are based on the height of the building. As a consequence, this change in bond requirement impacts the selection process of SFRMs for projects being constructed that were permitted under the 2009 or later version of the IBC.

The International Building Code lists three physical properties for SFRMs. These physical properties are:

1. Thickness of application
2. Density in pounds per cubic foot
3. Bond strength (adhesion/cohesion).

Of these three physical properties, only bond strength has requirements specifically outlined by the IBC. In the case of thickness of application and density, the code states that these properties must meet the thickness and density requirements of the approved fire resistance design. These properties require special inspection as required in IBC Chapter 17.

In the 2009 IBC, the bond strength requirements changed for SFRM in response to recommendations made by the International Code Council's (ICC) Ad-Hoc Committee on Terrorism Resistant Buildings (TRB) proposals. The ICC's TRB studied the National Institute of Standards and Technology (NIST) reports and made recommendations based on the World Trade Center attack documents. In the reports, NIST recommended an increased bond strength requirement for "High-Rise" Buildings. High-Rise Buildings are defined in Chapter 2 of the IBC as buildings with an occupied floor located more than 75 feet above the lowest level of fire department vehicle access.

Prior to 2009, the IBC required that the bond strength of SFRM, when tested in accordance with ASTM E736, be in excess of 150 per square foot. In 2009 the IBC moved away from a single value for the bond strength of SFRM for all buildings and implemented bond strength requirements based on the height of the building. The IBC maintained the 150 per square foot bond strength requirement for buildings with a height of less than 75 feet, while increasing bond strength requirements for buildings with a height of greater than 75 feet. In fact, the IBC added two new bond strength requirements by segmenting buildings in categories of 75 feet to 420 feet and above 420 feet.

The minimum bond strength for SFRM for buildings greater than 75 feet above the lowest level of fire department vehicle access is provided in the 2009 version of the IBC in Section 403 entitled **High-Rise**

Buildings, while the minimum bond strength of 150 per square foot for SFRM of buildings below 75 feet is stated in Section 1704.12.6, Bond Strength of SFRM. These requirements are detailed in the chart and schematic below:

HEIGHT OF BUILDING ^(a)	SFRM MINIMUM BOND STRENGTH ^(b)
0 TO 74 Feet	150 psf
Greater than 74 Feet, Up to 420 Feet	430 psf
Greater than 420 Feet	1,000 psf

a) Above the lowest level of fire department vehicle access

b) The minimum bond strength requirement for the SFRM must be installed throughout the building.

Source: 2009 International Building Code

It must be noted that the minimum bond strength requirement for the SFRM must be installed throughout the building.



Grace Image

The specification community will need to consider these bond strength requirements when specifying the SFRM on any projects designed under the 2009 or later IBC. Plan reviewers also need to keep this in mind as they review construction documents during the permitting process. Though the new code must be considered when developing criteria for bond strength in a specification, the new bond strength requirements have no impact on any other physical property criteria for the SFRM in a specification.

For example, the new code language has no impact on density requirements. The selection of density criteria is an independent decision to the required minimum bond strength as dictated by the 2009 IBC. Traditionally, SFRMs have been divided into three distinct product groupings based upon their density. There were:

1. Low, standard or commercial density (15-21 pcf) – usually containing a gypsum binder
2. Medium density (22-39 pcf) – usually contains a cement and / or gypsum binder
3. High density (39 + pcf) – containing a cement binder



New York skyline with SFRM on steel columns.
Photo of Grace Monokote MK-10HB. Grace Photo.

Historically, there is a relationship between the applied cost of SFRM and the increase in density. The cost difference is driven primarily by the applied yield of the materials. As density increases, the applied yield of the material will decrease and applied cost increases. Some have attempted to correlate bond strength with cost as well, but the same correlation does not exist.

Until recently the only way to meet the new code requirements was to specify a medium density SFRM product. This is because the market had lacked low density products that could achieve bond strengths in excess of 430 psf. As a result, medium density products are being specified in applications where a standard density product would meet all of the requirements with the exception of bond strength. A prime example of this is when the SFRM is to be concealed once the building is complete in buildings taller than 75 feet.

This practice has created the misconception that medium density spray fire-resistive materials (SFRM) must be specified to meet the new building code high-rise building requirements. This is no longer the case. Over the last year, several new low density products have been introduced to the marketplace that can achieve the required high-rise bond strength requirements. The introduction of these products has created more cost-effective solutions to meeting the new IBC bond strength requirements.

These new low density SFRM products typically provide higher yields, and faster application and coverage rates when compared with medium density

products providing lower in-place cost solutions. Using these new low density products offers significant advantages to the building owner and manager:

Prior to the new bond requirement, designers needed to consider several factors when selecting the appropriate SFRM for a project. The primary questions for determining the appropriate criteria for the SFRM for a project included:

- Will the SFRM be for interior applications or exterior applications?
- Will the SFRM be concealed or exposed?
- If exposed, will the SFRM be exposed to abrasion or simply exposed to view?
- If exposed to abrasion, what is the anticipated level of abrasion?
- Does the SFRM need to be damage resistant?
- Will the SFRM be exposed to high humidity?

Now, for buildings being designed in accordance to the 2009 or later version of the IBC, the following question must also be added:

- How tall will the building be?



Steel frame High Rise Building.
Grace Photo.



Steel columns with SFRM Fireproofing protection. Photo of Grace Monokote MK-10HB. Grace Photo.

With the introduction of the new high bond low density products, the design has more flexibility in selecting the products that meet all of their requirements versus choosing a product that meets the new bond requirements while exceeding all of the other requirements at a higher cost. 🔥

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Fire-Rated Glazing in High-Rise Buildings

By Diana San Diego

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Advances in fire-rated glazing technology have made it possible for architects to use glazing like never before. There was a time when fire-rated glazing simply meant wired glass. Without having to choose between clear views and meeting fire-rated code requirements, today's architects have the freedom to design elegant spaces that incorporate truly transparent fire-rated glazing serving multiple life-saving functions. Fire-rated glazing provides built-in 24/7 protection by effectively compartmentalizing smoke, flames and dangerous radiant heat, enabling occupants to safely exit the building under hazardous conditions.

Fire-rated glass has been used extensively in education and healthcare facilities, and it is making its way into high-rise buildings for both interior and exterior applications. The San Francisco Public Utilities Commission (SFPUC) Office Building featured a 2-hour fire-resistance-rated stairwell for all 14 floors that enabled abundant natural light to penetrate further into the building while providing occupants with expansive views of the surrounding neighborhood. The design team behind The Kensington, a mixed-use residential high-rise in Boston, incorporated the same environmental and visual benefits by including a 1-hour fire-resistance-rated curtain wall on the west elevation which would have never been possible prior to the development of today's fire-resistive glazing products.

High-Rise buildings that prominently use fire-resistance-rated glazing like the SFPUC and The Kensington are not unique. But in order to take full advantage of its benefits, it is important to first understand the types of fire-rated glazing products available today and the allowed applications in the IBC.

Understanding Fire-Protective vs. Fire-Resistive Glazing

Fire-protective glass meets NFPA 252/257 and is designed to compartmentalize smoke and flames and is subject to application, area and size limitations under the IBC. Fire-protective glass is typically used in doors and openings up to 45 minutes and cannot exceed 25% of the total wall area, or 60-/90-minute door vision panel sizes limited to 100 square inches because it does not block radiant heat transmission. Examples include specialty tempered, traditional wired glass, safety wired glass, fire-rated ceramics and specialty fire-protective glass.

While wired glass and ceramics are rated up to 90 and 180 minutes respectively, they are typically limited to small door vision panels, and size limitations may apply in ratings and applications over 45 minutes. In addition, fire-protective glass, such as ceramics and wired glass, have limited use in 1-hour walls, and are prohibited altogether as



The 2-hour transparent stairwell, used in all 14 floors of the SFPUC, is situated prominently near the main lobby. *SAFTIFIRST Photo.*



Part of The Kensington's west facing elevation featured a 1-hour curtain wall that integrated seamlessly. *SAFTIFIRST Photo.*

sidelites, transoms and windows in exit enclosures/stairwells and a majority of fire barrier walls because they cannot block radiant heat.

Fire-resistive glass is tested to ASTM E119/NFPA 251/UL 263, which is the test used to classify a fire-resistance-rated wall or floor assembly and complies with code requirements. Fire-resistive glass is not limited in application or size. This type of glazing compartmentalizes smoke and flames, *and* blocks the transmission of dangerous levels of radiant heat through the glazing. As a result, it can be used in wall and door applications 60 minutes and above without the size limitations that apply to fire-protective glass. Examples include fire-resistive tempered glass units and multi-laminates.

