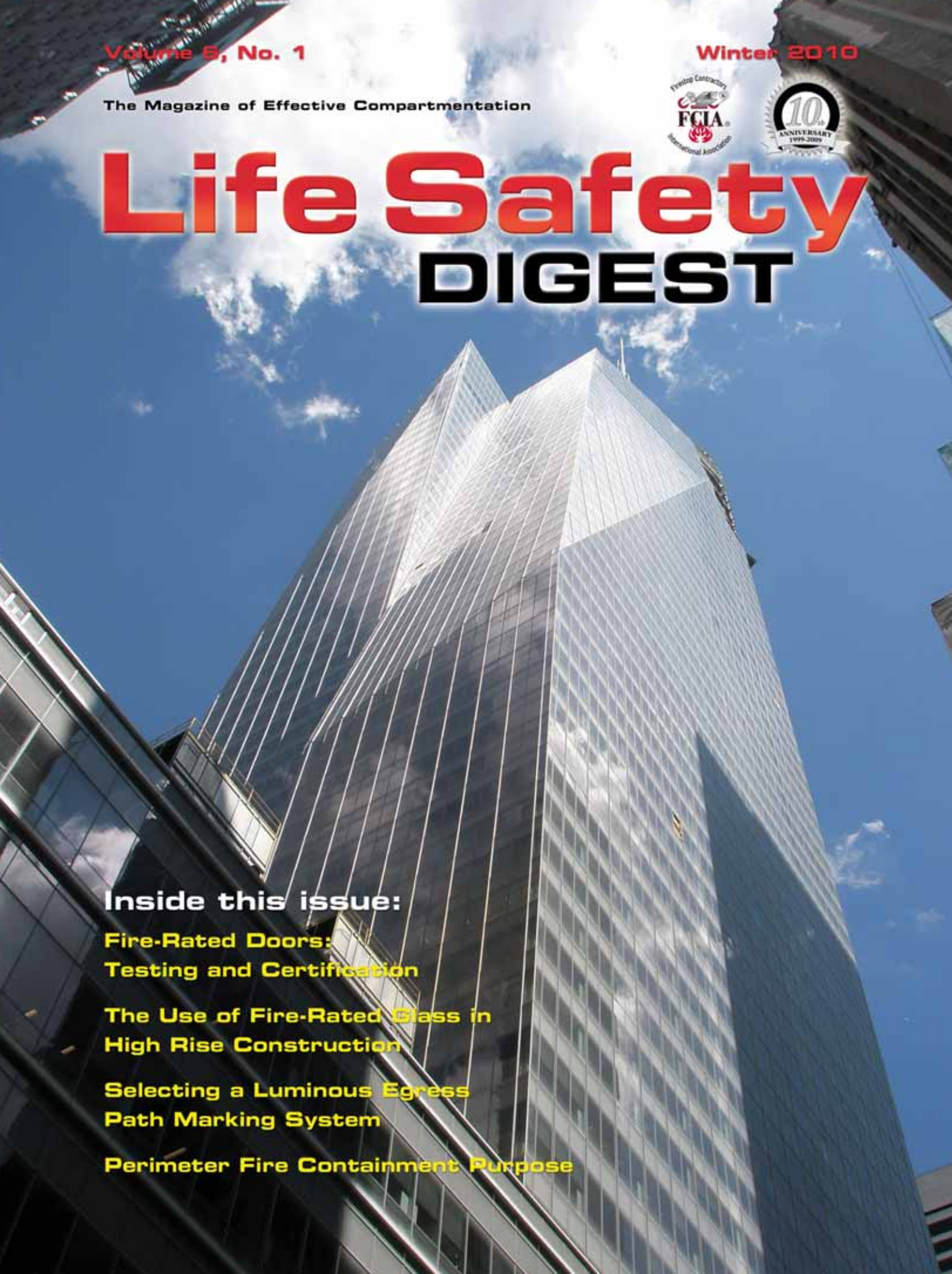
Volume 6, No. 1 Winter 2010

The Magazine of Effective Compartmentation

Life Safety DIGEST



Inside this issue:

Specified Technologies Inc.

FIRESTOPPING, ITS ALL WE DO

...and we do it better!

For 20 years STI has invested heavily in R&D, testing and the firestop industry. As the fully focused manufacturer with the broadest range of products and UL® systems, professional contractors rely on STI for innovation, quality and expertise.

Congratulations On Your 10th Anniversary!

Firestop Contractors FCIA® International Association

Specified Technologies Inc. • 200 Evans Way • Somerville, NJ 08876 USA • T: 800.992.1180 • F: 908.526.9623 • www.stifirestop.com

Life Safety DIGEST

On the Cover:
The Bank of America Building, New York, a city of high rise buildings, stands tall and proud, protected with fire and smoke protection features.

Subscription information:
To subscribe, visit www.fcia.org, click on Life Safety Digest, subscribe. For article submissions, further information, contact FCIA at 708-202-1108 or e-mail info@fcia.org. To unsubscribe, email info@fcia.org, unsubscribe to Life Safety Digest.

Life Safety Digest, Volume 6, No. 1, is published quarterly by The McGraw-Hill Cos. for the Firestop Contractors International Association. Information has been obtained from sources believed to be reliable. However, because of the possibility of human or mechanical error by our sources, the Firestop Contractors International Association does not guarantee the accuracy or completeness of any information and is not responsible for any errors or omissions of for the results obtained from use of such information. The publisher reserves the right to censor, review, edit, reject or cancel any materials not meeting the standards of Life Safety Digest.

Reprints: Life Safety Digest Magazine Reprints are available from FCIA headquarters; 1-100- $.95/issue; 101-500 - $.90/issue ; 501-1000 - $.80/issue; 1000+ - $.70/issue. All shipments FOB Hillside, IL, 60162. Advertisers receive a reprint discount.

Online Availability: Archives of the full magazine, including ads, text of articles and selected tables in this publication are available at http://www.fcia.org , Magazine.

Editorial Contributions: You are invited to share your expertise and perspectives. Before writing, contact FCIA at info@fcia.org for writing guidelines & policies.

Advertising Representatives: Contact McGraw-Hill's sales staff at 312-233-7477.

Contents

HILTI

Firestop Systems

Professional installation. Every time.

Hilti. Outperform. Outlast.

When it comes to Life Safety and code compliance, you can count on the elite team of Hilti Accredited Firestop Contractors. Extensive, manufacturer's-direct training and ongoing field audits by the large network of Hilti Fire Protection Specialists and Independent Hilti Accredited Firestop Speciality Contractors (HAFSC) help limit your liability and offer you peace of mind. Please call your local Hilti representative or Hilti Center to find you local HAFSC.

Editor's Message

FCIA celebrated its 10th Anniversary at the FCIA Firestop Industry Conference & Trade Show in November. Reflecting on the 10 years, there's a lot that has been accomplished. (See editors' message in the last issue of Life Safety Digest).

Since inception, FCIA has worked to bring Firestop Systems, Effective Compartmentation and the "DIIM" Method (proper Design, Installation, Inspection and Maintenance) for the industry in codes and standards for reliability in our industry. Other compartmentation industries have followed suit, and we have all shared best practices.

At the ICC Code Development Hearings in Baltimore, several code change proposals we've been working on were approved by the committee. Special inspections for firestopping, marking fire-resistance-rated and smoke-resistant assemblies…and much more. (See the Code Corner section in this issue.) While we don't win them all, we have racked up a good track record as an industry lately.

Although the day-to-day battles we all face on projects everyday continue, there is light at the end of the tunnel for fire and life safety as the initiatives we started long ago start to be recognized by major organizations such as the International Code Council (ICC), the National Fire Protection Association (NFPA), and the major specifiers of fire and life safety systems.

For this and many more reasons, take the time to join and get active in your industry. FCIA and other associations support fire-resistance-rated and smoke-resistant compartmentation – Fire Rated Swinging and Rolling Doors, Fire Rated Glazing, Fire Dampers, Fire Rated Walls and Floors –and work together to build and maintain safer buildings for all.

Fire-Rated Doors: Testing and Certification

Fire doors can look great too.

By Bob McCluney and Robert J. Carpenter

Fire barriers are designed to prevent or interrupt the spread of fire, and smoke barriers are designed to resist the spread of fire and smoke between spaces. By definitions in the International Building Code, fire barriers are wall assemblies, whereas smoke barriers are either wall, floor or ceiling assemblies. Because doors are access portals to any given space, and essentially interrupt the fire and smoke barriers, they must undergo very similar testing and meet similar fire codes and criteria as the fire and smoke barriers themselves.

Fire doors and smoke-resistant door assemblies are tested for specific applications. For smoke resistant assemblies, UL 1784 is referenced in the International Building Code, Section 715.3.4, and other sections. This article discusses only fire doors.

Hollow metal fire door assemblies can carry 20-, 45-, 60-, 90- and 180-minute fire protection ratings, with the doors affixed with various labels (the 60-minute label is strictly for wood veneer doors). The labels specify the amount of time the assembly is able to resist a fire of a given temperature. Fire door assemblies can also carry labels indicating the temperature rise rating of the door.

Temperature rise ratings refer to the transmission of heat from one side of the door to the other. The ratings are given as 250º F, 450º F or 650º F, and apply for a 30-minute time frame only. The 250º F rating is actually the highest rating, because it indicates the lower amount of heat transfer or the most thermally efficient. Their application is often used for stairwells to reduce injuries during an incident by code. A standard fire door does not bear a temperature rise indication on the label. If a temperature rise door is required, it will carry both a fire label and a temperature rise label.

Fire door assemblies are tested and certified by accredited laboratories such as UL (Underwriters Laboratories) or Intertek. The two primary fire tests conducted are the ANSI/UL 10C and the ANSI/UL 10B. ANSI/UL 10C is a positive pressure fire test applicable per the International Building Code (IBC) to side-hinged or pivoted swinging doors ANSI/UL 10B is a neutral pressure test applicable to all other types of doors. Both tests are based upon NFPA 101 building/life safety code requirements for aiding people safely out of a building, and Standard NFPA 80, which outlines fire testing, installation, inspection and maintenance of fire doors.

Fire testing requires that the entire assembly – including wall, door, frame, glazing and hardware – is tested.

The assembly is installed either into a masonry, or steel or wood stud wall. The frame can be attached with sheet metal screws to “Z” brackets or nailing clips—which are spot-welded to the inside of the frame, mounted with wire anchors or bolted in place. The anchoring will depend on the type of wall the assembly is intended to go in. The door is then placed in a closed and latched position, and the furnace is engaged. Fire tests are conducted in furnaces capable of producing a fire exposure of nearly 2,000 ºF.

Immediately following the desired length of fire exposure, the furnace fire is extinguished, and the assembly is removed from the furnace and exposed to the hose stream test. The assembly is impacted with a water hose stream from a fire hose, to simulating a force applied to the door, as may occur as things are falling

Large openings protected with fire doors

Glazing included in fire doors, if allowed

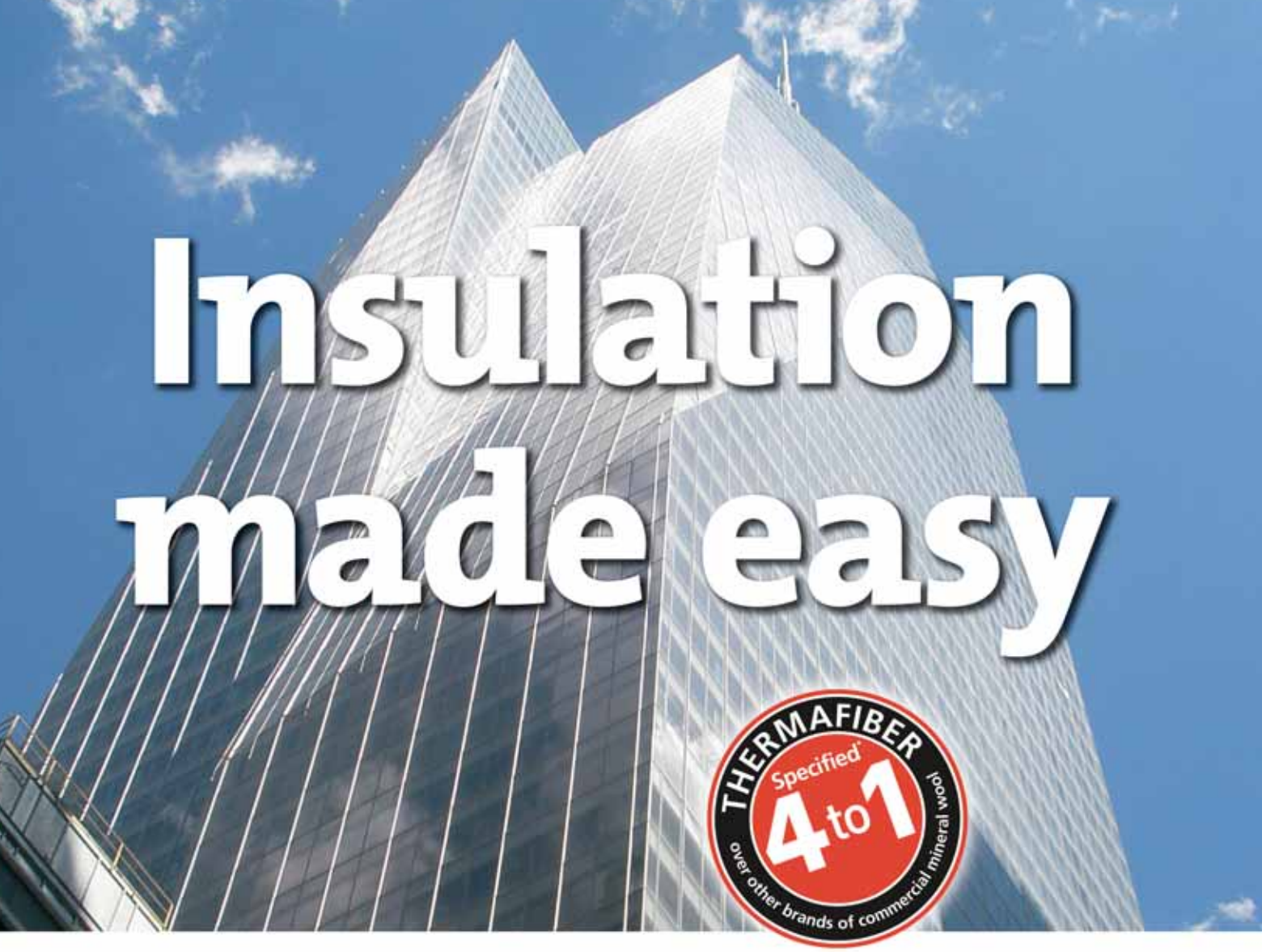
from the ceiling during an actual fire, including ceiling tile, ductwork, light fixtures, etc. The water pressure and duration of the hose stream test differ for different hourly ratings desired.