Updated Chapter 7 Tables in the 2012 IBC

The requirements for fire-rated glass can be found in Chapter 7 of the International Code Council’s (ICC) International Building Code (IBC). In the IBC 2012 version, three tables were updated to clarify where fire-protective (or fire protection) and fire-resistive (or fire-resistance) glazing can and cannot be used to make it easier for specifiers, designers, building and fire code officials and installers to clearly categorize, select and apply fire-protective and fire-resistive glazing.

Table 716.3 shows how fire-rated glass is permanently marked based on the performance requirements that product has met:

Excerpt from Table 716.3

Fire Test Standard	Marking	Definition of Marking
ASTM E119 or UL 263	W	Meets wall assembly criteria.
NFPA 257 or UL 9	OH	Meets fire window assembly criteria including the hose stream test.
NFPA 252 or UL 10B or UL 10C	D H T	Meets fire door assembly criteria. Meets fire door assembly “Hose Stream” test. Meets 450° F temperature rise criteria for 30 minutes
	XXX	The time in minutes of the fire resistance or fire protection rating of the glazing assembly

From the Table 716.3 chart above, the key points are:

- “W” means that the glazing has been tested to the fire wall test standard (ASTM E-119/NFPA 251/UL 263) and thus classified as fire resistive.
- Glazing products that are marked “D” means that the product has been tested to the fire door test standard, NFPA 252, and the marking “H” means that it passes the hose stream test. The marking “T” means that the glazing meets the temperature rise limits required for doors used in exit enclosures and passageways.
- Glazing products that are marked “OH” means that the glazing has been tested to the fire window test standard, NFPA 257, and meets both the fire endurance and hose stream requirements of the test standard.

After discussing the different types of fire-rated glazing available today, where is fire-rated glass commonly found in High-Rise buildings?

1- and 2-Hour Stairwell/Exit Enclosures

Stairs are necessary vertical components in an egress path from anywhere other than the ground floor, and the 2012 IBC requires that interior exit stairways be enclosed. Vertical stairwell/exit enclosures four stories and more must be rated for 2 hours while vertical stairwell/exit enclosures less than four stories must be rated for 1 hour.

Below is an excerpt from 2012 IBC Table 716.5 that shows the fire-rated glazing requirement for doors, sidelites and transoms in 1- and 2-hour stairwell/exit enclosures:

Excerpt from Table 716.5

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (HRS.)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (HRS.)	DOOR VISION PANEL SIZE	FIRE RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELITE/TRANSOM ASSEMBLY RATING (HRS.)		FIRE RATED GLAZING MARKING SIDELITE/TRANSOM PANEL	
					Fire Protection	Fire Resistance	Fire Protection	Fire Resistance
Shaft, exit enclosures and exit passageway walls	2	1-1/2	100 sq. in. ^{c,d}	≤100 sq. in. = D-H-90 >100 sq. in. = D-H-T or D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Fire barriers having a required fire-resistance rating of 1 hour. Enclosures for shafts, exit access stairways, exit access ramp, interior exit stairways, interior exit ramps and exit passageway walls.	1	1	100 sq. in. ^{c,d}	≤100 sq. in. = D-H-60 >100 sq. in. = D-H-T-60 or D-H-T-W-60	Not Permitted	1	Not Permitted	W-60

- c. Fire-resistance-rated glazing tested to ASTM E-119 in accordance with Section 716.2 shall be permitted, in the maximum size tested.
- d. Except where the building is equipped throughout with an automatic sprinkler and the fire-rated glazing meets the criteria established in Section 716.5.5.

Based on this 716.5 chart above:

- Fire-protective glazing is limited to 100 square inches in door vision panels in 60- and-90 minute temperature rise doors. However, fire-resistive glazing can be used in door vision panels larger than 100 square inches in 60- and 90-minute temperature rise doors.
- Fire-protective glazing is not permitted in sidelites and transoms surrounding the door.
- Fire-resistive 60-minute glazing must be used in sidelites and transoms surrounding a 60-minute temperature rise door.
- Fire-resistive 120-minute glazing must be used in sidelites and transoms surrounding a 90-minute rise minute door.

Interior Fire-Rated Walls, Barriers and Windows

This excerpt from Table 716.6 shows the different requirements fire window openings in interior walls and fire partitions:

Excerpt from Table 716.6

Type of Wall Assembly	Required Wall Assembly Rating (Hours)	Minimum Fire Window Assembly Rating (Hours)	Fire Rated Glazing Marking
Interior Walls			
Fire Walls	All	NP ^a	W-XXX ^b
Fire Barriers	>1 1	NP ^a NP ^a	W-XXX ^b W-XXX ^b
Incidental use areas (707.3.6), Mixed occupancy separations (707.3.8)	1	3/4	OH-45 or W-60
Fire Partitions	1 0.5	3/4 1/3	OH-45 or W-60 OH-20 or W-30
Smoke Barriers	1	3/4	OH-45 or W-60

Based on the information in the chart, the following conclusions can be stated:

- Only fire-resistive glazing may be used in fire walls and fire barriers rated 1-hour and over, except where 45-minute fire protective glazing is allowed in 1-hour fire barriers used as incidental use areas, mixed occupancy separations, subject to 25% area limits.
- Fire-protective glazing may be used in 1-hour fire partitions and smoke barriers and limited to 25% of the wall area. To exceed the 25% area limitation, fire-resistive glazing rated equal to the wall must be used.

NP = Not Permitted.

- a. Not permitted except fire-resistance-rated glazing assemblies tested to ASTM E 119 or UL 263, as specified in Section 716.2.
- b. xxx = The fire rating duration period in minutes, which shall be equal to the fire-resistance rating required for the wall assembly.

For door assemblies, the requirements are different for assemblies in 2-hour fire barriers and walls vs. 1-hour fire barriers walls, fire partitions and smoke barriers.

Below is an excerpt from Table 716.5:

Type of Assembly	Required Wall Assembly Rating (Hours)	Minimum Fire Door and Fire Shutter Assembly Rating (Hours)	Door Vision Panel Size	Fire Rated Glazing Marking Door Vision Panel	Minimum Sidelite/Transom Assembly Rating (Hours)		Fire Rated Glazing Marking Sidelite/Transom Panel	
					Fire Protection	Fire Resistance	Fire Protection	Fire Resistance
Fire Walls and Fire Barriers having a required fire resistance rating greater than 1 hour	2	1-1/2	100 sq. in.°	≤100 sq. in. = D-H-90 ≥100 sq. in. = D-H-W-90	Not permitted	2	Not permitted	W-120
Other Fire Barriers	1	3/4	Maximum size tested	D-H-NT-45	Fire Protection 3/4		D-H-NT-45	
Other Fire Partitions	1	3/4	Maximum size tested	D-H-45	3/4		D-H-45	
Smoke Barriers	1	1/3 ^b	Maximum size tested	D-20	3/4		D-H-OH-45	

- b. For testing requirements, see Section 716.6.3.
- c. Fire-resistance-rated glazing tested to ASTM E-119 in accordance with Section 716.2 shall be permitted, in the maximum size tested.

Based on the 716.5 chart above:

- Fire-protective glazing is limited to 100 square inches in door vision panels in 90-minute temperature rise and non-temperature rise doors. However, fire-resistive glazing can be used in door vision panels larger than 100 square inches.
- Fire-protective glazing is not permitted in sidelites and transoms surrounding the 90-minute door. 2-hour fire resistive glazing must be used.
- 45-minute fire protective glazing can be used in doors, sidelites and transoms in some 1-hour fire barriers and other fire partitions.
- 20-minute fire-protective glazing can be used in door vision panels in 1-hour smoke barriers. The sidelites and transoms must use 45-minute fire protective glazing.

Building Envelope

The IBC works to protect the spread of fire from building to building by defining horizontal separation distances and requiring fire ratings for building exteriors in close proximity. The IBC measures the building face to the closest interior lot line or the centerline of a street, alley or public way. If there is more than one building on the same property, the IBC refers to an “imaginary” property line.

An exterior wall may or may not be allowed to have openings depending on the fire separation distance. When allowed, the code distinguishes between openings that are “protected” (fire-rated doors, windows, shutters) and “unprotected” (no fire rating). Table 705.8 in the 2012 IBC lays out the percentage of protected and unprotected openings and size limits allowed in exterior walls.

Once it’s been determined from Table 705.8 that protected openings are allowed, Tables 716.6 and 716.5 can be used a guideline for fire-rated glazing requirements.

This excerpt from Table 716.6 shows the requirements for exterior fire-rated windows and walls:

Excerpt from Table 716.6:

Type of Wall Assembly	Required Wall Assembly Rating (Hours)	Minimum Fire Window Assembly Rating (Hours)	Fire Rated Glazing Marking
Exterior Walls	>1 1 0.5	1-1/2 3/4 1/3	OH-90 or W-XXX ^b OH-45 or W-60 OH-20 or W-30

- b. XXX = The fire rating duration period in minutes, which shall be equal to the fire-resistance rating required for the wall assembly.