Some of the Conditions of Acceptance for a door assembly evaluated to ANSI/UL 10C are as follows:

1. No apparent openings anywhere on the assembly during fire exposure.
2. No more than 5% of the glass (of total glass area) dislodged during the hose stream test.
3. Limited separation between leaves of pairs of doors. The swinging movement of one door leaf (of a pair of doors) must have remained within the door's thickness from the edge of the other leaf. *Criteria varies in pairs of doors with specific types of hardware.
4. No separation of frame from the wall or the frame from the door.
5. The swinging movement of the door remains perpendicular to the plane of the door. The door frame must have remained in its original position.
6. A door must not separate more than ½ in. at the latch location.
7. No flaming occurred on the non-fire side of the door during the first 30 minutes of the test.
8. Limited intermittent flaming (6 in. max in length, not exceeding 5-minute intervals) acceptable along door edges after the first 30 minutes of the test.
9. Continuous light flaming on the non-fire side during the last 15 minutes of the test is acceptable as long as it does not exceed a distance of 1 ½ in. from a vertical door edge, 3 in. from the top edge of the door and 3 in. from the top edge of a vision panel's frame.

If a glazing assembly is included within the door assembly, the criteria for passing the test is as follows:

1. The assembly needs to remain secure in its fastenings.
2. Movement of any operable component (at closed position) should not exceed the thickness of the frame member.



Thermafiber Insolutions™

More than insulation ... real solutions.

With Thermafiber, you get more than just batts of mineral wool at the job site—you get real solutions. To help your project stay on schedule and on budget, we developed our five-step Insolutions approach:

1. All-phase consultation
2. High-performance products
3. Cost-saving insulation hanger systems
4. Labor-saving customization and packaging
5. The greenest commercial insulation you can get

For more information, download our Insolutions brochure at: insolutions.thermafiber.com

Thermafiber®
THE NAME IN MINERAL WOOL®

Phone: 888-834-2371
www.thermafiber.com

*Reed Construction Data, June 27, 2008

3. The glass edges should not separate from the glazing frame more than 30% of each individual glass light perimeter.

4. No more than 5% of the glass (of total glass area) was dislodged during the hose stream test.

Temperature rise is measured on the non-fire side of the door for 30 minutes into the test and is measured as the difference in temperature between the temperature of the door and the ambient temperature surrounding the assembly of the unexposed surface.

The maximum door size that can be tested is 8 ft by 10 in. A size that exceeds this limit will not carry a fire label, but will be certified non-combustible and/or UL construction (built from fire-rated materials).

Once a door assembly has undergone the appropriate testing and has been approved for various conditions and requirements, the testing lab will issue a fire label. Each laboratory has independent policies on what information is included on their labels. There are additional policies in terms of what is listed on what assembly component (depending on type, location, use, etc.). Most fire labels will include the name and mark of the certifying lab or organization, the manufacturer (including name, logo and control number), a description of the product, wording that can include “Listed”, “Approved” or “Classified”, and a serial number specific to the product.

The overall rating of the assembly unit will be that of the lowest performing component – whether it be the door, frame or hardware – and each component will be labeled separately. If any one component is not labeled or does not comply with its specific installation requirements, the entire assembly is not compliant with requirements of the International Building Code. .

Furthermore, to verify that a manufacturer is producing fire door assemblies in conformance of the certification, laboratory personnel will inspect a manufacturer’s facility on a regular but unscheduled basis to ensure correct procedures.

Some manufacturers can supply fire ratings with other performance combinations such as acoustical, bullet/blast resistance or radio frequency shielding. Fire curtains, shutters, hinge doors and sliding doors can also be manufactured and certified for fire ratings.

Bob McCluney is President, and Robert J. Carpenter, AHC, is Technical Consultant of Krieger Specialty Products. Krieger has been a leading manufacturer of custom door and window products for over 70 years. Offering industry leading design, testing, manufacturing and installation, Krieger doors and windows fulfill various acoustical, stainless steel, bullet, blast, security, thermal and radio frequency shielding needs. Check them out at http://www.Kriegerproducts.com.

Fire doors protect, when maintained

Single fire doors mean continuous fire barriers

The Use of Fire-Rated Glass in High Rise Construction

Fire rated glazing is clear, yet provides safety

By Bret Penrod

Modern high-rise buildings are becoming increasingly complex, the urban environment congested and the use of buildings more varied. This presents fire safety professionals with increased challenges compounded by diverse occupancies and multiple uses.

Modern methods of construction and the use of specialized materials also present a new set of challenges. The use of fire-rated glass in the interior and the external envelope of the building adds to the comfort of the internal environment while providing passive fire protection.

Fire-rated glass provides interesting clear views inside and outside of the building, and allows natural daylight to stimulate the people who use the building where there otherwise would have been an opaque wall. The optical quality and clarity of fire-rated glass is so great that most people will never realize that this high-performance product is so sophisticated.

In high-rise construction, the key strategic objectives for fire safety are to allow safe escape for the occupants without panic, combined with allowing safe unhindered access for the firefighters and rescue workers to do their job. Fire-rated glass provides protected separation from the flames, heat, smoke and other products of combustion, which is critical for safe egress.

Secondly, the fire must be contained to its place of origin and prevented from spreading, so that the structure is protected from local or general collapse. Fire-resistant glass can be more effective at fulfilling these objectives than traditional solid walls. This is due to the advantages of transparency and openness provided by glass, especially promoting easier vision and therefore less panic and more streamlined crowd movement. Fire-resistant glass based on the intumescent interlayer technology – which in the event of a fire turns from a clear to an opaque insulating barrier- is particularly effective because it points to the fire's location behind the glass as it blocks the fire with a functional fire and heat barrier.

Total Fire Protection includes Compartmentation and Structural Fire Resistance, Sprinker and Suppression Systems, Alarm Systems, and Occupant/Firefighter Education. The Compartmentation discipline is one of the basic principles of fire safe building design.

Fire-rated glass used in walls, openings and doors can contain a fire in the compartment of its origin. Clear fire-rated glass which has been tested to ASTM E 119, the fire-resistance standard used for walls, can now effectively serve as transparent wall assemblies.

This provides architects a new dimension when designing a building for daylight and life safety. Fire-resistance rated walls composed of clear fire-rated glass with intumescent interlayers are being used throughout many buildings including high-rise construction. A crucial benefit of passive fire protection such as Compartmentation is that there are no electronic or other controls that must be triggered to help contain the fire.

Fire-rated glass has many applications beneficial for high-rise buildings. The stairwells in parking garages can now be visually opened for greater security while offer-

ing protection from a burning vehicle or other fires. The use of fire-rated glass allows the people in the stairwells to see who may be lurking about and for the security personnel to have a clear view as to who is coming and going in and out of the building. Adding fire-rated glass also allows natural daylight or passive light to penetrate dark areas that might otherwise need to use artificial lighting, thus decreasing energy usage and bills.

For the building envelope, fire-rated glass can now incorporate many of the high-performance "low e" (low energy use) coatings and tinted glass products that are on the market today. Fire-resistance-rated curtain wall systems have now been tested and listed by independent laboratories for use with fire-resistance glass in wall applications. This allows for broad expanses of fire-resistance-rated glass coated with energy efficient low e coatings or tinted glass to be used for building envelope applications where fire-rated glass is needed for lot line protection while comfortably meeting a U-factor or solar heat gain coefficient energy specified by the energy codes. Triple glazed insulated glass units incorporating fire-rated glass are available to meet even the most stringent U-factor requirements.

In the building interior, fire-rated glass can also be combined with decorative glass, sandblasted for opacity or design features. Fire-rated glass manufactured from a special low iron glass composition is colorless for excellent visible light transmission and does not detract from the desired effects of the functional element or when combined with other glass products. There are many cases where sound absorption specifications must be met as well. The fire-rated glass with the multi-layer intumescent interlayers have especially good STC ratings up to 46 dB and can be further improved with high performance glass products with specific sound absorbing properties to further improve the acoustic performance.

One of the most important aspects of preventing fire spread in high-rise construction is to limit the risk of possible fire movement from floor to floor through the façade elements. Glass facades are vulnerable, but the risk can be countered by installing horizontal strips of fire-resistant glazing at especially high-risk locations (e.g. external to vertical escape stairs and on either side of internal re-entrant corners). Elevator shafts are also now being built with the use of fire-rated glass. Natural daylight is highly desired in these applications where there is the risk of power failure and the potential loss of electrical lighting.

There are also cases, such as police or security stations, where there is fire-rated glass with bullet-resistance ratings. The multi-layer laminated fire-resistance glass can meet level I through level III bullet standards with an anti-spalling film applied to the protected side. There are also applications where fire-rated glass with a bullet rating and one-way mirrors are required and is now in use.

Fire rated glazing provides options for designers

Fire-rated glass floors with listings of up to two hours are now available. The fire-rated glass floors must be tested by third party laboratory as a system; glass with frames, to ASTM E 119, to the required loading. The walking surface is a layer of glass separated in the frame above the fire-rated glass, normally with an anti-slip surface. The same fire-rated glass used in floors can also be used in skylights where there is no human traffic. Fire-rated glass floors and skylights bring daylight right into the heart of the building.

When selecting, specifying or approving a fire-resistance-rated glass, ensure the glass has been tested and is listed by a third-party laboratory, such as Underwriters Laboratories, Inc. All of the test standards for fire-rated-glass rated greater than 20 minutes includes the hose stream test, which protects it from breakage resulting from thermal shock in the event that the glass is quickly

heated by the fire and then rapidly cooled by operation of an automatic sprinkler, or other force.

All glass, including fire-rated glass, used in applications where people can come into contact must pass the human impact safety standards set forth by the Consumer Products Safety Commission (CPSC). In the past, fire-resistance-rated glass was often limited to the 45-minute fire protection rating of wire glass, which does not block the radiant heat from a fire or meet the highest levels of human impact safety.

Now the options for fire-rated glass are expansive and ever increasing. Fire rated glass can help to make high-rise buildings safer, brighter and sustainable with most people not even knowing that the glass has all of the high-tech attributes. Complex buildings with all of the concerns met for safety are now possible with the use of high-performance fire-rated glass.

Bret Penrod, CSI, is General Manager, of Pilkington Fire Protection Glass North America, based in Toledo, Ohio. He can be reached at Bret.Penrod@nsg.com

Fire resistance from fire rated glazing

Selecting a Luminous Egress Path Marking System

By Manny Muniz

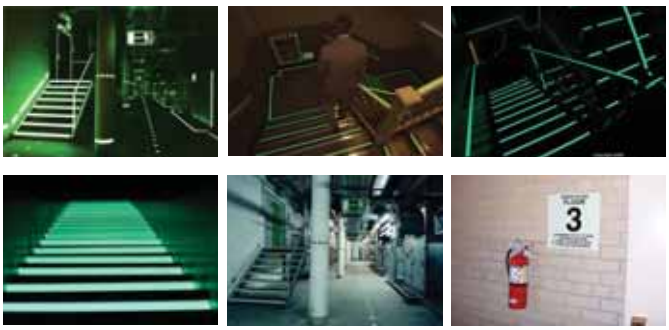
Luminous Egress Path Marking System installers will often be called upon to either assist with or actually make the decision on which Luminous Egress Path Marking System is appropriate for a particular building. This requires certain considerations which must be taken into account in order to arrive at an appropriate selection.

First and foremost, the installer must determine which code requirements are applicable for the building. This can either be very simple, such as in the case of California which has one state code and one edition of that code with local amendments, or challenging like the state of Texas, which allows local jurisdictions to adopt their own codes with different editions.

It should also be noted that different states and local jurisdictions have different rules regarding which code is applicable based on when the plans and specifications are submitted.

Once the code and edition of that code has been ascertained, the exact code requirements for the Luminous Egress Path Marking System must be reviewed in order to have a good understanding of what is required. Remember that codes are dynamic and are constantly undergoing changes. Already, changes to the 2009 International Building Code (IBC) and International Fire Code (IFC) requirements for Luminous Egress Path Marking System are being considered to make improvements in the code language and modify the requirements as determined necessary by the International Code Council (ICC) voting membership.

Many states and local jurisdictions may also have the authority to amend the model code requirements, typically to be more restrictive. Installers should check to make sure they are referencing the correct code, correct edition of that code and any state or local jurisdiction amendments adapted that may alter the requirements for Luminous Egress Path Marking System from the model IBC or IFC Code.



Marking layout and proper installation critical to safety

Next in the selection process is the need to determine what standards the Luminous Egress Path Marking System must comply with. Often times, this can be found in the section describing the Luminous Egress Path Marking System requirements. Other times, one must go to Chapter 35 of the IBC or Chapter 45 of the IFC, Referenced Standards, to find the applicable standards for these systems.

Once you know what standards the Luminous Egress Path Marking System must comply with, you can look at Luminous Egress Path Marking Systems that have documented proof of compliance with those standards. An official document from a testing organization is preferred over a manufacturer's cut sheet. Remember that you are one of the people responsible to see that what you install does, in fact, comply with the code.

The type of building is also a consideration, with questions that must be answered to match the Luminous Egress Path Marking System with the expected conditions. Questions like, "Is the building open to the public, is the public traffic light or heavy, or is this a school building which may experience more vandalism than other buildings, are all considerations worthy of review prior to system selection?" "Is this a new building or an existing building?" The 2009 IBC covers the Luminous Egress Path Marking System requirements for new buildings and the 2009 IFC covers the Luminous Egress Path Marking System requirements for existing buildings. These observations may dictate the type of Luminous Egress Path Marking System that is required.

Knowing what is on the market in terms of Luminous Egress Path Marking Systems is a very important step in this process. Google Luminous Egress Path Marking System and review the various systems and manufacturers. Call them and ask questions. It is no different than what you currently do in selecting firestop systems materials.

The cost of a Luminous Egress Path Marking System is also a prime consideration in the selection process. You will find low cost (budget minded) systems and high-end (Cadillac®) systems. Be careful … as the cheapest system may not be the best choice if it does not provide good performance and exhibit durability under the conditions expected. As the saying goes, you get what you pay for.

Another consideration when selecting a supplier are the tools and training necessary with the various Lu-

Find safety equipment in the dark easily

minous Egress Path Marking Systems. Check with the manufacturer and download the installation instructions to see what is needed. How easy or difficult will this be to install by your personnel?

Once you have selected the Luminous Egress Path Marking System, be able to explain why you chose that particular system and why it is the best suited for the particular building. This will show that you have done your homework and that you are familiar with all the various systems on the market. Become an expert in this field and you will instill confidence in the people you work with.