Based on the chart:

- For walls greater than 1-hour, 90-minute fire-protective glazing is allowed within specified limits.
- For 1-hour walls, 45-minute fire-protective glazing is allowed within specified limits.
- For 30-minute walls, 20-minute fire-protective glazing is allowed within specified limits.
- To exceed specified limits, fire-resistive glazing rated equal to the wall must be used.

This excerpt from Table 716.5 shows the requirements for exterior fire-rated door assemblies:

Excerpt from Table 716.5:

Type of Assembly	Required Wall Assembly Rating (Hours)	Minimum Fire Door and Fire Shutter Assembly Rating (Hours)	Door Vision Panel Size	Fire Rated Glazing Marking Door Vision Panel	Minimum Sidelite/Transom Assembly Rating (Hours)		Fire Rated Glazing Marking Sidelite/Transom Panel	
					Fire Protection	Fire Resistance	Fire Protection	Fire Resistance
Exterior Walls	2	1-1/2	100 sq. in. ^c	≤ 100 sq. in. = D-H-90 > 100 sq. in. = D-H-W-90	Not permitted	2	Not permitted	W-120
					Fire Protection			
	1	3/4	Maximum Size Tested	D-H-45	3/4		D-H-45	

c. Fire-resistance-rated glazing tested to ASTM E-119 in accordance with Section 716.2 shall be permitted, in the maximum size tested.

Based on the chart:

- For 2-hour walls, fire-protective glazing is limited to 100 square inches in door vision panels in 90-minute doors. However, fire-resistive glazing can be used in door vision panels larger than 100 square inches.
- For 2-hour walls, fire-protective glazing is not permitted in sidelites and transoms surrounding the 90-minute door. 2-hour fire-resistive glazing must be used.
- 45-minute fire-protective glazing can be used in doors, sidelites and transoms in 1-hour walls

What About Fire-Rated Framing Requirements?

Because fire-rated glazing is used in door, window and wall assemblies, code requirements for framing must also be considered. Simply put, the fire-rated framing requirements must match the glazing requirements in order for the assembly to fully meet the requirements of the code. Fire-protective framing is allowed where codes allow fire protective glazing. When codes require fire-resistive glazing to block radiant heat transmission, fire-resistive framing must be used, and the entire assembly must meet the same rating requirement as the wall.

In 1- or 2-hour applications where meeting ASTM E-119/NFPA251/UL263 is required, both the glazing and the framing must be fire resistive.

The dual role that fire-rated glass plays by protecting building occupants in the event of a fire while providing tangible, daily benefits in day lighting interior spaces, increased security, improved energy efficiency and aesthetic appeal provides countless benefits to building occupants. With today's 21st century high-rises constantly pushing architects towards innovative design and increased safety, advanced fire-rated glazing will continue to provide designers with cutting-edge products that meet and exceed their expectations. 🔥

Diana San Diego has over 7 years of experience in the architectural glazing industry and over 10 years of experience in public relations and marketing. As the Director of Marketing at SAFTI FIRST, leading USA-manufacturer of fire rated glass and framing systems, she oversees the advertising, public and media relations, content management and educational programs for the company. She may be contacted at 888.653.3333 ext. 756 or via email at dianas@safti.com.

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NFPA 101®-Life Safety Code® Keeping the “Total” in the Total Concept

By Robert Solomon, PE

Editors Note: There are many healthcare structures that classify as High-Rise Buildings. NFPA’s 101, The Life Safety Code, is used in the healthcare industry as the fire code for these important structures.

Since 1926, the NFPA *Life Safety Code* (then known as the *Building Exits* code) recognized the need to blend building construction, active systems and staff response when healthcare occupancies are being designed.

In later years, this concept was formalized into what is now known as the *Total Concept*. The 2012 code defines the total concept in Chapters 18 and 19 (New and Existing Healthcare Occupancies) and includes the following attributes:

- (1) Design, construction, and compartmentation
- (2) Provision for detection, alarm, and extinguishment
- (3) Fire prevention procedures and planning, training, and drilling programs for the isolation of fire, transfer of occupants to areas of refuge, or evacuation of the building

These three provisions work together to provide the optimum level of protection of the occupants. Done properly, they allow the patients (or residents in the case of long-term care) to “defend in place.” In other words, the total concept works to minimize the need to relocate the occupants—a less than desirable action in the healthcare setting.

In order to achieve item (1) noted above, you will find the code requires extensive use of both fire-resistive and non-combustible construction as well as use of smoke compartments to divide every patient floor into at least two spaces. The construction of fire-resistance-rated walls and floor/ceiling assemblies work to contain fire and smoke from spreading between adjacent areas and floors. The aforementioned smoke compartments are created by smoke barriers. Smoke barriers are designed to contain smoke, or at least limit the movement of smoke across the smoke barrier. This permits the occupants to be transferred from the compartment with the fire to the adjacent compartment to defend in place until the fire can be brought under control.

While the code provides numerous details on the design and construction of these various fire-resistance-rated walls, floor/ceiling assemblies and smoke barrier walls, the maintenance of these construction features is a continuous, never-ending process. The scrutiny of healthcare facilities by local or state authorities having jurisdiction (AHJ), accreditation bodies such as The Joint Commission (TJC) or survey visits from the Centers for Medicare

and Medicaid Services (CMS) can all but guarantee these (among many other) specific construction features will be inspected. Continuity of these walls as well as penetrations through the walls is a key factor to ensure that the walls can achieve their intended goal as outlined in NFPA 101. The currently advertised *Barrier Management Symposium* will keep you up to date with the best practice approach to maintaining compliance with the Total Concept and the details that come along with that responsibility. 🔥

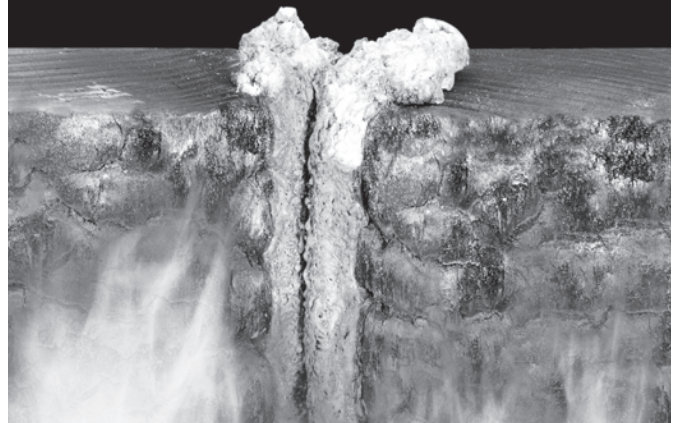
Robert Solomon is Division Manager of Building and Life Safety Codes at NFPA. He oversees the operations of the department whose projects include NFPA 1, Fire Code, NFPA 101, Life Safety Code and the NFPA Building Construction and Safety Code™. Additionally, he serves as an editor for several technical handbooks for NFPA including the Associate Editor for the NFPA Fire Protection Handbook 20th Edition and the Fire and Life Safety Inspection Manual, Ninth Edition. Robert can be reached at rsolomon@nfpa.org.

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Allowing for Design Creativity in High-Rise Structures Without Compromising Fire Safety at the Perimeter of the Building

By: Angie Ogino-Thermafiber, Inc. an Owens Corning Company

Imagine that a new International Building Code “IBC” is passed that states that the exterior curtain wall, in high rise structures, is required to be designed and constructed exactly as it was tested in a 3rd party perimeter fire containment test (ASTM E 2307). Based on the tested systems that are currently available, all buildings would be designed looking very much the same. Imagine what the Chicago or New York skyline would look like.

Every building owner, architect, and designer wants their building to look distinctively different than its neighbors. Buildings are creatively designed around aesthetic appeal, building function, and how the structure fits into the landscape of other existing buildings. Culture and environmental sustainability are also considered in the design of the exterior facade.

However, providing fire safety at the perimeter of the building is also critical. In fact the IBC building code requires that the void created between a rated floor assembly and a non-rated exterior wall must be protected with a system that will prevent the interior spread of fire.¹ These systems are required to be tested to ASTM E 2307 (Standard Test Method for Evaluating Perimeter Fire Barrier Systems Using the Multi-Story Test Apparatus).² The system must be capable of staying securely in place for the time period equal to the fire-resistance rating of the floor assembly.

So how do we provide this critical building safety but still allow the architect/designer the flexibility to design aesthetically appealing buildings? After all, design flexibility can have a negative impact on the fire performance at the exterior of the building. Varying spandrel heights and widths, type of spandrel materials, different geometrical shapes such as sloping curtain walls, vapor control devices, and louvers that allow for natural day-lighting can all influence the performance of the perimeter fire barrier system.

Requiring 3rd party testing on every spandrel condition is one way to be certain that the design is meeting the building code requirement and that the assembly will provide additional time to exit for the building’s occupants. However, curtain wall testing is important but very expensive. One curtain wall test alone could add significant cost per square foot to the project. Also, on larger high-rise structures, it is often the case that there are multiple curtain wall types on one project.