Finally, like anything else in life, there is a learning curve that never stops. After 21years of working with Luminous Egress Path Marking Systems, a day doesn't go by that I don't learn something new about this topic. Don't be afraid to ask questions either from manufacturers, distributors, code experts or the Authority Having Jurisdiction, (AHJ), who ultimately will state that the system is in compliance with the code.

There is no doubt in my mind as I see the members of FCIA take an interest in this opportunity to become professional installers of Luminous Egress Path Marking Systems that you will also be involved in the dynamic development of the various codes and standards governing such systems.

Manny Muniz is the President of Manny Muniz Associates, LLC, presently the Chair of the Code Development and Interpretation Committee for the National Code Services Association, a Section of the Western Fire Chiefs Association, a member of the various UL and ASTM advisory committees on the standards that govern Luminous Egress Path Marking Systems. He may be reached at manny@mannymuniz.com.

Perimeter Fire Containment Purpose

By Jim Shriver

Perimeter Fire Containment is designed to prevent flame and hot gasses from entering the room above via the void created at the intersection of the floor slab and the interior of the exterior wall assembly. WHY is this necessary? THE ANSWER: The unprotected void at the edge of slab becomes a chimney or flue for fire to rage up the inside of the building, transmitting fire from floor to floor in the building. Refer to the Los Angeles First Interstate Bank fire as a prime example of what can happen when the basics are not followed.

Often overlooked is how much exposure is actually created by the void at the edge of the building. A small building with a perimeter of 200 ft x 200 ft and a typical void of 3 in. creates 200 sq ft of open area that will allow smoke and hot gasses to flow freely to the floor above. Multiply this open area times the number of floors and the risk to life safety of the occupants and first responders becomes a magnitude unthinkable to a building owner or community.

Perimeter fire containment important for high rise construction

Building Code Requirements

The 2009 International Building Code addresses the requirements for perimeter fire containment. Section 714.4 is specific to curtain walls and the floor intersection. This section then directs you to section 705.8.5 Vertical separation of openings. On the surface, section 705.8.5 appears to eliminate the need for protected spandrel panels in sprinkled buildings. Because of the confusion, ICC added section 714.5 to clarify the code requirements and insure a perimeter fire barrier system is installed.

Section 714.4 Exterior curtain wall/floor intersection. Where fire-resistance-rated floor or floor ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies shall be sealed with an approved system to prevent the interior spread of fire. Such systems shall be securely installed and tested in accordance with ASTM E2307 to prevent the passage of heat and hot gasses sufficient to ignite cotton waste. Height and fire resistance requirements for curtain wall spandrels shall comply with Section 705.8.5.

Section 714.5 Spandrel Wall – Height and fire-resistance requirements for curtain wall spandrels shall comply with Section 705.8.5. Where Section 705.8.5 does not require a fire-resistance-rated spandrel wall, the requirements of Section 714.4 shall still apply to the intersection between the spandrel wall and the floor.

Testing and Listed Systems

Underwriters Laboratories, Inc. (UL) and Intertek Laboratory (OPL) test to the ASTM E2307 Standard Test Method Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-Story Test Apparatus. The systems are published in their respective fire resistance directories with over 250 systems currently listed. These systems include numerous types of curtain wall spandrel panels ranging from glass, aluminum and granite using aluminum mullions and transoms, precast structural concrete to EIFS systems, etc. In addition, typical spandrel heights ranging from 36 in. to greater than 60 in. have been tested. Manufacturers continue to test different systems to meet new curtain wall designs that add to the already published systems.

The Problem

Every building has its uniqueness in design and the desire to be aesthetically desirable to the building owners and architects. The result is a beautifully designed facade without a listed and tested system that is remotely close to resembling what was designed. Issues with mullion and transom spacing, multiple transoms, spandrel heights, floor location with respect to the sill height, mounting brackets, etc. all vary and create a variety of conditions. Yet, in the final building approval process, perimeter fire containment must provide a system that meets the building code requirements for Section 714.4 of the 2009 International Building Code.

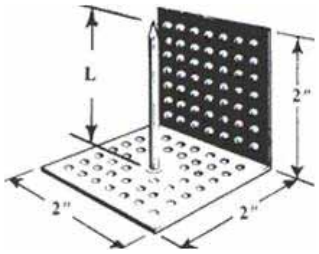
Complicating these requirements are some curtain wall manufacturers' restrictions prohibiting mechanical fasteners from penetrating their mullions or transoms since unitized systems use these areas for water management from the exterior of the building. The building code recognizes that there may be issues within a building's construction that must be resolved in order for the

building official to enforce the provisions of the code. Section 104.11 Alternative materials, design and methods of construction and equipment provides the means to resolve those issues. The key is to provide supporting documentation such as tests, research reports and sufficient evidence that the proposed system meets the basic principles necessary for perimeter fire barrier protection.

The Solution

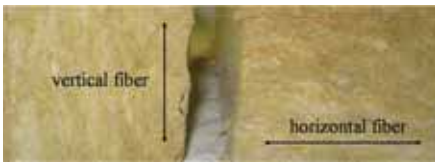
The basics - EVERY listed system in the UL and Intertek (OPL) Fire Resistant Directories have 5 BASIC PRINCIPLES that MUST be applied for a successful perimeter fire containment system:

1. Install a reinforcement member or a stiffener at the safe-off area behind the spandrel insulation to keep it from bowing due to the compression-fit of the safing insulation. (See Figure 1).

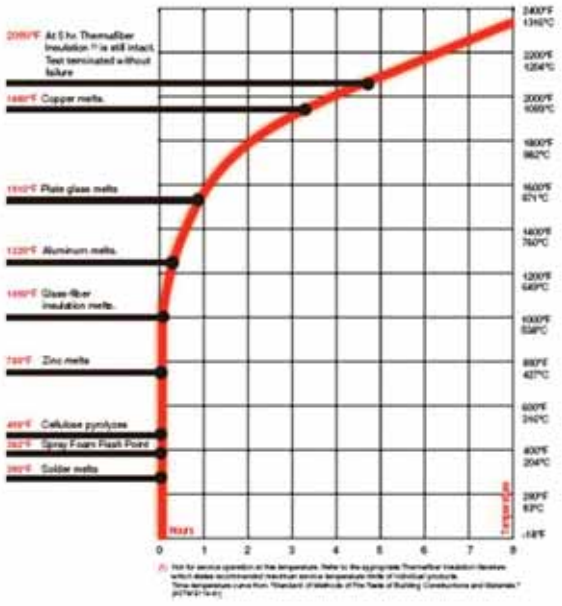


Mechanical attachment clips

2. Mechanical attachment of the mineral wool spandrel insulation – adhesive attachments and friction fit applications do not work. The adhesive service temperature ranges from minus 30 F to plus 250 F. Fire exposure temperatures based on ASTM E119 very quickly exceeds the adhesive service temperatures resulting in failure of the adhesive applied attachment to hold the spandrel insulation in place. (See Figure 2)



Fiber orientation is critical to performance



ASTM E-119 time, temperature curve.

3. Protection of the mullions with mineral wool mullion covers. Aluminum begins to melt at 1,220 F. (See Figure 4). Without the mullion protection on the fire exposure side, the aluminum mullions and transoms will soften and melt. The mechanical attachments holding the mineral wool spandrel insulation in place will no longer be held in place allowing the spandrel and safing insulation to fall out resulting in a breach of flame and hot gasses to the floor above. (See Figure 3)

4. Compression fitting and orientation of the safing insulation. The safing insulation is compression fit (typically 25%, but varies by system) between the slab edge and the inside face of the spandrel insulation. This compression fitting of the safing insulation creates a seal that maintains its integrity preventing flame and hot gasses from breaching through to the floor above.

5. Apply an approved smoke sealant material to the top of the safing insulation to provide a smoke barrier to the system. The smoke seal is commonly spray applied to the top of the safing (non fire exposure side) forming a smoke barrier with a typical L rating or leakage rating of 0. In addition, a 1 in. over spray as specified, onto the floor slab and spandrel insulation creates a continuous bond that adds to holding the safing material in place during the fire and building movement.

Since every design is different from the previous tested system, how is a design developed so that it can meet the basic code requirements?

The first step is to search for a listed system that closely resembles the curtain wall concept specified and proceed with the design listing that system. When that option doesn't work, consult with the manufacturer of listed and tested systems for assistance. Manufacturers who have been involved in testing curtain wall systems for many years have extensive files and research on perimeter fire testing of curtain walls designs. Data can be obtained as far back as the early 70's when the development of perimeter fire containment began. Many of today's manufacturers offer technical support services that may be able to

provide a solution to protect the perimeter void, meet the code requirements, and apply the 5 basic principles. An example of manufacturer's support is Insolutions™, a free service offered by Thermafiber, Inc.

Conclusion

Always follow the 5 basic principles as recommended by the International Firestop Council (IFC) for Engineering Judgments (EJ's) on Perimeter Fire Barrier Systems. These principles apply to the known factors to maximize protection at the perimeter of the building and minimize the interior spread of flame and hot gasses from floor to floor, keeping the first responders (fire fighters) and the building occupants First in Life Safety.

References:

International Code Council - International Building Code 2009, Chapter 7 Fire and Smoke Protection Features, section 714.4 Exterior Curtain wall/floor intersection and Chapter 1 Scope and Administration section 104.11 Alternate materials, design and methods of construction and equipment.

International Firestop Council – Recommended IFC Guidelines for Evaluating Firestop Systems in Engineering Judgments (EJ's) Perimeter Fire Barrier Systems.

Annual Book of ASTM Standards, Section Four Construction – E 2307-04 Standard Test Method Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-Story Test Apparatus.

Underwriters Laboratories, Inc. – Certifications Directory 2009.

Intertek Fire Resistive Directory of Listed Products and Systems.

Council on Tall Buildings and Urban Habitat Journal 2008 Issue II Building Façade or Fire Safety Façade? Daniel J. O'Connor, P.E., FSFPA, Schirmer Engineering Corporation, Deerfield, IL.

Insulation Outlook, June, 2006, Changes in Codes - Aiming to Save Lives, James Shriver, Thermafiber Inc. Wabash IN.

FS World, Fall, 2002, High-Rise Perimeter Protection Systems Reviewed, James Shriver, Thermafiber, Inc. Wabash, IN.

Loss Prevention Council, 1999, Fire Spread in Multi-story Buildings with Glazed Curtain Wall Facades.

American Architectural Manufacturers Association, AAMA, 1995 and 2002, Fire Safety in High Rise-Rise Curtain Walls.

USG Interiors, Inc., 1988, Fire Control Test Data and Case Studies.

Building Standards, July/August, 1988 Rock Wool Insulations Contain Fire in Aluminum Curtain Walls, William D. Leavitt, USG Corporation

Jim Shriver has a BS in Mechanical Engineering and over 34 years experience in the construction industry. Jim is currently Corporate Director of Technical Services for Thermafiber, Inc. (formerly USG Corp.) Contact Jim at jshriver@thermafiber.com

Industry News

Industry News

DHI Education Growing - Local chapter and in-house education enable DHI chapters and companies to bring DHI's renowned education sessions conveniently to local members and employees. Chapters/companies can purchase the instructor and student materials for many DHI training classes. Visit DHI.org for info.

GANA Appoints Tech Services Coordinator - Sara Neiswanger has been named the Glass Association of North America's (GANA) technical services coordinator, a new position within the association. She also serves the Protective Glazing Council International, the Glazing Industry Code Committee (GICC) and the Glazing Industry Secretariat Committee.

Luminescent Markings – At FCIA's Education and Committee Action & Firestop Industry Conferences, the luminescent marking industry gave an educational presentation about marking egress stairwells with systems to meet the new International Fire Code Requirement for these products. FCIA members are technical experts in Effective Compartmentation, and these luminescent systems seem to be a natural fit to the zero tolerance mindset of the FCIA member firestop contractor firms.

New Life Safety Organization forms – Formed to perform research, education and advocacy for life safety systems in buildings, the group's board is actively working towards its first meeting, in the fall of 2010. Visit Lifesafetyorganization.org to learn more.

FCIA Membership Growth Continues – FCIA's 2009 President, Bill Hoos, reported that FCIA's membership has grown to over 260. "FCIA's membership growth is a reflection of the activity of the group worldwide," stated Hoos. "We've worked with FM Approvals and Underwriters Laboratories to build Contractor Quality Management System Programs, ASTM for the E 2174 and E 2393 Inspection Standards for Penetration and Joint Firestop Systems, with master specification agencies, NFPA and ICC to create better quality firestop systems designs, installations, inspection and maintenance for fire and life safety." Visit FCIA.org for more info.

FCIA in the Middle East – The March 2009 FCIA Firestop Symposium in Dubai went so well, that UL followed up with a "Total Fire Containment Solutions Symposium." V Jagdish and Sumit Kumar from UL India, plus speakers from the FCIA/UL Total Fire Protection Systems and Compartmentation Symposiums, brought industry knowledge to attendees in Dubai. The FCIA Education Program and UL DRI Exams were administered to 10 individuals.

Delivering the keynote address, Jabel Ali Free Zone Authority's Nutankumar Manatowar said, "Total fire containment through passive fire protection is the responsibility of everyone…the consultants, contractor-installers, manufacturers, facility managers and authorities."

The gratifying part of the Middle East FCIA Education Program was the recognition of several initiatives by FCIA's boards, past and present, who have reached out to other compartmentation industry partners to help make our industry better.

FCIA started its compartmentation initiatives with the Door and Hardware Institute's leadership, and continues to work together with DHI's Bill Johnson and Jerry Heppes. We've also grown our relationships with the rolling door group, DASMA; fire damper leaders such as Greenheck and Ruskin; fire-rated glazing firms like Technical Glass Products and Pilkington; concrete groups and gypsum industries.

Driving the proper Design, Installation, Inspection and Maintenance of Firestop Systems – while working with the other compartmentation features to build standards for quality for each component – means our industry can say it's reliable with confidence.

Code Corner

ICC CTC Meets – The International Code Council's (ICC) Code Technology Committee met this spring to discuss issues related to balanced fire protection, height and area, among many other topics in preparation for the code hearings in Baltimore, October/November 2009. At the April meeting, it was reported by features committee co-chair, Dave Collins, FAIA, that the study of height and area in buildings is not able to move forward at this time, and a recommendation was made to disband the study. "There is little the committee can do to effect change, because it cannot find data to relate to improved safety, with the limited resources available. We recommend that the study group be terminated," said Collins. According to Collins, the group wants to provide a white paper, which will provide a basis for further research regarding fire flow concept and other topics. "We do have a history of why we've been where…but need good research to show why heights and areas are conservative or liberal to base the decisions to change the height and area tables in the code," he said.

ICC CTC chair Heilstedt added, "Thanks to California State Fire Marshal Kate Dargan and Dave Collins

for working on this important effort….we are a starting point for the next group."