Therefore the practicality of testing each and every curtain wall condition doesn’t always make sense. There are currently over 400 perimeter fire barrier systems in the Underwriters Laboratories and Intertek/Omega Point Laboratories Fire Resistance Directories. These designs have been evaluated per ASTM E 2307 and offer 1, 2 and 3-hour assemblies that will provide the fire protection required at the perimeter of the building and meet the requirements of the International Code Council’s International Building Code. These systems represent over 20 years of testing perimeter fire barrier designs.

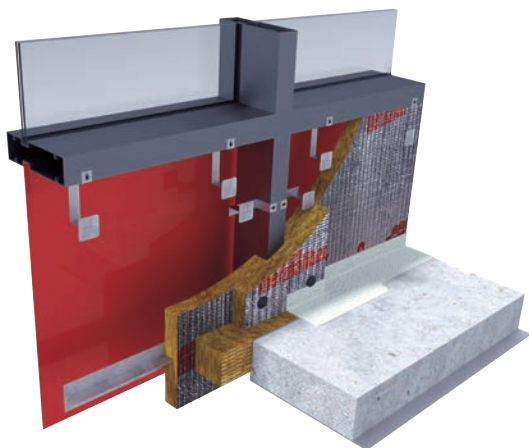
These ASTM E 2307 tested systems were and are designed based on what the manufacturers of perimeter fire barrier systems believe to be the most commonly constructed type of curtain wall systems. Even though there are hundreds of designs listed in the two lab’s Fire Resistance Directories, still these systems do not address every design situation out there. Building design is continually evolving. Buildings that were constructed even 10 years ago do not look or function the same as buildings being designed today. So, again we ask ourselves the question- how do we address additional exit time in buildings and still allow for creative building design?

Engineering Judgments- Quality and Consistency

More times than not, the architectural designs and even field conditions vary from the originally tested system. We often see various, innovative building designs that challenge the limitations of the currently available perimeter fire containment systems listed in the Fire Resistance Directories. When these design and field conditions differ from originally tested systems, Engineering Judgments, or “EJ’s”, are typically developed and provided. EJ’s recommend alternative methods to ensure that the performance of the perimeter fire barrier system is not compromised.³

The International Firestop Council “IFC”, which is a not-for-profit association of manufacturers of fire protective materials that when installed to the parameters of the design become systems, has developed “Recommended Guidelines For Evaluating Perimeter Fire Barrier Systems in Engineering Judgments.” This document was developed as a guideline for writing and interpreting EJ’s. These important guidelines are in place so that EJ’s are

consistent and written so that they follow the same principles accepted and used by the 3rd party testing laboratories and manufacturers of penetration, joint firestopping and perimeter fire containment systems. Understanding the rules of EJ development is just as crucial in the review and approval process for the Authorities Having Jurisdiction “AHJ’s.” Having this consistency leads to confidence in the quality and value of EJ’s.



Thermafiber Perimeter Fire Containment System rendering. *Thermafiber, an Owens Corning Company Photo.*

What Are The Engineering Judgment Guidelines?

- EJ’s should never be used in lieu of an existing test. If the design conditions are the same as an existing system, listed in the UL or Intertek/OPL Fire Resistance Directory, then there really is no need to provide an EJ.
- An EJ should be based on an interpolation of an existing tested perimeter fire barrier system that is similar to the design being evaluated. For example if a glass spandrel, aluminum framed curtain wall system is being used as the basis for the EJ, then the design being evaluated also needs to be a system utilizing similar construction materials - glass spandrel/aluminum framing, along with similar spandrel sizes. You wouldn’t use this same system to evaluate a steel panel curtain wall assembly. Another example would be a floor to wall joint system used to evaluate a perimeter fire containment condition. Cross referencing entirely different systems should never be acceptable. FW-* (floor to wall), HW-* (head of wall), WW-* (wall to wall), etc. systems should never be used to evaluate a perimeter fire barrier assembly since CW-* (Curtain Wall) systems are tested to a different test standard and are not applicable to the perimeter fire containment condition.
- An EJ should be based on the evaluation of the entire construction that is to be protected. For example, the judgment should not only address the joint between the floor slab and the exterior

curtain wall. Perimeter Fire Barrier Systems incorporate the entire assembly which includes the protection of the spandrel wall, the spandrel wall anchors, the exposed framing and the safe-off void. Therefore all of the surrounding construction components need to be taken into consideration when developing a judgment and predicting the fire performance behavior of the entire assembly.

- The EJ should be limited to specific conditions and a specific project. EJ’s should not be written as a blanket letter that covers multiple conditions or multiple projects. Every project has unique conditions. Therefore, the EJ needs to address specific areas of the building (submitted drawing numbers) as well as the project name. EJ’s should never be transferred to any other job.

What Should Be Included In An Engineering Judgment?

- It should be in written form. The judgment can be presented with or without detailed drawings. Drawings are preferred for simplification of installation procedures and evaluations by those requiring an EJ.
- The EJ should be clearly identified as an “Engineering Judgment” and not a listed system.
- Complete instructions on how to assemble the recommended fire barrier system should be clearly outlined in the EJ. There are basic design criteria that are required in providing a successful perimeter fire barrier system. These include the following:
 1. Mechanically attach mineral wool spandrel insulation per the installation requirements of the referenced tested system.
 2. Compression-fit mineral wool insulation within the safe-off void per the installation requirements of the referenced tested system.
 3. Provide a backer/reinforcement member at the floor line behind the spandrel insulation to keep it from bowing due to the compression-fit of the mineral wool insulation in the safe-off void. There are systems available that do not require a backer/reinforcement member, however, the EJ should be based on these specific systems which outline specific conditions that must exist for the no backer/reinforcement rule to be applicable.
 4. Protect exposed vertical mullions with mineral wool insulation mullion covers.
 5. Apply an approved smoke sealant material with details regarding the type and thickness.

The EJ should include the following:

- Project/Job name
- Project location
- Name of firm that EJ is being issued to

- Non-Standard conditions outlined
- Hourly rating required
- Type of assembly used (Example: Glass, Aluminum, Granite, Concrete Spandrel)
- Listed System being used as the basis for the judgment
- Critical dimensions such as the joint width, spandrel height, etc.
- Whether the evaluation is based on a static or dynamic conditions. Static meaning the joint was not evaluated for movement, dynamic meaning it was.
- Type of insulation, thickness and installation requirements including percent of compression.



Firestop Containment Workers install systems and engineering judgments. *Thermafiber, an Owens Corning Company Photo*

Who Should Be Writing Engineering Judgments?

- They should be written by qualified technical personnel from manufacturers with tested and listed systems similar to the proposed design conditions. If a Professional Engineer's "PE" stamp is required, the PE should work in collaboration with the manufacturer's technical personnel in developing the EJ. Having the manufacturer involved in the development of the judgment is crucial since the perimeter fire barrier systems are tested by manufacturers of perimeter fire containment systems. The manufacturer is the one that developed the concepts and tested the perimeter fire barrier systems. They also are the ones that house the actual test report and can refer back to the reports for crucial information such as thermocouple readings, component performance timelines, and other valuable information necessary to predict the performance of materials under fire exposure.
- Independent Testing Laboratories can also issue EJ's. Typically, the EJ is assigned to the lab's fire protection engineer who is responsible for testing perimeter fire barrier systems. This fire protection engineer will also rely on systems tested by manufacturers in the fire protection industry. Please note that there is a fee associated with these requests whereas the manufacturers generally provide EJ's at no charge.

- Third Party Fire Protection Engineers or Consultant can also provide this service. Again, it is important that they work in concert with the firestop manufacturer of the tested system. A fee is also associated with this approach.

Conclusion

Manufacturers of perimeter fire containment systems have been involved for many years in the testing and development of perimeter fire barrier systems. When they are installed correctly, they become systems are designed to contain the fire to the floor of origin of high-rise buildings. Although the intended testing was to provide the design community with the most common curtain wall construction systems for incorporating into the design plan of buildings, there are limitations in their ability to match up to constantly evolving designs.

Therefore, the EJ, when properly done, provides a valuable tool to the construction industry. With the power to issue EJ's comes much responsibility... It is the responsibility of those who issue these evaluations and judgments to use the guidelines in providing sound EJ's. The value of EJ's can be determined by the guidelines in which they are developed. Having guidelines to reference these judgments is beneficial in providing quality and consistency within the firestopping industry. The guidelines arm the designers, contractors and inspectors with a check list that qualifies the credibility of the EJ and ensures that the fire performance at the perimeter condition is not compromised.

Developing new technologies and enhancing building performance through innovative design, should always be encouraged as long as we don't compromise life safety in the process. 🔥

Angie Ogino is Thermafiber, Inc.'s (an Owens Corning Company) Technical Services Leader. Angie has over 15 years experience in the firestopping industry, providing EJ's and technical assistance to architects, building officials, OEMs, and contractors in the fire containment area. Angie is the developer and coordinator of all perimeter fire containment testing for Thermafiber at Underwriters Laboratories, Southwest Research and Intertek/Omega Point Laboratories. Angie is responsible for managing Thermafiber's UL and Intertek/OPL Follow-Up Service Programs and is a LEED AP.

Works cited:

1. International Code Council, International Building Code, Section 715.4 "Exterior curtain wall/floor intersection", IBC 2012.
2. American Society for Testing Materials, "ASTM E 2307 – Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems using the Intermediate Scale Multi-story Test Apparatus".
3. International Firestop Council, "Recommended Guidelines For Evaluating Firestop Systems in Engineering Judgments", www.firestop.org, website – 2013.

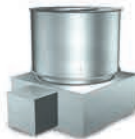


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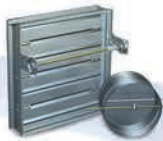
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Industry News

FCIA's Firestop Industry Conference & Trade Show (FIC) – At this year's FCIA FIC Conference, the theme was "Healthcare Focus" with speakers including The Joint Commission's George Mills, the American Society of Healthcare Engineers (ASHE) associate director of advocacy Jonathan Flannery, Canadian Healthcare Engineering Society's (CHES) president Peter Whiteman, UL's Luke Woods, Bill Koffel of Koffel Associates, and more.



TJC's George Mills at FCIA FIC



UL's Matthew Schumann



On the left, 2013 FCIA President Tracy Smith shaking hands with 2014 FCIA President Eric Keeton, on the right

FCIA's president Tracy Smith thanked the board, committees and membership for the 2013 support he received. Incoming 2014 president Eric Keeton spoke about industry unity, a key initiative for keeping fire and life safety first.

FCIA's Ray Usher Golf Tournament funds the Bob LeClair Scholarship for Fire Protection Engineering Students. This year's outing was the largest yet with 64 participants. Plus, we expanded the activities into horseback riding, geocaching and pottery.



Bill Koffel at FCIA FIC



More FCIA fun at the exhibits.

Attendees visited exhibitors 3M Fire Protection Products; Albion, Inc.; American Permalite, Inc.; Balco, Inc.; Emseal Joint Systems; LTD; Hilti; OnCenter Software; Rectorseal, Inc.; Specified Technologies, Inc.; Thermafiber, Inc. (an Owens Corning Company); and Walraven, Inc.

FCIA's leadership stays involved in the association serving on committees, attending conferences, and providing valuable input to the FCIA Board of Directors, when requested. At the FCIA FIC Conference, several of FCIA's past presidents attended including (Left to Right), Blase Reardon, Aedan Gleeson, Tracy Smith, Jodi Clem, Scott Rankin, Don Murphy, Tom Hottenroth, Bob Hasting and Randy Bosscauwen.



FCIA Past Presidents

FCIA ECA Conference Location Announced – Don't miss the FCIA Education and Committee Action Conference at the Omni La Mansion Del Rio Hotel in San Antonio. FCIA's Program Committee promises a great program in addition to FCIA Education for FM & UL Firestop Exams that take place Tuesday and Wednesday, April 29-30. Stay for the rest of the conference April 30, May 1 & 2 and help make a difference in the industry.

New FCIA Board of Directors Named – The Board of Directors at FCIA rotates three people every year. Potential candidates presented why they want to serve on the Board at the FCIA Firestop Industry Conference & Trade Show in Albuquerque, NM. Mark Dietz, Superl, Inc. Lino Lakes, MN; Gary Hamilton, Hamilton Benchmark, Inc. St. Francis, WI; and Ken Slama, National Firestop, Ltd, Winnipeg, MB Canada were elected by the FCIA voting membership to serve two-year terms.



FCIA's 2014 Board of Directors: from left, Eric Keeton, Tracy Smith, Don Murphy, Jodi Clem, Scott Rankin, Mark Dietz, Gary Hamilton, Ken Slama. FCIA Photo

FCIA @ IAS Board Meeting – FCIA’s executive director Bill McHugh participated in the International Accreditation Services Board of Directors Meeting at the ICC Annual Expo and Business Meeting. We made some great friends from around the world at this session.



From left, William McHugh, James Toscas, IAS president Chuck Ramani, John Barrios, Dr. Izz Eddin Katkhuda, and Selso Mata.

ASTM E 06 Meetings – FCIA’s Eric Keeton and Bill McHugh attended ASTM E 06 Task Group Meetings in Jacksonville, FL Oct. 21 and 22. The ASTM E 2174 and ASTM E 2393 Standards will have several ballot items submitted based on the meetings. The ballots will deal with the destructive testing part of the standard and other issues important to quality firestopping inspection.



ASTM E 2174 and ASTM E 2933 were the result of the strategic direction by the association from its inception in 1998. FCIA is pleased to have developed the standards with many contractors, consultants and manufacturers inputting their thoughts into the standards.



FCIA @ CSC Hamilton, Toronto Chapters – FCIA members and CSC members gathered at Hamilton CSC’s November Chapter Meeting then again at the CSC December

Toronto Chapter Meeting to participate in the Firestopping DIIM Education. The program on the DIIM - Design, Installation, Inspection and Maintenance - of firestopping and effective compartmentation continue to be well received by audiences in North America and the Middle East. Watch for a program close to you soon.

FCIA @ CONSTRUCT2013/CSI Annual Convention, SCIP Annual Meeting – FCIA’s Marketing Committee chair Don

Murphy and recently elected director Mark Dietz attended



the CSI Convention in Nashville, TN. Specifiers from around the US and Canada attended and visited the FCIA Exhibit Booth at the show. Additionally, FCIA spoke as part of an “Accreditation Panel” at the Specifications Consultant in Independent Practice Annual Meeting. The specifiers are an important friend to FCIA. They were the first group to advise FCIA that we were going the right direction with the DIIM Strategy.

FCIA MOP Updates – Look for updates to your FCIA Firestop Manual of Practice in late December. Chapter three is being expanded from 50 pages to over 500 with a big focus on “SYSTEMS.” Selecting and analyzing firestop systems is the basis of this firestopping industry. Certainly the products are important and their physical properties matter to serve in the environment that the products will reside during their useful life.

Without being installed to a tested and listed system or Engineering Judgment, the fire-resistance and smoke-resistant system simply does not exist. And, that’s what firestopping is for. Install to the tested and listed system to save lives.

SPECIAL REPORT - FCIA Barrier Management Symposium – The Joint Commission (TJC) has referenced penetrations and openings in fire and smoke barriers in the top 10 audit survey violations in their findings for the past three years at the American Society of Healthcare Engineers (ASHE) Annual Meeting and Expo.

To be effective compartmentation, the fire-resistance rating or smoke-resistant properties must be continuous from outside wall to outside wall and floor to ceiling, with penetrations and openings protected. That “continuity” is great as long as the building is delivered with appropriate protection and is maintained to keep the penetrations and openings fire-resistance-rated and smoke-resistant.

Following up on the successful Colorado Association of Healthcare Engineers and Directors Association (CAHED) Barrier Management Symposium in Colorado Springs, CO, there are several planned for 2014. Watch FCIA.org for more information about how we’re working with the healthcare industry to provide safer buildings for patients.

ICC Rolls out cdpACCESS™– cdpACCESS is the new, online cloud-based tool built exclusively for ICC’s Code Development Process (cdp). Once referred to as remote voting, cdpACCESS is much more than that. With cdpACCESS, a code change proposal can be created and



submitted online, and more.

The cdpACCESS features online collaboration, online submittal of floor modifications at the Committee Action Hearing, online creation and submittal of public comments to the Committee Action Hearing results and online voting on proposed code changes/public comments following the Public Comment Hearing.

Code change proposals for ICC’s Group C Code Development Cycle for the International Green Construction Code (IgCC) are due by January 10. Want to learn more? Attend webinars presented by ICC. Register at www.iccsafe.org/cdpACCESS.

ICC Group C Code Hearings

– Join ICC Members and others at the ICC Group C Code Development Hearings in Memphis, TN. Watch the cdpACCESS launch during the IgCC Code Development Process. Visit www.iccsafe.org, Code Development, for registration info.



ICC Supports Legal Action to Protect Copyright – As a

codes and standards development organization (SDO) with more than 100 years of ensuring the safety of buildings in the United States and around the world, the ICC supports recent action by the National Fire Protection Association (NFPA), ASTM International (ASTM) and the American Society of Heating, Refrigerating and Air Conditioning Engineers

(ASHRAE) to protect their copyright from illegal use. The plaintiffs seek to stop the unauthorized posting of copyright protected materials published by NFPA, ASTM and ASHRAE that undermines SDOs' ability to continuously improve public safety.