ICC 2012 Code Development - The ICC 2009/2010 Code Cycle will result in the 2012 International Family of Codes in the U.S. FCIA and many other organizations participated in the code development hearings, Baltimore, Oct. 23-Nov.11, 2009. The process is open to all. Proposals are presented, debated by attendees at the hearings, and then voted APPROVED, DISAPPROVED, by the committee. If no public comment is received, the proposal becomes part of the 2012 International Family of Codes.

FCIA Code Changes - William E. Koffel, Koffel Associates, Inc., representing FCIA, submitted new text to several sections of the International Codes. Key proposals FCIA is following include:

In ADM12–09/10), IBC 107.2.6 (New), a requirement for Fire Resistance Designs from Approved Sources approved prior to start of firestop installation was DISAPPROVED. This simple action for contractors to submit UL, or other laboratory tested systems, would provide a big boost for professionalism in firestopping, fire and life safety for the life of the building.

In FS 1, Sara Rice, representing herself proposed renaming Chapter 7 from "Fire and Smoke Protection Features" to "Construction of Horizontal and Vertical Assemblies." This was DISAPPROVED. FCIA spoke against the proposal, as FCIA was the proponent that changed the title to reflect both fire and smoke.

In FS4–09/10 703.4 (New) the International Firestop Council proposed that "the fire resistance rating of a building element, component or assembly shall be established without the use of automatic sprinklers or any other fire suppression system being incorporated as part of the assembly tested in accordance with the fire exposure, procedures, and acceptance criteria specified in ASTM E119 or UL 263." This was APPROVED AS SUBMITTED. This generated support from the Illinois Department of Public Health, National Association of State Fire Marshals, who supported our collaborative industry debate that a fire protection feature must first function on it's own, as a fire resistance rated element, to be considered a fire resistance rated element.

In FS 7, Valerie Loper from the City of Las Vegas, proposed letter height and strike size for marking fire or smoke barrier walls required by code. It was APPROVED AS MODIFIED.

In FS 31, Rick Thornberry recommended in 707.8 that Continuity of Joints in horizontal fire barriers extends to the exterior walls, which was APPROVED AS SUBMITTED.

In FS33–09/10 - 707.8 Proposed language to clarify that the same requirement to protect the joint of a fire barrier and the underside of the floor also applies to the joint of a fire barrier and a vertical exterior wall intersection was APPROVED AS SUBMITTED.

FS 51, the ICC Code Technology Committee Vertical Openings Group submitted many definitions, and cleared up issues in Chapter 7, with numerous items … all generated through consensus of FCIA, International Firestop Council, National Concrete Masonry Association, and others. APPROVED AS SUBMITTED.

FS72–09/10, 713.2 (New) attempted to add that contractor qualifications be required in buildings having occupied floors located more than 75 ft (22,860 mm) above the lowest level of fire department vehicle access, through-penetration firestop systems shall be installed by contractors that are approved or qualified for such installations under programs administered by approved agencies, such as FM Approvals or Underwriters Laboratories. Alternative proposals under **FS73–09/10** scopes the requirement to buildings assigned an Occupancy Category of III or IV in accordance with Table, 1604.5. **FS 85 and FS 86 are similar**, but pertain to joints using the same concepts as FS 72 and FS 73. There were several questions from the committee on FS 72, all pointing towards a positive outcome. The tie was broken by the chair, and it was DISAPPROVED 8-7.

Firestop Engineering judgments were debated in **FS74–09/10, 713.2.1 Alternative Methods**. Where the configuration of a penetrating item or group of items is such that listed penetration firestop system tested in accordance with ASTM E 814 or UL 1479 is determined to be non-existent and reconfiguration of the penetrations or fire-resistance-rated assembly is determined to be impractical or impossible, alternative methods for maintaining the integrity of the required fire–resistance rating of the assembly shall be permitted to be established by several methods or procedures. The same type of change was also in **FS83–09/10, section 713.4.2.3, for Joints**. Both were DISAPPROVED.

In FS 77, UL submitted a proposal to define the L-rating & add to test of 713.5 & 714.6 for smoke barrier leakage, which was APPROVED AS MODIFIED.

In S128–09/10, buildings having occupied floors located more than 75 ft (22,860 mm) above the lowest level of fire department vehicle access, special inspections for through penetrations, membrane penetration firestops, fire resistant joint systems, and perimeter fire barrier systems of the types specified in Sections 713.3.1.2, 713.4.1.2, 714.3 and 714.4 shall be in accordance with Sections 1704.15.1 or 1704.15.2., with new 2009 versions of **standards ASTM E 2174-09** Standard Practice for On-Site In-

spection of Installed Fire Stops and **ASTM E 2393-09** Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barrier. This was APPROVED AS MODIFIED.

FS84–09/10 In 714.2 (New), a very important section on installation, there is no real statement that communicates the firestopping objective. Joint systems are not systems until they've been installed in accordance with the listed system from an approved source such as Underwriter's Laboratories, FM Approvals, Intertek and others. Similar language already exists in the Code for through penetration firestop systems. This was APPROVED AS SUBMITTED.

Several Code Proposals from the International Firestop Council regarding grease and air ducts were DISAPPROVED.

In G118, the North American Insulation Manufacturers Association's Tony Crimi submitted a proposal to restore Table 302.3.2 from the 2003 IBC, but retain the modified text of section 508, essentially bringing the required separation of occupancy table back to historical levels of protection in the code. G118 was APPROVED AS SUBMITTED. FCIA's Code Consultant Bill Koffel wrote the supporting statement on the FCIA and IFC's behalf in 2006.

Additionally, in G119, the Required Separation of Occupancies, (Hours), Occupancy Table 508.4, confusion has existed as to why there are fire partitions to separate dwelling units and sleeping units in Groups R-1 and R-2 when there is no need to separate Group R occupancies. Similar to the required separation between the dwelling unit and a garage, the additional language will clarify that the requirements of Sections 709.1 and 712.3 still apply. This was APPROVED AS MODIFIED.

Sprinkler provision remains in next International Residential Code - The International Code Council (ICC) Residential Building Code Committee voted to retain the provision for residential sprinklers in new one- and two-family homes in the next edition of the International Residential Code (IRC). The 2009 IRC included this provision for the first time. Proposals were then submitted to remove the requirement for the next edition and were DISAPPROVED. Residential sprinklers have been required in NFPA 1, Fire Code®; NFPA 101®, Life Safety Code®; and NFPA 5000®, Building Construction and Safety Code® since the 2006 editions. Visit NFPA.org or ICCSafe.org for more information on both code development processes.

There were a lot more code changes focusing on fire safety, fire code, egress, structural, height and area, as well as occupancy separations from various organizations. To see what's what, download the 2,700-page document, use the PDF search to find code changes by person, organization, or section, then check out the Results of the Hearings, all posted at http://www.iccsafe.org/cs/codes/2009-10cycle/ProposedChanges.html.