"Voluntary, independent consensus-based SDOs develop codes and standards through balanced processes that bring together relevant stakeholders," said ICC CEO Dominic Sims. "The result is high-quality codes and standards that help build safe, sustainable, affordable and resilient communities. Protecting the copyright of codes and standards allows SDOs to offset the costs of the process while reducing the financial burden of government, facilitating building innovation and retaining their independence from special interests."

ICC Board Approves New Code of Ethics – The updated code of ethics ensures that ICC members continue to act with high integrity and that the association's code development process is conducted with no vested interests beyond public safety. With the launch of cdpACCESS, which includes online components to the code development process, the board's action emphasizes that ICC voting members will continue to act with professional integrity, competency and conduct. <http://www.iccsafe.org/AboutICC/Documents/CodeOfEthics.pdf>

"The protection of the health, safety and welfare of the public by creating safe buildings and communities is the solemn responsibility of the International Code Council ("ICC") and all who participate in ICC activities. Recognizing this, the ICC advocates commitment to a standard of professional behavior that exemplifies the highest ideals and principles of ethical conduct. The governing concepts embodied in this philosophy are characterized herein, for the benefit and guidance of those so engaged, and for the enlightenment of the public so served.

Each individual participating in an ICC activity shall:

- Support the mission of the ICC to provide the highest quality codes, standards, products and service for all concerned with the safety and performance of the built environment.
- At all times, act in an ethical manner, comply with the ethical rules and regulations related to his or her profession, and avoid conflicts of interest.
- Demonstrate integrity, honesty, and fairness while participating in ICC activities.
- For ICC certified individuals, maintain professional competence in all areas of employment responsibility and encourage the same for colleagues and associates.
- Act in accordance with the Bylaws and Policies of the International Code Council, including this Code of Ethics.

The ICC Board of Directors may take any actions it deems necessary in order to enforce this Code of Ethics and to preserve the integrity of the International Code Council."



New Feature Available for NFPA Committee Members – My Committee Page – To further support committee members in their work, NFPA has added new features to the My Profile page on NFPA.org. This newly created *My Committees* page provides committee members one central location to view all of their current committee member information.

October NFPA Standards Council Minutes Now Available - The NFPA Standards Council met in San

Diego in October. The agenda included the review of nine TIAs, a new document on extraction tools using reversed hydraulic vegetable oil-based hydraulic fluid, proposed revisions to Technical Committee and document scopes, and pending technical committee membership applications.

The Performance of Sprinkler Systems - Questions have arisen regarding the scope of NFPA 25 and whether the standard is adequate to ensure the successful operation of automatic sprinkler systems. Such fundamental questions called for a more organized method of evaluating the standard and changes have been proposed to NFPA 25 to address these issues. Check out an article in the NFPA Journal's December issue. www.nfpa.org/newsandpublications/nfpajournal/2013/november-december-2013.



New Mobile APP - NFPA announced the release of its new mobile application "NFPA News" for use with the iPhone, iPad, iPod touch and Android operating systems. The free app, now available for download on iTunes and Google Play, provides the latest happenings in the fire, electrical and life safety industry and allows users to access resources related to breaking news, code development updates, public safety

information, social media updates, and multimedia in one easy-to-use to package.

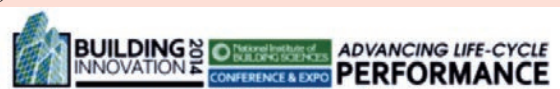
"We created this app as a way to provide useful information and updates that will contribute to fire safety at every level," said Lorraine Carli, NFPA vice president of Outreach and Advocacy.

Unlike similar apps, the free NFPA News mobile app provides instantly updated news releases, fire prevention research, blogs, videos, social media posts, and links to journal articles at your fingertips.

NIBS 2014 Conference - Don't miss the **Building Innovation 2014 — the National Institute of Building Sciences Second Annual Conference & Expo**, January 6-10, 2014, at the Washington Marriott Wardman Park in Washington, D.C.

Participate in the **Multihazard Mitigation Council (MMC) Symposium: Life-Cycle Performance: Moving Forward to More Resilient Communities** and engage with the experts on ways to increase community involvement to improve resilience and prepare for potential disasters. Building on the 2013 MMC Symposium, which had the theme, *Large-Scale Mitigation Planning and Strategies*, the 2014 MMC Symposium will look at barriers to mitigation in the nation's local residential and commercial sectors, and how these barriers impact a community's ability to respond to, and recover from, a disaster. The Portland Cement Association's Steve Szoke is speaking on local code issues along with several other high-level presenters.

As these barriers are eliminated, the United States becomes more resilient and the nation's communities gain increased life-cycle performance. www.nibs.org/?page=conference14_mmc for more info and registration information. 🔥



Code Corner

FCIA @ ICC's Public Comment Hearings

Special Focus – ICC ASHE – Ad Hoc Healthcare Committee Proposals – Jonathan Flannery, ASHE's sr. associate director of advocacy and ASHE's representative at the ICC / ASHE AdHoc Committee on Healthcare, had productive meetings with industry and ICC Governmental Members before and during the ICC public comment hearing.

Jonathan organized meetings with Bill Koffel, rep. FCIA; Dave Collins AIA's representative, Thom Zaremba, Fire Rated Glazing Industry; Vickie Lovell, rep. 3M, Air Movement and Control Association, Fire Safe America – Alliance; Tony Crimi, International Firestop Council; Jeff Hugo, National Fire Sprinkler Association (NFSA); John Williams, State of Washington, Chair, Ad Hoc Committee on Healthcare; and Ed Alitzer, National Association of State Fire Marshals (NASFM) & VA State Fire Marshal; Gary Hamilton; and Bill McHugh of FCIA to review the EB 26 and F212 Code Development Proposal Public Comments. Much great information was shared at the meeting so many could make educated decisions about positions for the formal hearing.



ICC's Public Comment Hearing at Atlantic City, NJ

During one of these ASHE meetings, one of the fire marshals in attendance stated that most fire marshals nationwide give the building "trade off credit" to only maintain the rated construction to what is required for new construction, when the facility installs a sprinkler system throughout the building and after a building risk evaluation...even though the code did not provide a trade off for the investment. In a way, this means that the "trade offs" that were part of EB 26 were happening already in many parts of the country.

At the hearings, many from industry and ICC Governmental Member groups supported the FCIA EB26 and other Proposals. Read on for the details.

EB 26, FCIA's Public Comment 2, which was APPROVED AS SUBMITTED, stated that all healthcare facilities that sprinkler the building throughout will be allowed to maintain only those fire-resistance-rated assemblies that are required in new construction, after a building evaluation.

Below are details for EB 26 and other proposals from the International Code Council Existing Building and Fire Code Public Comment Hearing Monograph:

EB26-13-Public Comment 2

William E. Koffel, P.E., Koffel Associates, Inc. representing Firestop Contractors International Association (FCIA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

803.6 Fire-resistance ratings. Where approved by the code official, buildings where an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 of the International Building Code has been added, and the building is now sprinklered throughout, the required fire-resistance ratings of building elements and materials shall be permitted to meet the requirements of the current building code. The building is required to meet the other applicable fire protection requirements of Chapter 9 of the International Building Code.

Plans, investigation and evaluation reports, and other data shall be submitted indicating which building elements and materials the applicant is requesting the code official to review and approve for determination of applying the current building code fire-resistance ratings. Any special construction features including fire-resistance rated assemblies and smoke-resistive assemblies, conditions of occupancy, means of egress conditions, fire code deficiencies, approved modifications or approved alternative materials, design and methods of construction, and equipment applying to the building that impact required fire-resistance ratings shall be identified in the evaluation reports submitted.

Commenter's Reason: Referring solely to Chapter 9 is problematic in that in one sense it is limiting and can infer that other provisions of the IBC need not be considered. In a similar manner, there may be requirements in Chapter 9 that are not relevant to the construction feature being evaluated. In lieu of creating a laundry list of code requirements to be met, the proposed language relies on the evaluation report addressing the issues to be considered and evaluated.

With respect to fire code deficiencies, the IEBC requires compliance with the IFC. However, as an existing building there may be some deficiencies that are existing but part of plan for correction. These should be included in the evaluation reports.

In the International Fire Code Hearings (F), proposal **F 212, Part I, Public Comment 3**, a Bob Davidson, Davidson Code Concepts, Inc., public comment, connected the Fire Code to the Existing Building (EB) EB 26 language.

F-212-13, Part I-Public Comment 3

Robert J Davidson, Davidson Code Concepts, LLC, representing self, requests Approval as Modified by this Public Comment.

Further modify as follows

SECTION 1103

FIRE SAFETY REQUIREMENTS FOR EXISTING BUILDING

1103.1 Required construction. Existing buildings shall comply with not less than the minimum provisions specified in Table 1103.1 and as further enumerated in Sections 1103.2

through 1103.9. The provisions of this chapter shall not be construed to allow the elimination of fire protection systems or a reduction in the level of fire safety provided in buildings constructed in accordance with previously adopted codes.