Life Safety Digest 2010 Industry Calendar

March 17 to 21
International Concrete Exposition (ICON Expo) and NCMA Convention
San Antonio, TX

April 12 to 14
International Firestop Council, Tampa area

April 19 to 24
AWCI's Convention & Intex Expo 2010
Denver, CO

April 25 to May 2
DHI's National School, Lansdowne, VA

April 27 to 30
FCIA Education & Committee Action Conference, San Francisco

May 12 to 14
CONSTRUCT2010, CSI Convention, Philadelphia

May 14 to 23
ICC Final Action Hearings, Dallas
(Visit iccsafe.org for schedule)

May 26 to 30
Construction Specifications Canada, Saskatoon

June 7 to 10
NFPA Conference & Expo, Las Vegas

June 10 to 12
AIA National Convention, Miami

June 23 to 26
Royal Architectural Institute of Canada, Saskatoon, Saskatchewan

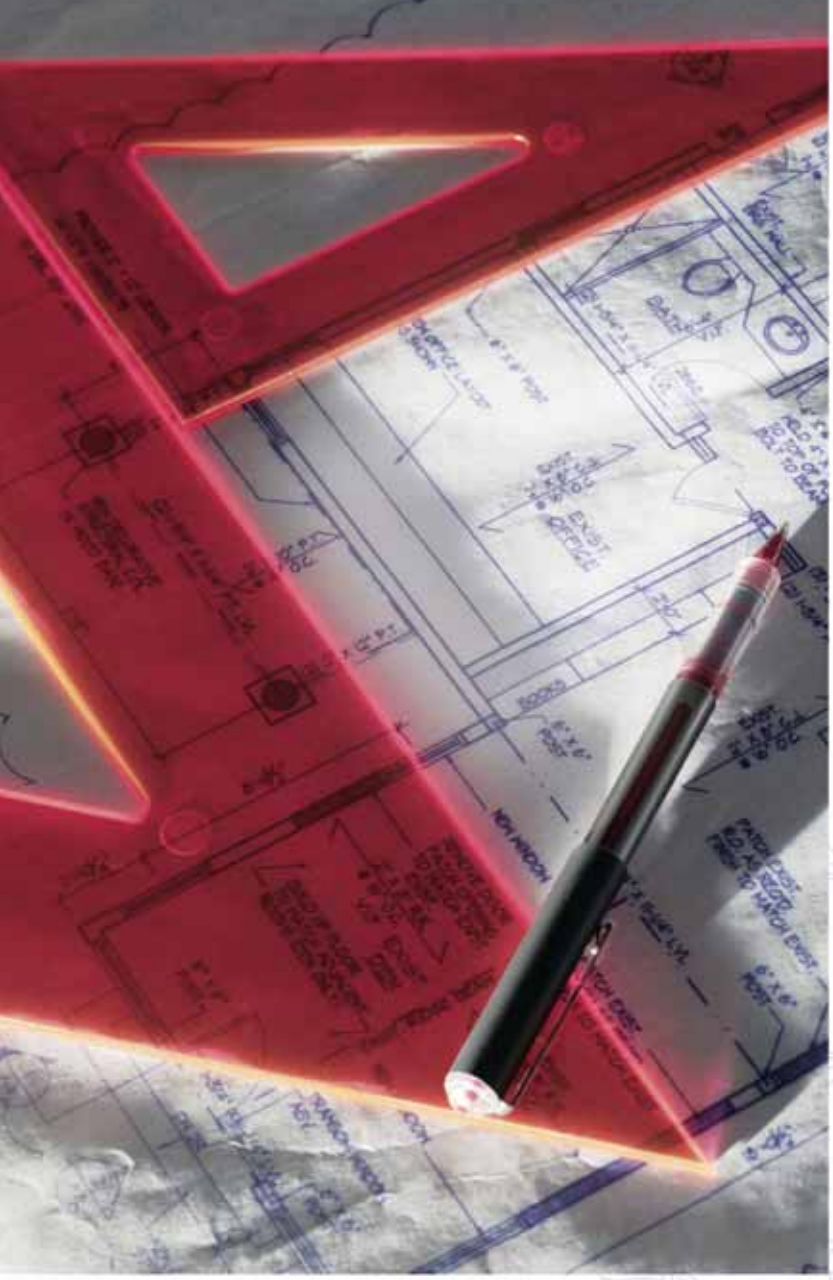
June 27 to 29
BOMA Annual Conference, Los Angeles

Oct. 25 to Nov. 1
ICC Annual Conference and Final Action Hearings, Charlotte
(Visit iccsafe.org for schedule)

Sept. 14 to 23
DHI's 35th Annual Conference & Exposition, Orlando

Oct. 3 to 8
Society of Fire Protection Engineers Annual Meeting, New Orleans

Nov. 9 to 12
FCIA Firestop Industry Conference & Trade Show, Phoenix



Wrap It Up

Specify FyreWrap® Elite™1.5 Duct Insulation, the innovative alternative to gypsum board enclosures.

A FyreWrap® fire-rated duct insulation system lets you wrap up your project in less time at lower cost. This lightweight, flexible material minimizes labor and installation time and saves valuable building space. FyreWrap Elite1.5 Duct Insulation offers superior fire protection and design flexibility including:

- ONE product for all fire rated duct wrap applications (two hour ratings)
- Complies with 2006 IMC and UMC for grease duct enclosures with a two layer system
- Single layer system for ventilation air ducts
- Thin, lightweight, flexible blanket form allows easy installation
- Saves space when compared to traditional gypsum shaft enclosures
- Utilizes high temperature biosoluble insulation

A FyreWrap product specification in several formats is available at *www.arcat.com;* search using keywords Unifrax, FyreWrap, or *www.unifrax.com*. For additional information on FyreWrap Elite 1.5 or other products, certifications, code compliance, installation instructions or drawings, contact Unifrax Corporate Headquarters USA at 716-278-3888.

FyreWrap
Fire Protection Materials

UNIFRAX

www.unifrax.com

Learn the FIRE Safe Facts ... BEFORE you design!

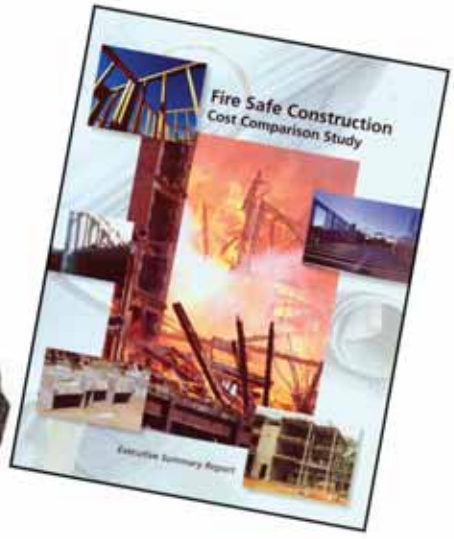
NEW
Independent
Research
Documents
Real Costs!

Fire Safety Construction Advisory Council
www.firesafeconstruction.org

To obtain a printed copy of this
20-page Executive Research Summary,
call: 1-847-297-6704
or for a **FREE downloadable copy**,
visit **www.firesafeconstruction.org**

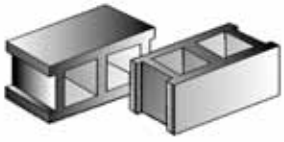
The Fire Safety Construction Advisory Councils of the midwest recently commissioned an independent and extraordinarily revealing study evaluating construction costs utilizing wood framing, light gauge steel framing and non-combustible concrete construction.

Using a four story building model with two different layout considerations, the study addresses costs in 3 cities in Illinois & Indiana.



The FACT is...
You can afford a safer building. **Masonry with Precast Flooring & Roofing** results in a **3% savings** in initial cost when compared to wood framing..

Fire Safe Construction saves substantially more in the long run.



Illinois Concrete Products Association

Calumet Flexicore
(219)932-3340

Masonry Advisory Council
Masonry Advisory Council
847-297-6704

Containing costs like containing fire, is a GOOD THING