Exceptions:

1. ~~Where a change in fire-resistance rating has been approved in accordance with Section 803.6 of the International Existing Building Code. Where approved in accordance with Section 102.4, in Group I-2 Condition 2 buildings where an automatic sprinkler system installed in accordance with Section 903.3.1.1 has been added and the building is now sprinklered throughout, the existing fire resistance ratings, opening protectives, penetrations and joints in assemblies are not required to be maintained where such fire resistance ratings, opening protectives, penetrations and joints are not required in new construction for sprinklered buildings.~~

2. Group U occupancies.

Commenter's Reason: In response to the committee reason statement, this proposal coordinates the IFC with the new language added to the IEBC by EB26-13 with a direct reference to the new language.

This puts into place a process for what is currently happening. Jurisdictions are granting approvals for passive fire protection reduction without clear guidance from the family of I-Codes. In some cases the reductions can be haphazardly approved and when buildings are not provided with an automatic fire suppression system throughout. The requirement is for the entire building to be sprinklered before this evaluation is considered and the pointer to the new Section 803.6 affirms that requirement and provides for a thorough review of the passive protection the applicant is seeking to obtain approval for reduction. This will have the added benefit of stopping the reduction in passive protections for projects to individual work areas or smoke compartments. The building would have to be considered as a whole. EB26 is included here for reference.

EB26-13 AM

803.6 Fire-resistance ratings. *Where approved by the code official, buildings where an automatic sprinkler system installed in accordance with Section 903.3.1.1 and 903.3.1.2 of the International Building Code has been added, and the building is now sprinklered throughout, the required fire-resistance ratings of building elements and materials shall be permitted to meet the requirements of the current building code. The building is required to meet the other applicable fire protection requirements of Chapter 9 of the International Building Code.*

Plans, investigation and evaluation reports, and other data shall be submitted indicating which building elements and materials the applicant is requesting the code official to review and approve for determination of applying the current building code fire-resistance

ratings. Any special construction features, conditions of occupancy, approved modifications or approved alternative materials, design and methods of construction, and equipment applying to the building that impact required fire-resistance ratings shall be identified in the evaluation reports submitted.

In **F212**, Pt. 2 the public comment was withdrawn by the proponent as EB 26 was approved.

The **F218** proposal was APPROVED AS MODIFIED by Public Comment 1.

F-218-13-Public Comment 1:

John Williams, CBO, Chair, ICC Ad Hoc Committee on Health Care and Carl Baldassarra, P.E., FSFPE, Chair, ICC Code Technology Committee, requests Approval as Modified by this Public Comment.

Replace the proposal as follows:

IFC 1103.4.1 Group I occupancies. In Group I occupancies, interior vertical openings connecting two or more stories shall be protected with 1-hour fire-resistance-rated construction.

Exceptions:

1. In Group I-2, unenclosed vertical openings not exceeding two connected stories and not concealed within the building construction shall be permitted as follows:
 - 1.1 The unenclosed vertical openings shall be separated from other unenclosed vertical openings serving other floors by a smoke barrier.
 - 1.2 The unenclosed vertical openings shall be separated from corridors by smoke partitions.
 - 1.3 The unenclosed vertical openings shall be separated from other fire or smoke compartments on the same floors by a smoke barrier.
 - 1.4 On other than the lowest level, the unenclosed vertical openings shall not serve as a required means of egress.
2. In Group I-2, atriums connecting three or more stories shall not require a 1-hour fire-resistance-rated construction when the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3, and all of the following conditions are met:
 - 2.1. For other than existing approved atriums with a smoke control system, where the atrium was constructed and is maintained in accordance with the code in effect at the time the atrium was created, the atrium shall have a smoke control system that is in compliance with Section 909; and,
 - 2.2. Glass walls forming a smoke partition or a glass-block wall assembly shall be permitted when in compliance with 2.2.1 or 2.2.2:

2.2.1. Glass walls forming a smoke partition shall be permitted where all of the following conditions are met:

1. Automatic Sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway or occupied space on the atrium side.
2. The sprinklers shall not be more than 12 inches away from the face of the glass and at intervals along the glass of not greater than 72 inches.
3. Windows in the glass wall shall be non-operating type.
4. The glass wall and windows shall be installed in a gasket frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.
5. The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction.

2.2.2. A fire barrier is not required where a glass-block wall assembly complying with Section 2110 of the International Building Code and having a 3/4-hour fire protection rating is provided.

2.3. Where doors are provided in the glass wall, they shall be either self-closing or automatic-closing and shall be constructed to resist the passage of smoke.

Commenter's Reason: Based on the input from the committee and interested parties, the AHC and CTC present the revised proposal above. The intent of this change is to appropriately address floor openings in existing construction. Today a conflict exists in the code; the building code would allow you to construct a floor opening without a 1-hour fire barrier in certain specific cases. The fire code would then tell you that approval is void and unilaterally require a 1-hour rating around all openings. This also impacts being enforced today and may be a reason why many jurisdictions do not adopt this chapter of the IFC. To set an appropriate retroactive standard, we believe the code should consider the historical context of the model codes. Unrated vertical openings have been allowed in hospitals and nursing homes previously. Atriums have been installed with various types

of smoke venting and removal systems over the past few decades. The AHC has attempted to determine the general requirements that have been broadly used through these versions of codes. If we set the requirements based on the current version of the IBC, the facilities will constantly be tearing out existing, compliant construction to upgrade to new requirements. The federal regulations governing hospitals and nursing homes have used a retroactive standard similar to the one above for the past 10 years. Through our experiences with facilities during that period of time, we believe that the requirements listed above are reasonably consistent with that action.

In regards to the sprinkler question, currently all Group I-2 fire areas are required to have sprinklers retroactively per Chapter 11 of this Code. In Dallas, a code change was accepted to provide sprinkler protection throughout the building by a date certain provided by the adopting jurisdiction. The code change here was modified to state that the atrium option can be used if the "building is equipped throughout."

In F 239, FCIA's Public Comment 2 added that a drop ceiling "had to resist the passage of smoke" in addition to the 1 pound per square foot weight of the tile. This means the manufacturers literature must state that the product is suitable for that application.

F239-13-Public Comment 2

William E. Koffel, P.E., Koffel Associates, Inc., representing Firestop Contractors International Association (FCIA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1105.3.3 Corridor Walls Continuity.

Corridor walls shall extend from the top of the foundation or floor below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a ceiling above where the ceiling membrane is constructed to limit the passage of smoke.
3. The underside of a lay-in ceiling system where the ceiling system is constructed to limit the passage of smoke and where the ceiling tiles weigh at least one pound per square foot of tile.

In F 239, FCIA's Public Comment 4 eliminated big holes in patient sleeping room corridor walls such as "mail slots."

F239-13-Public Comment 4

William E. Koffel, P.E., Koffel Associates, Inc., representing Firestop Contractors International Association (FCIA), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

1105.3.4.3 Openings in corridor walls and doors.

In other than smoke compartments containing patient sleeping rooms, mail slots, pass through windows or similar openings

shall not be required to be protected where the aggregate area of the openings between the corridor and a room are not greater than 80 square inches (51 613 mm²) and are located with the top edge of any opening no higher than 48 inches above the floor.

In F 241, FCIA's Public Comment 1 added penetrations and joints that must comply with the IBC, to the Ad Hoc Committee's corridor section that is now added to the code. This takes us back to "systems." Additionally, as is allowed in NFPA 101, if materials already exist in the building's fire-resistance-rated assembly that were allowed during permit time, then they may remain.

F-241-13-Public Comment 2

William E. Koffel, P.E., Koffel Associates, Inc., representing Firestop Contractors International Association (FCIA), requests Approval as Modified by this Public Comment.

Further modify the proposal as follows:

1105.5.4 Penetrations. *Penetrations of smoke barriers shall comply with the International Building Code.*

Exception: Approved existing materials and methods of construction.

1105.5.5 Joints. Joints made in or between smoke barriers shall comply with International Building Code.

Exception: Approved existing materials and methods of construction.

*(Renumber subsequent sections)
(Portions of proposal not shown remain unchanged.)*

Commenter's Reason: The proposed new section for existing smoke barriers does not address penetrations and joints. Especially as compared to some of the other new sections, the lack of requirements could imply that there are no requirements. Note that F239 (corridors) contains sections on penetrations and joints.

The proposed language indicates that penetrations and joints are to be protected as required by the IBC. However, recognizing that existing penetrations and joints may be protected using materials or construction methods that were acceptable at the time of construction but not permitted by the current edition of the IBC, the proposed language exempts existing approved materials and methods of construction. However, it should be noted that new penetration in an existing smoke barrier would need to be protected as required by the IBC.

F278 – This proposal clarified that rubbish, trash, be removed from "in buildings" daily. Based on the proposal, trash cans over 40 gallons need to be made of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation. It also requires "lids" on the containers meet the same standard. Burning of debris cannot take place unless "approved" by the fire code official. Below are the original code proposal and

the public comment. The area that may be important to contractors is bolded in its entirety in the public comment area.

F-241-13-Public Comment 1

**Marcelo M Hirschler, GBH International
3304.2, 3304.3 (New), 3304.4**

Proposed Change as Submitted

Revise as follows:

3304.2 Waste disposal. Combustible debris shall not be accumulated within buildings. Combustible debris, rubbish and waste material shall be removed from buildings at the end of each shift of work. Combustible debris, rubbish and waste material shall not be disposed of by burning on the site unless approved.

3304.2 Combustible debris, rubbish and waste. Combustible debris, rubbish and waste material shall comply with the requirements of Sections 3304.2.1 through 3304.2.4.

3304.2.1 Combustible debris, rubbish and waste material shall not be accumulated within buildings.

3304.2.2 Combustible debris, rubbish and waste material shall be removed from buildings at the end of each shift of work.

PUBLIC COMMENT IS 3304.2.3

3304.2.3 Rubbish containers. ***Where rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m³) are used Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material, until the end of each shift of work they shall have tight fitting or self closing lids. Such The rubbish containers shall be constructed entirely of materials that comply with one of the following:***

1. Noncombustible materials.

2. Materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.

3304.2.4 Spontaneous ignition. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container.

3304.3 Burning of combustible debris, rubbish and waste. Combustible debris, rubbish and waste material shall not be disposed of by burning on the site unless approved.

3304.3 3304.4 Open burning. *Open burning shall comply with Section 307.*

3304.4 Spontaneous ignition. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container.

Public Comment:

Marcelo M. Hirschler, (GBH International), requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

3304.2.3 Rubbish containers. Where rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m³) are used Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material, until the end of each shift of work they shall have tight fitting or self closing lids. Such The rubbish containers shall be constructed entirely of materials that comply with one of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.

(Portions of proposal not shown remain unchanged.) 🔥

Occupancy Classifications & Photoluminescent Pathway Markings and Signs

Sidebar continued from "How We found Our Way...a Historical Perspective of emergency egress" by Steve Cooper on page 6.

Photoluminescent marking requirements in the International Building and Fire Codes apply to groups A, B, E, R1, I and M. In Chapter 3, the 2012 International Building Code (IBC) occupancy classifications listed "with respect to occupancy" are:

1. Assembly (see Section 303): Groups A-1, A-2, A-3, A-4 and A-5
2. Business (see Section 304): Group B
3. Educational (see Section 305): Group E
4. Factory and Industrial (see Section 306): Groups F-1 and F-2
5. High Hazard (see Section 307): Groups H-1, H-2, H-3, H-4 and H-5
6. Institutional (see Section 308): Groups I-1, I-2, I-3 and I-4
7. Mercantile (see Section 309): Group M
8. Residential (see Section 310): Groups R-1, R-2, R-3 and R-4
9. Storage (see Section 311): Groups S-1 and S-2
10. Utility and Miscellaneous (see Section 312): Group U

In the A, B, E, I and M occupancies, the requirement applies to all occupancies. From the 2012 IBC, R is defined as:

SECTION 310 RESIDENTIAL GROUP R

310.1 Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the International Residential Code.

From the 2012 IBC, The R-1 is:

310.3 Residential Group R-1. Residential occupancies containing sleeping units where the occupants are primarily transient in nature, including:

- Boarding houses (transient) with more than 10 occupants
- Congregate living facilities (transient) with more than 10 occupants
- Hotels (transient)
- Motels (transient)

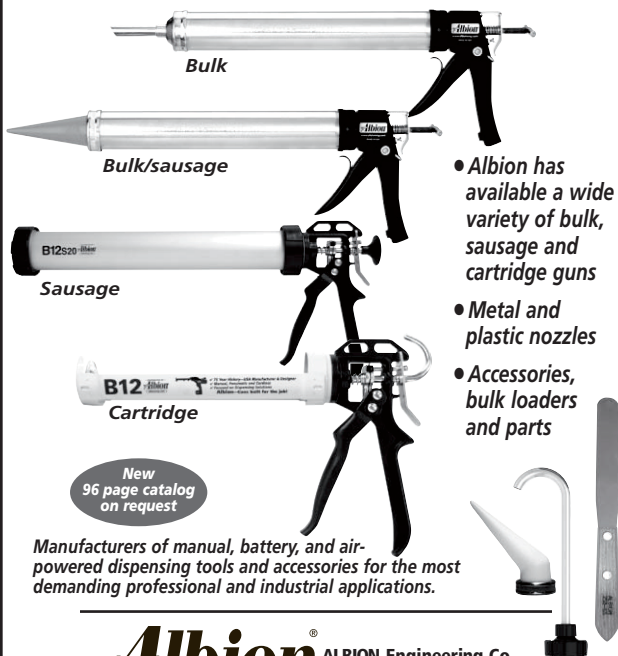
Why R-1s and not other occupancies in R such as boarding houses, care facilities, apartment houses, dormitories and all the other residential occupancies? The reason could be that people in R-1s tend to be "transient" in nature and not permanent residents of a structure. Familiarity with a structure and emergency egress increases the longer a person spends in the structure.

People who stay in hotels may only stay one night. They may either choose not to or do not have time to seek all ways out of a structure for emergencies.

Secondly, emergencies are not planned. Emergency situations, especially at night during sleeping hours, can mean disorientation. Awakening occupants from sleep tends to provide a level of real confusion for most people.

Photoluminescent markings and signage help the egress path become "obvious and intuitive" to building occupants, confused or not. That's paramount for those who really need to know how to get out when the situation matters. 🔥

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Life Safety Digest

2014 Industry Calendar

January 6 to 10

Building Innovation 2014
Conference & Expo
Washington, DC
www.nibs.org

January 10

ICC's International Green
Construction Code
Change Proposals Due
www.iccsafe.org

January 20 to 24

World of Concrete
Las Vegas
www.worldofconcrete.com

February 3 to 5

BOMA's Winter Business
Meeting & National
Issues Conference
Washington, DC
www.boma.org

February 6 to 10

ICON-XCHANGE
Palm Springs, CA
www.iconxchange.org

March 16 to 19

ASHE Planning, Design &
Construction Summit and
Exhibition
Orlando, FL
www.ashe.org

March 18 to 19

International Facility
Managers Association
IFMA Fusion 2014
Ottawa
www.ifma.org

April 7 to 9

ASTM E06 Meetings
Toronto
www.astm.org

April 15 to 17

International Facility
Managers Association
IFMA Fusion DC 2014
Washington, DC
www.ifma.org

April 29 to May 2

FCIA Education and
Committee Action
Meetings
www.fcia.org

April 27 to May 4

ICC Committee Action
Hearings (Group C
Codes)
Memphis, TN
www.iccsafe.org

May 21 to 25

Construction
Specifications Canada
Conference
Kitchener, Ontario
www.csc-dss.ca

June 9 to 12

NFPA Conference & Expo
Las Vegas
www.nfpa.org

June 20 to 22

BOMA 2014 Every
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Expo
Orlando, FL
www.boma.org

June 26 to 28

AIA Convention 2014
Chicago
www.aia.org

August 3 to 6

ASHE Annual Conference
and Technical Exhibition
Chicago
www.ashe.org

September 26 to 27

IIDEX Canada
Toronto
www.iidexcanada.com

September 28 to October 7

ICC Annual Business
Meeting, Expo and Public
Comment Hearings
Ft. Lauderdale, FL

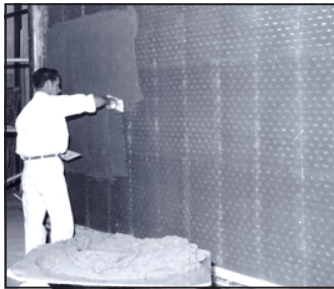
October 5 to 8

ASTM E06 Meetings
www.astm.org

November 4 to 8

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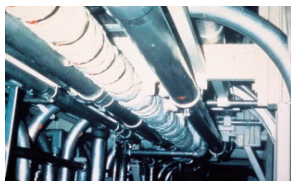
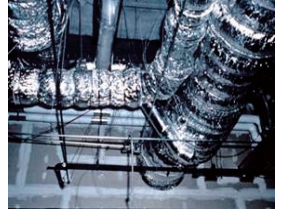
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Specified Technologies Inc. is an industry leading firestop manufacturer with its headquarters located in Somerville, NJ USA. American owned and operated since 1990, STI has a strong commitment to manufacturing and assembling its products in the United States. STI has offices in Latin America, Europe, the Middle East, India and China with representation across every continent. As the industry leader, STI is committed to offering the right products, tested systems and specification tools to get the job done right, ***the first time.***